CAE Specification

System Interface Definitions, Issue 5

The Open Group

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Contents

List of Tables

Preface

The Open Group

The Open Group is an international open systems organisation that is leading the way in creating the infrastructure needed for the development of network-centric computing and the information superhighway. Formed in 1996 by the merger of the X/Open Company and the Open Software Foundation, The Open Group is supported by most of the world's largest user organisations, information systems vendors and software suppliers. By combining the strengths of open systems specifications and a proven branding scheme with collaborative technology development and advanced research, The Open Group is well positioned to assist user organisations, vendors and suppliers in the development and implementation of products supporting the adoption and proliferation of open systems.

With more than 300 member companies, The Open Group helps the IT industry to advance technologically while managing the change caused by innovation. It does this by:

- consolidating, prioritising and communicating customer requirements to vendors
- conducting research and development with industry, academia and government agencies to deliver innovation and economy through projects associated with its Research Institute
- managing cost-effective development efforts that accelerate consistent multi-vendor deployment of technology in response to customer requirements
- adopting, integrating and publishing industry standard specifications that provide an essential set of blueprints for building open information systems and integrating new technology as it becomes available
- licensing and promoting the X/Open brand that designates vendor products which conform to X/Open Product Standards
- promoting the benefits of open systems to customers, vendors and the public.

The Open Group operates in all phases of the open systems technology lifecycle including innovation, market adoption, product development and proliferation. Presently, it focuses on seven strategic areas: open systems application platform development, architecture, distributed systems management, interoperability, distributed computing environment, security, and the information superhighway. The Open Group is also responsible for the management of the UNIX trade mark on behalf of the industry.

The X/Open Process

This description is used to cover the whole Process developed and evolved by X/Open. It includes the identification of requirements for open systems, development of CAE and Preliminary Specifications through an industry consensus review and adoption procedure (in parallel with formal standards work), and the development of tests and conformance criteria.

This leads to the preparation of a Product Standard which is the name used for the documentation that records the conformance requirements (and other information) to which a vendor may register a product. There are currently two forms of Product Standard, namely the Profile Definition and the Component Definition, although these will eventually be merged into one.

The X/Open brand logo is used by vendors to demonstrate that their products conform to the relevant Product Standard. By use of the X/Open brand they guarantee, through the X/Open Trade Mark Licence Agreement (TMLA), to maintain their products in conformance with the Product Standard so that the product works, will continue to work, and that any problems will be fixed by the vendor.

Open Group Publications

The Open Group publishes a wide range of technical literature, the main part of which is focused on specification development and product documentation, but which also includes Guides, Snapshots, Technical Studies, Branding and Testing documentation, industry surveys and business titles.

There are several types of specification:

- *CAE Specifications*

  CAE (Common Applications Environment) Specifications are the stable specifications that form the basis for our product standards, which are used to develop X/Open branded systems. These specifications are intended to be used widely within the industry for product development and procurement purposes.

  Anyone developing products that implement a CAE Specification can enjoy the benefits of a single, widely supported industry standard. In addition, they can demonstrate product compliance through the X/Open brand. CAE Specifications are published as soon as they are developed, so enabling vendors to proceed with development of conformant products without delay.

- *Preliminary Specifications*

  Preliminary Specifications usually address an emerging area of technology and consequently are not yet supported by multiple sources of stable conformant implementations. They are published for the purpose of validation through implementation of products. A Preliminary Specification is not a draft specification; rather, it is as stable as can be achieved, through applying The Open Group's rigorous development and review procedures.

  Preliminary Specifications are analogous to the *trial-use* standards issued by formal standards organisations, and developers are encouraged to develop products on the basis of them. However, experience through implementation work may result in significant (possibly upwardly incompatible) changes before its progression to becoming a CAE Specification. While the intent is to progress Preliminary Specifications to corresponding CAE Specifications, the ability to do so depends on consensus among Open Group members.

- *Consortium and Technology Specifications*

  The Open Group publishes specifications on behalf of industry consortia. For example, it publishes the NMF SPIRIT procurement specifications on behalf of the Network Management Forum. It also publishes Technology Specifications relating to OSF/1, DCE, OSF/Motif and CDE.

  Technology Specifications (formerly AES Specifications) are often candidates for consensus review, and may be adopted as CAE Specifications, in which case the relevant Technology Specification is superseded by a CAE Specification.

In addition, The Open Group publishes:

- *Product Documentation*

  This includes product documentation — programmer's guides, user manuals, and so on — relating to the Pre-structured Technology Projects (PSTs), such as DCE and CDE. It also includes the Single UNIX Documentation, designed for use as common product documentation for the whole industry.

