INTERNATIONAL STANDARD

ISO/IEC 14519

IEEE Std 1003.5

Second edition
2001-12-15

Information technology — POSIX® Ada Language Interfaces — Binding for System Application Program Interface (API)

Technologies de l'information — Interfaces de langage POSIX® Ada — Boucle pour interface de programme d'application système (API)

Reference number
ISO/IEC 14519:2001(E)
IEEE
Std 1003.5, 1999 edition

Abstract: This standard is part of the POSIX ® series of standards for applications and user inter-faces 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 primaries, 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 socket detailed network inter-faces, 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.

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

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Print: ISBN 0-7381-2921-6 SH94937
PDF: ISBN 0-7381-2922-4 SS94937

International Standard ISO/IEC 14519:2001(E)

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 14519 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

This second edition cancels and replaces the first edition (ISO/IEC 14519:1999), which has been technically revised.

Annex D forms a normative part of this International Standard. Annexes A, B and C are for information only.

International Organization for Standardization/International Electrotechnical Commission
Case postale 56 • CH-1211 Genève 20 • Switzerland

IEEE Std 1003.5, 1999 Edition

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. Members of the committees serve voluntarily and without compensation. They are not necessarily members of the Institute. The standards developed within IEEE represent a consensus of the broad expertise on the subject within the Institute as well as those activities outside of IEEE that have expressed an interest in participating in the development of the standard.

Use of an IEEE Standard is wholly voluntary. The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard. Every IEEE Standard is subjected to review at least every five years for revision or reaffirmation. When a document is more than five years old and has not been reaffirmed, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE Standard.

Comments for revision of IEEE Standards are welcome from any interested party, regardless of membership affiliation with IEEE. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments.

Interpretations: Occasionally questions may arise regarding the meaning of portions of standards as they relate to specific applications. When the need for interpretations is brought to the attention of IEEE, the Institute will initiate action to prepare appropriate responses. Since IEEE Standards represent a consensus of all concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to interpretation requests except in those cases where the matter has previously received formal consideration.

Comments on standards and requests for interpretations should be addressed to:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
USA

Note: Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. The IEEE shall not be responsible for identifying patents for which a license may be required by an IEEE standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

Contents

TABLES

Introduction

(This introduction is not a part of IEEE Std 1003.5, 1999 Edition, 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.

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.

IEEE Std 1003.5-1992 was prepared by the 1003.5 Working Group, sponsored by the Technical Committee on Operating Systems and Applications Environments of the IEEE Computer Society. At the time IEEE Std 1003.5-1992 was approved the membership of the IEEE P1003.5 working group was as follows:

Technical Committee on Operating Systems and Application Environments (TCOS)

Chair:	Jehan-François Pâris

TCOS Standards Subcommittee

Chair:	Jim Isaak
Vice Chairs:	Ralph Barker
	Hal Jesperson
	Lorraine Kevra
	Pete Meier
	Andrew Twigger
Treasurer:	Peter Smith
Secretary:	Shane McCarron

P1003.5 Working Group Officials

Chair:	James P. Lonjers
	Steven Deller (1989-1991)
	Major Terrence Fong (1988-1989)
Vice Chairs:	James P. Lonjers (1990-1991)
	Major Terrence Fong (1989-1990)
	Stowe Boyd (1988-1989)
Editors:	David Emery
	Hal Jesperson
	Steven Deller (1988-1989)
Rationale Editor:	Mitch Gart
Secretary:	C. Jayne Baker
	David Emery (1988-1989)

Technical Reviewers

Ted Baker	David Emery	Jim Lonjers
Steven Deller	Mitch Gart	Jim Moore
Dennis Doubleday		Stephen Schwarm

Working Group

Ted Baker	Michael Gillam	Sue LeGrand
Stowe Boyd	Al Globus	James Lonjers
Bevin Brett	Mars Gralia	James Moore
Charles Brown	Jayne Guyse	Mark Ruddock
Robert Brown	Ken Harvey	Stephen Schwarm
Bhavesh Damania	Ruth Hirt	Michael Shapiro
Steven Deller	Jeff Hooley	Brian Sullivan
Dennis Doubleday	Michael Kjolsrud	Del Swanson
David Emery	Peter Krupp	Robert Voigt
Terry Fong	James Leathrum	Olle Wikstrom
Mitchell Gart		John Zenor

The following persons where members of the balloting group for IEEE Std 1003.5-1992.

