

Linux Standard Base Languages Specification 3.2

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LSB Languages Specification

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Foreword

This is version 3.2 of the LSB Languages specification. This version is a preliminary version for review only. Conclusion of work on this version will result in version 3.2 of the LSB Languages specification.

Implementations may not claim conformance to this version.

Introduction

The LSB Languages specification defines the runtime language components that are required to be present on a conforming system.

This document should be used in conjunction with the documents it references. Information referenced in this way is as much a part of this document as is the information explicitly included here.

I Introductory Elements

1 Scope

The LSB Languages specification defines components for runtime languages which are found on an LSB conforming system.

2 Normative References

The specifications listed below are referenced in whole or in part by the LSB Languages specification. Such references may be normative or informative; a reference to specification shall only be considered normative if it is explicitly cited as such. The LSB Languages specification may make normative references to a portion of these specifications (that is, to define a specific function or group of functions); in such cases, only the explicitly referenced portion of the specification is to be considered normative.

Table 2-1 Informative References

Name	Title	URL
Perl Core Modules	Perl 5.8.8 Core Modules	http://perldoc.perl.org/5.8.8/index-modules-A.html
Perl Functions	Perl 5.8.8 Functions	http://perldoc.perl.org/5.8.8/perlfunc.html
Perl Language Reference	Perl 5.8.8 Language Reference	http://perldoc.perl.org/5.8.8/index-language.html
Perl Manual	Perl 5.8.8 Manual Page	http://perldoc.perl.org/5.8.8/perlrun.html
Perl Operators	Perl 5.8.8 Operators and Precedence	http://perldoc.perl.org/5.8.8/perlop.html
Perl Syntax	Perl 5.8.8 Syntax	http://perldoc.perl.org/5.8.8/perlsyn.html
Python Library Reference	Python Library Reference Release 2.4.2	http://www.python.org/doc/2.4.2/lib/lib.html
Python Reference Manual	Python Reference Manual Release 2.4.2	http://www.python.org/doc/2.4.2/ref/ref.html

3 Requirements

This specification describes runtime language interpreters which shall be found in specified locations. It also defines a number of runtime modules which shall be in an implementation-defined directory which the interpreters shall search by default.

4 Definitions

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

can

be able to; there is a possibility of; it is possible to

cannot

be unable to; there is no possibility of; it is not possible to

may

is permitted; is allowed; is permissible

need not

it is not required that; no...is required

shall

is to; is required to; it is required that; has to; only...is permitted; it is necessary

shall not

is not allowed [permitted] [acceptable] [permissible]; is required to be not; is required that...be not; is not to be

should

it is recommended that; ought to

should not

it is not recommended that; ought not to

5 Terminology

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

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.

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.

II Python Interpreter

6 Python Interpreter

6.1 Introduction

The Python interpreter API is described in the Python Library Reference, with the following requirements for an LSB conforming runtime.

6.2 Python Interpreter Location

The Python interpreter binary, or a link to the binary, shall exist at `/usr/bin/python`.

6.3 Python Interpreter Version

The default installed Python version shall be 2.4.2 or greater. Applications can depend on the 2.4 interfaces.

6.4 Operators and Functions

Core Python operators, subroutines, and built-in functions shall be present and shall operate as defined in Python Reference Manual.

6.5 Python Modules

Certain modules are required to be present on a conforming implementation. The behavior of the modules is governed by the following specification:

Python Library Reference

The following Python Modules are required:

Table 6-1 Required Python Modules

array	audioop	binascii
bisect	cmath	codecs
collections	cPickle	crypt
cStringIO	csv	datetime
errno	exceptions	fcntl
gc	grp	heapq
hotshot	imp	itertools
locale	marshal	mmap
operator	os	ossaudiodev
parser	posix	pwd
random	re	resource
select	signal	socket
string	sys	syslog
termios	thread	time
unicodedata	weakref	zipimport

zlib		
------	--	--

6.6 Python Interpreter Command

This section contains a description of the `python` command.

