IEEE Standard for Information Technology— POSIX® Ada Language Interfaces— Part 1: Binding for System

Application Program Interface (API)— Amendment 2: Protocol-Independent Interfaces

Sponsor

Portable Applications Standards Committee
of the
IEEE Computer Society

Approved 8 December 1998

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Abstract: This standard is part of the POSIX series of standards for applications and user interfaces to open systems. It defines the Ada language bindings as package specifications and accompanying textual descriptions of the application program interface (API). This standard supports application portability at the source code level through the binding between ISO 8652:1995 (Ada) and ISO/IEC 9945-1:1996 (IEEE Std 1003.1-1996) (POSIX), as amended by IEEE P1003.1g/D6.6. Terminology and general requirements, process primitives, the process environment, files and directories, input and output primitives, device- and class-specific functions, language-specific services for Ada, system databases, synchronization, memory management, execution scheduling, clocks and timers, message passing, task management, the XTI and sockets detailed network interfaces, event management, network support functions, and protocol-specific mappings are covered. It also specifies behavior to support the binding that must be provided by the Ada compilation system.

Keywords: Ada, API, application portability, computer language bindings, information exchange, interprocess communication, networks, open systems, operating systems, portable application, POSIX, POSIX language bindings, protocol-specific, protocol-independent, real-time, sockets, thread, XTI.

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Introduction

(This introduction is not a part of IEEE Std 1003.5c-1998, IEEE Standard for Information Technology – POSIX®Ada Language Interfaces – Part 1: Binding for System Application Program Interface (API) – Amendment 2: Protocol-Independent Interfaces, but is included for information only.)

This standard is an amended version of IEEE Std 1003.5b-1996. The basic goal of this standard is to provide an Ada application program interface for the language-independent services made accessible to C-language applications programs by the interfaces defined in ISO/IEC 9945-1:1996 (IEEE Std 1003.1-1996) {2} as amended by IEEE P1003.1g {B14}.

The intent is to support portability of Ada applications via a standard binding to the services provided by a POSIX-conforming operating system. POSIX is defined by the standard C-language interfaces cited above. Therefore, much of the work in producing this standard was deciding what features of those C-language interfaces represented POSIX functionality, as opposed to C-language-specific features.

This standard provides package specifications and accompanying textual description for a set of Ada packages that represent the POSIX system. This standard also specifies behavior to support the binding that must be provided by the Ada compilation system, and further defines behavior specified as implementation defined in the Ada language standard (particularly in the area of `Text_IO`) for use in a POSIX environment.

The emphasis in POSIX is on application program portability, so the interfaces in this standard are not intended to be sufficient to implement an Ada compilation system or a POSIX shell as defined in IEEE Standard 1003.2 {B16}. For an application, the intent is that a Strictly Conforming POSIX.5 Application (one that uses only the facilities in this standard and that does not depend on implementation-defined behavior) can be ported to any Conforming Implementation of these interfaces and that the binding makes it easy to identify where a program is not strictly conforming and makes such programs easier to port.

Organization of This Standard

The standard is divided into three parts:

— Statement of scope, list of normative references, and conformance information (Section 1)

— Definitions and global concepts (Section 2)

— The various interface facilities (Sections 3 through 19)

The content of the sections parallels that of the correspondingly numbered sections of ISO/IEC 9945-1:1996 and IEEE P1003.1g/D6.6, with a few changes required to accomodate differences between the Ada and C-language interfaces.This standard

has no Section 10, since there is no Ada binding for that Section 10 (Data Interchange Formats) of ISO/IEC 9945-1:1996.

This introduction, any footnotes, notes accompanying the text, and the informative annexes are not considered part of this standard.

Related Standards Activities

Activities to extend this standard to address additional requirements can be anticipated in the future[1].

Extensions are approved as amendments or revisions to this standard, following IEEE and ISO/IEC procedures.

Anyone interested in participating in the PASC working groups addressing these issues should send his or her name, address, and phone number to the Secretary, IEEE Standards Board, Institute of Electrical and Electronics Engineers, Inc., P.O. Box 1331, 445 Hoes Lane, Piscataway, NJ 08855-1331, USA, and ask to have this information forwarded to the chair of the appropriate PASC working group. A person who is interested in participating in this work at the international level should contact his or her ISO/IEC national body.

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[1] A *Standards Status Report* that lists all current IEEE Computer Society standards projects is available from the IEEE Computer Society, 1730 Massachusetts Avenue NW, Washington, DC 20036-1903, USA; Telephone: +1 202 371-0101; FAX: +1 202 728-9614.

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IEEE Standard for Information Technology— POSIX® Ada Language Interfaces— Part 1: Binding for System Application Program Interface (API)— Amendment 2: Protocol Independent Interfaces

c

Section 1: General

1.1   Scope

This standard defines a set of system application program interfaces to operating system services. These interfaces provide access via the Ada programming language to the same operating system services for which C-language interfaces are specified in ISO/IEC 9945-1:1996 {2} [1)2)] and IEEE P1003.1g {B14}.

c

The purpose of this standard is to support application portability at the Ada source code level. This standard is intended to be used by both application developers and system implementors.

This standard is intended to be compatible with implementations of the 1995 revision to the Ada language standard (ISO/IEC 8652:1995 {1}). Fall-back approaches compatible with implementations of the original Ada language standard (ISO/IEC 8652:1987 {B5}) are also provided (see 1.3).

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1) Plain numbers in curly braces correspond to those of the normative references in 1.2. Numbers preceded by a "B" in curly braces correspond to those of the bibliography in Annex A. See 2.1 for the description of this and the other typographical conventions followed in this document.

2) A language-independent definitions of this standard was once under development, but work on that project was suspended.

c

This standard is intended to contain no specifications that conflict with "Year 2000" requirements.   ‖c

This standard comprises three major components:

— Definitions for terminology and concepts, and definitions and specifications that govern program structures, language-system interaction, and related requirements.

— Definitions of the specific Ada interfaces to the system services defined by the POSIX standards, presented in the form of Ada packages.

— Interpretations of Ada semantics with respect to the POSIX standards.

The following areas are outside the scope of this standard:

(1) User interface (shell) and commands associated with Ada program development.

(2) Ada bindings to the archive/interchange file formats for *tar* and *cpio*.

(3) Network protocols.

(4) Graphics and windowing interfaces.

(5) Database management system interfaces.

(6) Object or binary code portability.

(7) System configuration and resource availability.

(8) Interfaces to the Ada runtime system.

When the XTI Detailed Network Interface option and/or the Sockets Detailed Network Interface option are supported, then a set of DNI's (see 2.2.3.26) are also within the scope of this standard. A DNI is intended to provide access to protocol-specific features of the underlying network for highly portable applications that need access to sophisticated network features. The DNI's are based on the SPG4 XTI and 4.4 BSD socket specifications.

The following areas are outside of the scope of the DNI's:

— Interface to manipulate underlying protocol implementations

— Network management interface

— Interface to manipulate performance-specific features

— Definition for protocol address formats   ‖c

This standard describes the external characteristics and facilities that are of importance to applications developers, rather than the implementation approaches that may be employed to achieve them. Special emphasis is placed on those facilities and capabilities needed for the broad spectrum of applications.

This standard has been defined exclusively at the source code level. The objective is that a Strictly Conforming POSIX.5 Application can be compiled to execute on any conforming implementation, within the portability of the application Ada code itself.