Harold C. Adams
John S. Adams
Omar Ahmed
David Allen
Charles J. Antonelli
B. Ardary
David Athersych
Randall Atkinson
Randal J. August
Kenneth A. Austin
Carolyn J. Baker
Robert L. Baker
Ted Baker
James Baldo
Brad Balfour
Gary E. Barnes
Mitchell C. Barnhart
Randall Barron
Steven Barryte
Barbara K. Beauchamp
Gary Beerman
E. Jerome Bell
Donald Bennett
Peter A. Berggren
Mark Biggar
Robert Bismuth
Alex Blakemore
Stephen Blanchette, Jr.
Pieter Botman
Stowe Boyd
Carl Brandon
Philip Brashear
Joseph P. Brazy
Mark S. Breckenridge
Ronald F. Brender
Jim Briggs
Thomas C. Brooke
Jerry R. Brookshire
Charles O. Brown
Elizabeth B. Brown
Jane C. Bryan
Gary L. Burt
Christopher Byrnes
David Calloway
Nicholas A. Camillone
Kenneth W. Campbell
Rick Carle
David J. Carlson
Dana Carson
Jeffrey R. Carter
Jerry Cashin
H. L. Catala
Larry Chandler
Andy Cheese
James Chelini
Andrew Chung
Brad Clark
Lori A. Clarke
Norman H. Cohen
Edward Colbert
Phillippe Collard
Robert A. Conti
William M. Corwin
Mike Cossey
John Courtney
Donald Cragun
Richard A. Crawford
Jim Creegan
Phyllis Crill
John J. Cupak
Charles Dana
William H. Dashiell
David Davis
Rich DeBernardo
David DeFanti
Mike Dean
Dave Decot
Steven Deller
Jorge Diaz-Herrera
Michael B. Dillencourt
James H. Dobbins
Audrey Dorofee
Terence Dowling
Diptendu Dutta
Eugene Edelstein
Theodore F. Elbert
Richard W. Elwood
David Emery
Arny Engelson
Philip H. Enslow
William Eventoff
Gary Falacara
John H. Fauerby
Charles A. Finnell
Jeffery Fischer
Shayne Flint
Terence Fong
Edward J. Forbes, Jr.
Roy S. Freedman
Randal S. Freier
Dale J. Gaumer
Larry Gearhart
K. M. George
Gregory A. Gicca
Robert T. Goettge
Phillip Goldstein
Roger Golliver
William N. Goolsby
William J. Goulet
Mars J. Gralia
Allen L. Grau
Charles R. Grauling
Daniel Green
Tom Griest
F. Grize
Ernesto Guerrieri
Lawrence M. Gunther
R. N. Hagen
Charles Hammons
Peter A. Hansen
Sam Harbaugh
Samuel Harbison
David S. Hardin
Charles Harkey
Loren L. Hart
Thomas S. Hawker
Clark M. Hay
Ralph Hayward
John Craig Heberle
William Hefley
A. Marlow Henne
Donald C. Hill
Norman Hines
C. Michael Holloway
Jeffrey Hooley
Joseph P. Hoolihan
Tom Housman
Richard Howard
Norman R. Howes
Lynne M. Hubbs
David K. Hughes
Richard G. Hull
Jeremy James
Hal Jespersen
Darryl N. Johnson
Bruce Johnston
Alain Jouchoux
Juern Juergens
Steven Kahn
Fumimiko Kamijo
Alan Kaminsky
Ling Kan
Karl Kelley
Robert H. C. Kemp
Judy S. Kerner
James J. Keys
Paul J. King
Hans R. Klay
Kenneth Kloss
Robert Knighten
Joseph B. Kolb
John C. Krasnowski
Lak Ming Lam
Rudolf C. Landwehr
Charles F. Lanman