PYTHON

Name

`python` – an interpreted, interactive, object-oriented programming language

Synopsis

```
python [-d ] [-E ] [-h ] [-i ] [ -m module-name ] [-O ] [ -Q argument ] [-S ] [-t ] [-u ] [-v ] [-V ] [ -W argument ] [-x ] [ -c command | script | - ] [arguments]
```

DESCRIPTION

Python is an interpreted, interactive, object-oriented programming language that combines remarkable power with very clear syntax. For an introduction to programming in Python you are referred to the Python Tutorial. The Python Library Reference documents built-in and standard types, constants, functions and modules. Finally, the Python Reference Manual describes the syntax and semantics of the core language in (perhaps too) much detail. (These documents may be located via the INTERNET RESOURCES below; they may be installed on your system as well.)

Python's basic power can be extended with your own modules written in C or C++. On most systems such modules may be dynamically loaded. Python is also adaptable as an extension language for existing applications. See the internal documentation for hints.

Documentation for installed Python modules and packages can be viewed by running the *pydoc* program.

COMMAND LINE OPTIONS

-c command

Specify the command to execute (see next section). This terminates the option list (following options are passed as arguments to the command).

-d

Turn on parser debugging output (for wizards only, depending on compilation options).

-E

Ignore environment variables like PYTHONPATH and PYTHONHOME that modify the behavior of the interpreter.

-h

Prints the usage for the interpreter executable and exits.

-i

When a script is passed as first argument or the *-c* option is used, enter interactive mode after executing the script or the command. It does not read the \$PYTHONSTARTUP file. This can be useful to inspect global variables or a stack trace when a script raises an exception.

-m module-name

- Searches *sys.path* for the named module and runs the corresponding .py file as a script.
- O
- Turn on basic optimizations. This changes the filename extension for compiled (bytecode) files from .pyc to .pyo. Given twice, causes docstrings to be discarded.
- Q *argument*
- Division control; see PEP 238. The argument must be one of "old" (the default, int/int and long/long return an int or long), "new" (new division semantics, i.e. int/int and long/long returns a float), "warn" (old division semantics with a warning for int/int and long/long), or "warnall" (old division semantics with a warning for all use of the division operator). For a use of "warnall", see the Tools/scripts/fixdiv.py script.
- S
- Disable the import of the module *site* and the site-dependent manipulations of *sys.path* that it entails.
- t
- Issue a warning when a source file mixes tabs and spaces for indentation in a way that makes it depend on the worth of a tab expressed in spaces. Issue an error when the option is given twice.
- u
- Force stdin, stdout and stderr to be totally unbuffered. On systems where it matters, also put stdin, stdout and stderr in binary mode. Note that there is internal buffering in *xreadlines()*, *readlines()* and file-object iterators ("for line in *sys.stdin*") which is not influenced by this option. To work around this, you will want to use "*sys.stdin.readline()*" inside a "while 1:" loop.
- v
- Print a message each time a module is initialized, showing the place (filename or built-in module) from which it is loaded. When given twice, print a message for each file that is checked for when searching for a module. Also provides information on module cleanup at exit.
- V
- Prints the Python version number of the executable and exits.
- w *argument*
- Warning control. Python sometimes prints warning message to *sys.stderr*. A typical warning message has the following form: *file:line: category: message*. By default, each warning is printed once for each source line where it occurs. This option controls how often warnings are printed. Multiple -w options may be given; when a warning matches more than one option, the action for the last matching option is performed. Invalid -w options are ignored (a warning message is printed about invalid options when the first warning is issued). Warnings can also be controlled from within a Python program using the *warnings* module.

The simplest form of *argument* is one of the following *action* strings (or a unique abbreviation): *ignore* to ignore all warnings; *default* to explicitly request the default behavior (printing each warning once per source line); *all* to print a warning each time it occurs (this may generate many messages if a warning is triggered repeatedly for the same source line, such as inside a loop); *module* to print each warning only the first time it occurs in each module; *once* to print each warning only the first time it occurs in the program; or *error* to raise an exception instead of printing a warning message.

The full form of *argument* is *action:message:category:module:line*. Here, *action* is as explained above but only applies to messages that match the remaining fields. Empty fields match all values; trailing empty fields may be omitted. The *message* field matches the start of the warning message printed; this match is case-insensitive. The *category* field matches the warning category. This must be a class name; the match test whether the actual warning category of the message is a subclass of the specified warning category. The full class name must be given. The *module* field matches the (fully-qualified) module name; this match is case-sensitive. The *line* field matches the line number, where zero matches all line numbers and is thus equivalent to an omitted line number.