- *Guides*

  These provide information that is useful in the evaluation, procurement, development or management of open systems, particularly those that relate to the CAE Specifications. The Open Group Guides are advisory, not normative, and should not be referenced for purposes of specifying or claiming conformance to a Product Standard.

- *Technical Studies*

  Technical Studies present results of analyses performed on subjects of interest in areas relevant to The Open Group's Technical Programme. They are intended to communicate the findings to the outside world so as to stimulate discussion and activity in other bodies and the industry in general.

- *Snapshots*

  These provide a mechanism to disseminate information on its current direction and thinking, in advance of possible development of a Specification, Guide or Technical Study. The intention is to stimulate industry debate and prototyping, and solicit feedback. A Snapshot represents the interim results of a technical activity.

Versions and Issues of Specifications

As with all *live* documents, CAE Specifications require revision to align with new developments and associated international standards. To distinguish between revised specifications which are fully backwards compatible and those which are not:

- A new *Version* indicates there is no change to the definitive information contained in the previous publication of that title, but additions/extensions are included. As such, it *replaces* the previous publication.
- A new *Issue* indicates there is substantive change to the definitive information contained in the previous publication of that title, and there may also be additions/extensions. As such, both previous and new documents are maintained as current publications.

Corrigenda

Readers should note that Corrigenda may apply to any publication. Corrigenda information is published on the World-Wide Web at **http://www.opengroup.org/public/pubs**.

Ordering Information

Full catalogue and ordering information on all Open Group publications is available on the World-Wide Web at **http://www.opengroup.org/public/pubs**.

This Specification

This specification is one of a set of CAE Specifications (see above) defining the X/Open System Interface (XSI) operating system requirements:

- System Interface Definitions, Issue 5 (this specification)
- Commands and Utilities, Issue 5 (the **XCU** specification)
- System Interfaces and Headers, Issue 5 (the **XSH** specification).

This specification provides common definitions for the **XCU** specification and the **XSH** specification, therefore readers should be familiar with this specification before using the **XCU** specification or the **XSH** specification. This specification is structured as follows:

- Chapter 1 is an introduction.
- Chapter 2 defines general terms used in this specification, the **XCU** specification and the **XSH** specification.
- Chapter 3 describes the notation used to specify file input and output formats in this specification and the **XCU** specification.
- Chapter 4 describes the Portable Character Set and the process of character set definition.
- Chapter 5 describes the syntax for defining internationalisation locales as well as the POSIX locale provided on all systems.
- Chapter 6 describes the use of environment variables for internationalisation and other purposes.
- Chapter 7 describes the syntax of pattern matching using regular expressions employed by many utilities and matched by the *regcomp*( ) and *regexec*( ) functions.
- Chapter 8 describes files and devices found on all systems.
- Chapter 9 describes the asynchronous terminal interface for many of the **XSH** specification's functions and the **XCU** specification's *stty* utility.
- Chapter 10 describes the policies for command-line argument construction and parsing.

Comprehensive references are available in the index.

Typographical Conventions

The following typographical conventions are used throughout this document:

- **Bold** font is used in text for options to commands, filenames, keywords, type names, data structures and their members.
- *Italic* strings are used for emphasis or to identify the first instance of a word requiring definition. Italics in text also denote:
  - — command operands, command option-arguments or variable names, for example, substitutable argument prototypes
  - — environment variables, which are also shown in capitals
  - — utility names
  - — external variables, such as *errno*
  - — functions; these are shown as follows: *name*( ); names without parentheses are C external variables, C function family names, utility names, command operands or command

option-arguments.

- Normal font is used for the names of constants and literals.
- The notation **<file.h>** indicates a header.
- Names surrounded by braces, for example, {ARG_MAX}, represent symbolic limits or configuration values which may be declared in appropriate headers by means of the C **#define** construct.
- The notation [EABCD] is used to identify an error value EABCD.
- Syntax, code examples and user input in interactive examples are shown in `fixed width` font. Brackets shown in this font, `[ ]`, are part of the syntax and do *not* indicate optional items. In syntax the `|` symbol is used to separate alternatives, and ellipses (`...`) are used to show that additional arguments are optional.
- **`Bold fixed width`** font is used to identify brackets that surround optional items in syntax, **`[ ]`**, and to identify system output in interactive examples.
- Variables within syntax statements are shown in *`italic fixed width font`*.
- Ranges of values are indicated with parentheses or brackets as follows:
  - (a,b) means the range of all values from a to b, including neither a nor b
  - [a,b] means the range of all values from a to b, including a and b
  - [a,b) means the range of all values from a to b, including a, but not b
  - (a,b] means the range of all values from a to b, including b, but not a.
- Shading is used to identify extensions or warnings as detailed in **Codes** on page 2.