Gary Lauther
Patricia K. Lawlis
Scott A. Leschke
M. Levitz
Stephen H. Levy
F. C. Lim
Timothy E. Lindquist
J. J. Logan
James P. Lonjers
Warren E. Loper
Mark Loveland
George A. Ludgate
Sonny Lundahl
Wesley Mackey
Austin J. Maher
James Maloney
Roger Martin
Robert Mathis
Fred Maymir-Ducharme
Catherine McDonald
Robert L. McGarvey
Daniel L. McNamee
Robert McWhirter
Nancy R. Mead
Geoff Mendal
Jay Michael
Gary W. Miller
Robert E. Miller
Judah Mogilensky
Al Mok
Charles S. Mooney
James D. Mooney
Freeman Moore
James W. Moore
Jerry A. Moore
John I. Moore, Jr.
Duncan Morrill
M. W. Morron
Gary Mrenak
David G. Mullens
Richard E. Nesee
Sai Lun Ng
Daniel Nissen
Karl Nyberg
James O'Day
Evelyn Obaid
Patricia Oberndorf
Kurt M. Olender
S. Ron Oliver
James K. Parrish
Thomas Parrish
Offer Pazy
Walt Penney
Guido Persch
Flavio Petersen
Thomas A. Peterson
George W. Petznick
Hane W. Polzer
J. Pottmyer
Charles Pow
Eileen Quann
Paul Rabin
John Reddan
W. Scott Redmon
Gregg Reed
Carl Reinert
Judith Richardson
Richard A. Rink
Clyde Roby
C. Allan Rofer
Hyman Rosen
Jerome D. Rosen
Frederick M. Rysz
Agnes M. Sardi
Robert J. Satnik
Allen Saxton
Lorne H. Schachter
F. P. Schauer
Alfred H. Scholldorf
Ron Schroeder
Mike Schultz
W. L. Schultz
Fritz Schulz
Leonard Seagren
Richard Seibel
Lawrence H. Shafer
Michael D. Shapiro
John G. Shea
Nagy M. Shehad
Dan Shia
Thomas E. Shields
Keith Shillington
David Shochat
Stephen Schwarm
Robert Charles Shock
Jerome L. Sibol, Jr.
Lee Silverthorn
Ronald Skoog
Thomas J. Smith
Charles Snyder
Jon S. Squire
Jeff Stevenson
Brian Sullivan
Del Swanson
S. Tucker Taft
Ravi Tavakley
Donn S. Terry
John A. Thalhamer
William J. Thomas
Peter L. Thompson
James L. Troy
Roger Tubby
Mark-Rene Uchida
L. David Umbaugh
Robert B. Urling
Evelyn M. Uzzle
Frances Van Scoy
Leonard Vanek
Michael W. Vannier
Uwe Wacker
Robert N. Wagoner
Mary Wall
Stephen R. Walli
Neal Walters
Kenneth Wasmundt
William Webster
J. Richard Weger
Brian Weis
Robert Weissensee
Michael K. Welter
Stephen Wersan
Thomas Wheeler
William Whitaker
Bruce Wieand
David Willcox
David C. Willet
David Williamson
Paul A. Willis
David H. Winfield
David C. Wolfe
Paul A. Wolfgang
Michal Young
Oren Yuan
Janusz Zalewski
K. M. Zemrowski
John Zolnowsky

When the IEEE Standards Board approved IEEE Std 1003.5-1992 on 18 June 1992, it had the following membership:

Marco W. Migliaro, *Chair* **Donald C. Loughry,** *Vice Chair*

Andrew G. Salem, *Secretary*

Dennis Bodson	Donald N. Heirman	T. Don Michael*
Paul L. Borrill Clyde R. Camp	Ben C. Johnson	John L. Rankins
	Walter J. Karplus	Wallace S. Read
Donald C. Fleckenstein	Ivor N. Knight	Ronald H. Reimer
Jay Forster *	Joseph L. Koepfinger*	Gary S. Robinson
David F. Franklin	Irving Kolodny	Martin V. Schneider
Ramiro Garcia	D.N. “Jim” Logothetis	Terrance R. Whittemore
Thomas L. Hannan	Lawrence V. McCall	Donald W. Zipse

*Member Emeritus

Also included are the following nonvoting IEEE Standards Board liaisons:

Satish K. Aggarwal
James Beall
Richard B. Engleman
David E. Soffrin
Stanley Warshaw

Mary Lynne Nielsen
IEEE Standards Project Editor

IEEE Std 1003.5b-1996 was prepared by the P1003.5 working group, sponsored by the Portable Applications Standards Committee of the IEEE Computer Society. At the time IEEE Std 1003.5b-1996 was approved the membership of the P1003.5 working group was as follows:

Portable Applications Standards Committee (PASC)

Chair: Jehan-François Pâris

PASC Standards Subcommittee

Chair:	Lowell Johnson
Vice Chair:	Charles Severance
Functional Chairs:	Barry Needham
	John Spencer
	Jay Ashford
	Andrew Josey
Treasurer:	Peter Smith
Secretary:	Charles Severance

IEEE P1003.5 Working Group Officials

Chair:	James P. Lonjers (1991-1994)
	Stephen Schwarm (1995-1996)
	Ted Baker (1996-1997)
Vice Chairs:	Stephen Schwarm (1991-1995)
	Randy Greene (1995-1996)
	David Emery (1003.5 Interpretations)
Editor:	Ted Baker (P1003.5b)
Rationale Editor:	Lee Lucas
Secretary:	C. Jayne Guyse (1991-1993)
	Peter Obermayer (1994-1996)

Technical Reviewers

Ted Baker	Lee Lucas	Henry H. Robbins
Mark Faulk	Peter Obermayer	Stephen Schwarm
Ted Giering	Offer Pazy	Del Swanson
Randy Greene	Ruth A. Peek	Laurent Visconti
	Ed Posnak	

Working Group

Theodore P. (Ted) Baker	David K. Hughes	Ray Ricco
Bevin Brett	James Lonjers	Henry H. Robbins
Steven Deller	Lee Lucas	Stephen Schwarm
David Emery	Peter Obermayer	Jim Smith
Mark Faulk	James T. Oblinger	Del Swanson
Randy Greene	Offer Pazy	Laurent Visconti
C. Jayne Guyse	Ruth A. Peek	John Zenor

The following persons were members of the balloting group for IEEE Std 1003.5b-1996:

Alejandro A. Alonso	Norman R. Howes	Dave Plauger
Theodore P. Baker	David K. Hughes	Arlan Pool
Robert Barned	Judy Kerner	Henry H. Robbins
Andy Bihain	Philippe Kruchten	Stephen Schwarm
William M. Corwin	Thomas M. Kurihara	Leonard W. Seagren
Steven Deller	Arthur Licht	Robert Alan Siegel
David Emery	C. Douglass Locke	Dennis C. Stewart
Philip H. Enslow	James P. Lonjers	Alfred Strohmeier
Michael Gonzalez	Lee W. Lucas	Del Swanson
C. Jayne Guyse	Roland McGrath	Mark-René Uchida
Joe Gwinn	Paul Murdock	USENIX
Patrick Hebert	James T. Oblinger	Victor Fay-Wolfe
Steven Howell	Offer Pazy	John Zenor

When the IEEE Standards Board approved IEEE Std 1003.5b-1996 on 20 June 1996, it had the following membership:

Donald C. Loughry, *Chair* **Richard J. Holleman,** *Vice Chair*

Andrew G. Salem, *Secretary*

Gilles A. Baril	E. G. "Al" Kiener	Jose R. Ramos
Clyde R. Camp	Joseph L. Koepfinger*	Arthur K. Reilly
Joseph A. Cannatelli	Stephen R. Lambert	Ronald H. Reimer
Stephen L. Diamond	Lawrence V. McCall	Gary S. Robinson
Harold E. Epstein	Bruce McClung	Ingo Rüsch
Donald C. Fleckenstein	Marco W. Migliaro	John S. Ryan
Jay Forster *	Mary Lou Padgett	Chee Kiow Tan
Donald N. Heirman	John W. Pope	Leonard L. Tripp
Ben C. Johnson		Howard L. Wolfman

*Member Emeritus

Also included are the following nonvoting IEEE Standards Board liaisons:

Satish K. Aggarwal
Alan H. Cookson
Chester C. Taylor

Lisa S. Young
IEEE Standards Project Editor

IEEE Std 1003.5c-1998 was prepared by the P1003.5 working group, sponsored by the Portable Applications Standards Committee of the IEEE Computer Society. At the time IEEE Std 1003.5c-1998 was approved the membership of the P1003.5 working group was as follows:

PASC Standards Subcommittee

Chair:	Lowell Johnson
Vice Chair:	Joe Gwinn
Functional Chairs:	Curtis Royster
	Jason Zions
	Jay Ashford
	Andrew Josey
Secretary:	Nick Stoughton

IEEE P1003.5 Working Group Officials

Chair:	Ted Baker
Vice Chair:	Linda Harowicz
Editors:	Craig Meyer (P1003.5c Editor)

Working Group

Ted Baker	Greg Bussiere	Craig Meyer
	Linda Harowicz	

The following persons were voting members of the balloting group for IEEE Std 1003.5c-1998:

Ted Baker	Mars J. Gralia	Craig Meyer
Bob Barned	Linda Harowicz	Stephen Michell
Carl Brandon	Matthew Heaney	Howard E. Neely
Greg Bussiere	Niklas Holsti	Peter E. Obermayer
Jorge L. Diaz-Herrera	David C. Hoos	James T. Oblinger
Victor Giddings	Michael J. Kamrad	Jan Pukite
Michael Gonzalez	Mark Lundquist	Curtis Royster

The following persons were nonvoting members of the balloting group for IEEE Std 1003.5c-1998:

Robert E. Allen	Robert A. Duff	Robert C. Leif
A. Barnes	W. Douglas Findly	B. Craig Meyers
Ronald Bjornseth	Anthony Gargaro	James W. Moore
Stephen E. Blake	David Gross	Tushar Pokle
Chad Bremmon	Maretta Holden	Bill Pritchet
Vincent Celier	Harry Joiner	Michael Rohan
Hans O. Danielsson	Rush Kester	David Shochat
John Davies	Jim Kroening	Lynn Stuckey
Peter Dencker	Mark Larsen	Terry J. Westley
Guido Duerinckx		Stephen Whiting

When the IEEE Standards Board approved IEEE Std 1003.5c-1998 on 8 December 1998, it had the following membership:

Richard J. Holleman, *Chair* **Donald N. Heirman,** *Vice Chair*

Judith Gorman, *Secretary*

James H. Gurney	Jim D. Isaak	L. Bruce McClung
Satish K. Aggarwal	Lowell G. Johnson	Louis-François Pau
Clyde R. Camp	Robert Kennelly	Ronald C. Petersen
Gary R. Engman	E. G. "Al" Kiener	Gerald H. Peterson
Harold E. Epstein	Joseph L. Koepfinger*	John B. Posey
Jay Forster*	Stephen R. Lambert	Gary S. Robinson
Thomas F. Garrity	Jim Logothetis	Hans E. Weinrich
Ruben D. Garzon	Donald C. Loughry	Donald W. Zipse

*Member Emeritus

Yvette Ho Sang
IEEE Standards Project Editor

INTERNATIONAL STANDARD ISO/IEC 14519:2001(E)

Information technology—POSIX® Ada Language Interfaces—Part 1: Binding for System Application Program Interface (API)

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}.