-x

Skip the first line of the source. This is intended for a DOS specific hack only. Warning: the line numbers in error messages will be off by one!

INTERPRETER INTERFACE

The interpreter interface resembles that of the UNIX shell: when called with standard input connected to a tty device, it prompts for commands and executes them until an EOF is read; when called with a file name argument or with a file as standard input, it reads and executes a *script* from that file; when called with *-c command*, it executes the Python statement(s) given as *command*. Here *command* may contain multiple statements separated by newlines. Leading whitespace is significant in Python statements! In non-interactive mode, the entire input is parsed before it is executed.

If available, the script name and additional arguments thereafter are passed to the script in the Python variable *sys.argv*, which is a list of strings (you must first *import sys* to be able to access it). If no script name is given, *sys.argv[0]* is an empty string; if *-c* is used, *sys.argv[0]* contains the string *'-c'*. Note that options interpreted by the Python interpreter itself are not placed in *sys.argv*.

In interactive mode, the primary prompt is *>>>*; the second prompt (which appears when a command is not complete) is *....*. The prompts can be changed by assignment to *sys.ps1* or *sys.ps2*. The interpreter quits when it reads an EOF at a prompt. When an unhandled exception occurs, a stack trace is printed and control returns to the primary prompt; in non-interactive mode, the interpreter exits after printing the stack trace. The interrupt signal raises the *KeyboardInterrupt* exception; other UNIX signals are not caught (except that *SIGPIPE* is sometimes ignored, in favor of the *IOError* exception). Error messages are written to *stderr*.

FILES AND DIRECTORIES

These are subject to difference depending on local installation conventions; `{prefix}` and `{exec_prefix}` are installation-dependent and should be interpreted as for GNU software; they may be the same. The default for both is `/usr/local`.

`{exec_prefix}/bin/python`

Recommended location of the interpreter.

`{prefix}/lib/python<version> {exec_prefix}/lib/python<version>`

Recommended locations of the directories containing the standard modules.

`{prefix}/include/python<version> {exec_prefix}/include/python<version>`

Recommended locations of the directories containing the include files needed for developing Python extensions and embedding the interpreter.

`~/.pythonrc.py`

User-specific initialization file loaded by the `user` module; not used by default or by most applications.

ENVIRONMENT VARIABLES

PYTHONHOME

Change the location of the standard Python libraries. By default, the libraries are searched in `{prefix}/lib/python<version>` and `{exec_prefix}/lib/python<version>`, where `{prefix}` and `{exec_prefix}` are installation-dependent directories, both defaulting to `/usr/local`. When `$PYTHONHOME` is set to a single directory, its value replaces both `{prefix}` and `{exec_prefix}`. To specify different values for these, set `$PYTHONHOME` to `{prefix}:{exec_prefix}`.

PYTHONPATH

Augments the default search path for module files. The format is the same as the shell's `$PATH`: one or more directory pathnames separated by colons. Non-existent directories are silently ignored. The default search path is installation dependent, but generally begins with `{prefix}/lib/python<version>` (see `PYTHONHOME` above). The default search path is always appended to `$PYTHONPATH`. If a script argument is given, the directory containing the script is inserted in the path in front of `$PYTHONPATH`. The search path can be manipulated from within a Python program as the variable `sys.path`.

PYTHONSTARTUP

If this is the name of a readable file, the Python commands in that file are executed before the first prompt is displayed in interactive mode. The file is executed in the same name space where interactive commands are executed so that objects defined or imported in it can be used without qualification in the interactive session. You can also change the prompts `sys.ps1` and `sys.ps2` in this file.

PYTHONY2K

Set this to a non-empty string to cause the `time` module to require dates specified as strings to include 4-digit years, otherwise 2-digit years are converted based on rules described in the `time` module documentation.

PYTHONOPTIMIZE

If this is set to a non-empty string it is equivalent to specifying the `-O` option. If set to an integer, it is equivalent to specifying `-O` multiple times.

PYTHONDEBUG

If this is set to a non-empty string it is equivalent to specifying the `-d` option. If set to an integer, it is equivalent to specifying `-d` multiple times.