Note: A symbolic limit beginning with POSIX is treated differently, depending on context. In a C-language header, the symbol {POSIX*string*} (where *string* may contain underscores) is represented by the C identifier _POSIX*string*, with a leading underscore required to prevent ISO C name space pollution. However, in this specification, the leading underscore is not used because this requirement does not exist for languages other than C.

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Referenced Documents

The following documents are referenced in this specification or in one of its companion specifications, CAE Specification, **Commands and Utilities, Issue 5** or CAE Specification, **System Interfaces and Headers**, **Issue 5**:

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AIX Version 3.2 For RISC System/6000, Technical Reference: Base Operating System And Extensions,1990,1992 (Part No. SC23-2382-00).

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(Reaffirmed 1989) Programming Language FORTRAN.

ANSI C
American National Standard for Information Systems: Standard X3.159-1989, Programming Language C.

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Standard for Binary Floating-Point Arithmetic.

ANSI/IEEE Std 854-1987
Standard for Radix-Independent Floating-Point Arithmetic.

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IEEE Floating Point draft report of ANSI X3J11.1 (NCEG).

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ISO 6937
ISO 6937: 1983, Information Processing — Coded Character Sets for Text Communication.

ISO 8601
ISO 8601: 1988, Data Elements and Interchange Formats — Information Interchange — Representation of Dates and Times.

ISO 8859-1
ISO 8859-1: 1987, Information Processing — 8-bit Single-byte Coded Graphic Character Sets — Part 1: Latin Alphabet No. 1.

ISO/IEC 646
ISO/IEC 646: 1991, Information Processing — ISO 7-bit Coded Character Set for Information Interchange.

ISO/IEC 1539
ISO/IEC 1539: 1991, Information Technology — Programming Languages — Fortran (technically identical to ANSI standard X3.9-1978 [FORTRAN 77]).

ISO C
: ISO/IEC 9899: 1990: Programming Languages — C, including:
Technical Corrigendum 1: 1994.
Amendment 1: 1994, Multibyte Support Extensions (MSE) for ISO C.

ISO POSIX-1
: ISO/IEC 9945-1: 1996, Information Technology — Portable Operating System Interface (POSIX) — Part 1: System Application Program Interface (API) [C Language] (identical to ANSI/IEEE Std 1003.1-1996). Incorporating ANSI/IEEE Stds 1003.1-1990, 1003.1b-1993, 1003.1c-1995 and 1003.1i-1995.

ISO POSIX-2
: ISO/IEC 9945-2: 1993, Information Technology — Portable Operating System Interface (POSIX) — Part 2: Shell and Utilities (identical to IEEE Std 1003.2-1992 as amended by IEEE Std 1003.2a-1992).

MSE working draft
: Working draft of ISO/IEC 9899: 1990/Add3: draft, Addendum 3 — Multibyte Support Extensions (MSE) as documented in the ISO Working Paper SC22/WG14/N205 dated 31 March 1992.

OSF AES
: Application Environment Specification (AES) Operating System Programming Interfaces Volume, Revision A (ISBN: 0-13-043522-8).

OSF/1
: OSF/1 Programmer's Reference, Release 1.2 (ISBN: 0-13-020579-6).

POSIX.1
: IEEE Std 1003.1-1988, Standard for Information Technology — Portable Operating System Interface (POSIX) — Part 1: System Application Program Interface (API) [C Language].

SunOS 5.3
: SunOS 5.3 STREAMS Programmer's Guide (Part No. 801-5305-10).

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: System V Interface Definition (Spring 1986 - Issue 2).

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: System Interface Definitions (1989 - 3rd Edition).

System V Release 2.0

— UNIX System V Release 2.0 Programmer's Reference Manual (April 1984 - Issue 2).

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System V Release 4.2
: Operating System API Reference, UNIX® SVR4.2 (1992) (ISBN: 0-13-017658-3).

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Guide, December 1995, XPG3-XPG4 Base Migration Guide, Version 2 (ISBN: 1-85912-156-X, G501).

XNS, Issue 5
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XCU, Issue 2
X/Open Portability Guide, Volume 1, January 1987, XVS Commands and Utilities (ISBN: 0-444-70174-5).

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X/Open Specification, 1988, 1989, February 1992, Commands and Utilities, Issue 3 (ISBN: 1-872630-36-7, C211); this specification was formerly X/Open Portability Guide, Volume 1, January 1989 XSI Commands and Utilities (ISBN: 0-13-685835-X, XO/XPG/89/002).

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