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).

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.

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

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

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.

1.2 Normative References

The following standards contain provisions that, through references in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

{1} ISO/IEC 8652:1995[3], *Information technology—Programming languages—Ada* [Revision of first edition (ISO/IEC 8652:1987)], 15 February 1995.

{2} ISO/IEC 9945-1:1996 (IEEE Std 1003.1-1996[4]), *Information technology—Portable Operating System Interface (POSIX)—Part 1: System Application Program Interface (API) [C Language].* This edition incorporates the extensions for realtime applications (POSIX.1b, POSIX.1i) and threads (POSIX.1c).

{3} ISO/IEC 8072:1996 (CCIT X.214:1988[5]), *Information technology—Open systems interconnection—Transport service definition.*

{4} ISO/IEC 8073:1992 (CCITT X.224:1992), *Information technology—Telecommunications and information exchange between systems—Open systems interconnection— Protocol for providing the connection-mode transport service.*

{5} ISO/IEC 8208:1995, *Information technology—Data communications—X.25 Packet layer protocol for data terminal equipment.*

{6} ISO/IEC 8348:1996, *Information technology—Open systems interconnection—Network service definition.*

{7} ISO/IEC 8473-1:1994, *Information technology—Protocol for providing the connectionless-mode network service: Protocol specification.*

{8} ISO/IEC 8473-3:1995, *Information technology—Protocol for providing the connectionless-mode network service: Provision of the underlying service by an X.25 subnetwork.*

{9} ISO/IEC 8602:1995, *Information Technology—Protocol for providing the OSI connectionless-mode transport service.*

{10} ISO/IEC 8878:1992, *Information technology—Telecommunications and information exchange between systems—Use of X.25 to provide the OSI connection-mode network service.*

---

3) ISO/IEC publications can be obtained from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembé, CH-1211, Genève 20, Switzerland/Suisse (http://www.iso.ch) or from the Sales Department of the International Electrotechnical Commission, Case Postale 131, 3 rue de Varembé, CH-1211, Genève 20, Switzerland/Suisse (http://www.iec.ch/). ISO/IEC publications can also be obtained in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (http://www.ansi.org).

4) IEEE standards publications are available from the IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (http://www.standards.ieee.org).

5) CCITT documents can be obtained from the CCIT General Secretariat, International Telecommunications Union, Sales Section, Place des Nations, CH-1211, Genève 20, Switzerland/Suisse.

{11} ISO/IEC ISP 11188-3:1996, *Information Technology—International standardization profile—Common upper layer requirements—Part 3: Minimal OSI upper layer facilities.*

{12} IETF RFC 768:1980[6)], *User Datagram Protocol.*

{13} IETF RFC 791:1981, *Internet Protocol DARPA Internet Program Protocol Specification.*

{14} IETF RFC 793:1981, *Transmission Control Protocol DARPA Internet Program Protocol Specification.*

{15} IETF RFC 919:1984, *Broadcasting Internet Datagrams.*

{16} IETF RFC 922:1984, *Broadcasting Internet Datagrams in the Presence of Subnets.*

{17} IETF RFC 1006:1987, *ISO Transport Service on Top of the TCP, Version: 3.*

{18} IETF RFC 1122:1989, *Requirements for Internet Hosts—Communication Layers.*

NOTE: Abbreviations for the above standards are defined in 2.2.3.

6) IETF documents can be obtained in printed form from the Network Information Center, Network Solutions, 14200 Park Meadow Drive, Suite 200, Chantilly, VA 22021, USA, or in electronic form via FTP over the Internet from nic.ddn.mil.