PYTHONINSPECT

If this is set to a non-empty string it is equivalent to specifying the `-i` option.

PYTHONUNBUFFERED

If this is set to a non-empty string it is equivalent to specifying the `-u` option.

PYTHONVERBOSE

If this is set to a non-empty string it is equivalent to specifying the `-v` option. If set to an integer, it is equivalent to specifying `-v` multiple times.

AUTHOR

The Python Software Foundation: <http://www.python.org/psf>

INTERNET RESOURCES

Main website: <http://www.python.org/> Documentation:
<http://docs.python.org/> Community website: [http://starship.python.net/Developer resources:](http://starship.python.net/Developer/resources) <http://www.python.org/dev/> FTP:
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III Perl Interpreter

7 Perl Interpreter

7.1 Introduction

The Perl interpreter API is described in the Perl Language Reference, with the following requirements for an LSB conforming runtime.

7.2 Perl Interpreter Location

The Perl interpreter binary, or a link to the binary, shall exist at `/usr/bin/perl`.

7.3 Perl Interpreter Version

The default installed Perl version shall be 5.8.X with $X \geq 8$.

7.4 Perl Operators and Functions

Core Perl operators, subroutines, and built-in functions shall be present and shall operate as defined in Perl Syntax, Perl Operators and Perl Functions.

7.5 Perl Modules

Certain modules are required to be present on a conforming implementation. The behavior of the modules is governed by the following specification:

Perl Core Modules

The following Perl Modules are required:

Table 7-1 Required Perl Modules

AnyDBM_File	Attribute::Handlers	attributes
AutoLoader	AutoSplit	autouse
base	B::Concise	B::Debug
B::Deparse	Benchmark	bigint
bignum	bigrat	blib
B::Lint	B::Showlex	B::Terse
B::Xref	bytes	Carp
Carp::Heavy	CGI	CGI::Apache
CGI::Carp	CGI::Cookie	CGI::Fast
CGI::Pretty	CGI::Push	CGI::Switch
CGI::Util	chardnames	Class::ISA
Class::Struct	constant	CPAN
CPAN::FirstTime	CPAN::Nox	Cwd
Data::Dumper	DB	DBM_Filter
DBM_Filter::compress	DBM_Filter::encode	DBM_Filter::int32
DBM_Filter::null	DBM_Filter::utf8	Devel::DProf
Devel::Peek	Devel::PPPport	Devel::SelfStubber

diagnostics	Digest	Digest::base
Digest::file	Digest::MD5	DirHandle
Dumpvalue	Encode	Encode::Alias
Encode::Byte	Encode::CJKConstants	Encode::CN
Encode::CN::HZ	Encode::Config	Encode::EBCDIC
Encode::Encoder	Encode::encoding	Encode::Encoding
Encode::Guess	Encode::JP	Encode::JP::H2Z
Encode::JP::JIS7	Encode::KR	Encode::KR::2022_KR
Encode::MIME::Header	Encode::MIME::Header: :ISO_2022_JP	Encode::Symbol
Encode::TW	Encode::Unicode	Encode::Unicode::UTF7
English	Env	Exporter
Exporter::Heavy	ExtUtils::Command	ExtUtils::Command::M M
ExtUtils::Constant	ExtUtils::Constant::Base	ExtUtils::Constant::Utils
ExtUtils::Constant::XS	ExtUtils::Embed	ExtUtils::Install
ExtUtils::Installed	ExtUtils::Liblist	ExtUtils::Liblist::Kid
ExtUtils::MakeMaker::b ytes	ExtUtils::MakeMaker::C onfig	ExtUtils::Manifest
ExtUtils::Mkbootstrap	ExtUtils::Mksymlists	ExtUtils::MM_AIX
ExtUtils::MM_Any	ExtUtils::MM_BeOS	ExtUtils::MM_DOS
ExtUtils::MM_MacOS	ExtUtils::MM_NW5	ExtUtils::MM_OS2
ExtUtils::MM_QNX	ExtUtils::MM_Unix	ExtUtils::MM_VOS
ExtUtils::MY	ExtUtils::Packlist	ExtUtils::testlib
Fatal	Fcntl	fields
File::Basename	FileCache	File::CheckTree
File::Compare	File::Copy	File::DosGlob
File::Find	File::Glob	FileHandle
File::Path	File::Spec::Epoc	File::Spec::Functions
File::Spec::Mac	File::Spec::OS2	File::Spec::Unix
File::stat	File::Temp	filetest
Filter::Simple	Filter::Util::Call	FindBin
GDBM_File	Getopt::Long	Getopt::Std
Hash::Util	I18N::Collate	I18N::Langinfo
I18N::LangTags	I18N::LangTags::Detect	I18N::LangTags::List
if	integer	IO

IO::Dir	IO::File	IO::Handle
IO::Pipe	IO::Poll	IO::Seekable
IO::Select	IO::Socket	IO::Socket::INET
IO::Socket::UNIX	IPC::Open2	IPC::Open3
IPC::SysV	IPC::SysV::Msg	IPC::SysV::Semaphore
less	List::Util	List::Util::Scalar
locale	Locale::Constants	Locale::Country
Locale::Currency	Locale::Language	Locale::Maketext
Locale::Maketext::Guts	Locale::Maketext::GutsLoader	Locale::Script
Math::BigFloat	Math::BigFloat::Trace	Math::BigInt
Math::BigInt::Calc	Math::BigInt::CalcEmu	Math::BigInt::Trace
Math::BigRat	Math::Complex	Math::Trig
Memoize	Memoize::AnyDBM_File	Memoize::Expire
Memoize::ExpireFile	Memoize::ExpireTest	
Memoize::SDBM_File	Memoize::Storable	MIME::Base64
MIME::Base64::QuotedPrint	Net::Cmd	Net::Config
Net::Domain	Net::FTP	Net::FTP::A
Net::FTP::dataconn	Net::FTP::E	Net::FTP::I
Net::FTP::L	Net::hostent	Net::netent
Net::Netrc	Net::NNTP	Net::Ping
Net::POP3	Net::protoent	Net::servent
Net::SMTP	Net::Time	NEXT
O	Opcode	Opcode::ops
Opcode::Safe	open	overload
PerlIO	PerlIO::encoding	PerlIO::scalar
PerlIO::via	PerlIO::via::QuotedPrint	Pod::Checker
Pod::Find	Pod::Functions	Pod::Html
Pod::InputObjects	Pod::LaTeX	Pod::Man
Pod::ParseLink	Pod::Parser	Pod::ParseUtils
Pod::Perldoc	Pod::Perldoc::BaseTo	Pod::Perldoc::GetOptsOO
Pod::Perldoc::ToChecker	Pod::Perldoc::ToMan	Pod::Perldoc::ToNroff

Pod::Perldoc::ToPod	Pod::Perldoc::ToRtf	Pod::Perldoc::ToText
Pod::Perldoc::ToTk	Pod::Perldoc::ToXml	Pod::Plainer
Pod::PlainText	Pod::Select	Pod::Text
Pod::Text::Color	Pod::Text::Overstrike	Pod::Text::Termcap
Pod::Usage	POSIX	re
SDBM_File	Search::Dict	SelectSaver
SelfLoader	Shell	sigtrap
Socket	sort	Storable
strict	subs	Switch
Symbol	Sys::Hostname	Sys::Syslog
Term::ANSIColor	Term::Cap	Term::Complete
Term::ReadLine	Test	Test::Builder
Test::Builder::Module	Test::Builder::Tester	Test::Builder::Tester::Color
Test::Harness	Test::Harness::Assert	Test::Harness::Iterator
Test::Harness::Point	Test::Harness::Straps	Test::More
Test::Simple	Text::Abbrev	Text::Balanced
Text::ParseWords	Text::Soundex	Text::Tabs
Text::Wrap	Tie::Array	Tie::File
Tie::Handle	Tie::Hash	Tie::Memoize
Tie::RefHash	Tie::Scalar	Tie::SubstrHash
Time::gmtime	Time::HiRes	Time::Local
Time::localtime	Time::tm	Unicode::Collate
Unicode::Normalize	Unicode::UCD	UNIVERSAL
User::grent	User::pwent	utf8
warnings	warnings::register	XS::APItest
XS::Typemap		

7.6 Perl Interpreter Command

The `perl` command is described in Perl Manual.

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