



REFERENCE

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards and Technology



FIPS PUB 119-1

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION
(Supersedes FIPS PUB 119—1985 November 8)

Ada

CATEGORY: SOFTWARE STANDARD

SUBCATEGORY: PROGRAMMING LANGUAGE

1995 MARCH 13

FIPS PUB 119-1

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Computer Systems Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20899-0001

Issued March 13, 1995



U.S. Department of Commerce

Ronald H. Brown, Secretary

Technology Administration

Mary L. Good, Under Secretary for Technology

National Institute of Standards
and Technology

Arati Prabhakar, Director

Foreword

The Federal Information Processing Standards Publication Series of the National Institute of Standards and Technology (NIST) is the official publication relating to standards and guidelines adopted and promulgated under the provisions of Section 111(d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235. These mandates have given the Secretary of Commerce and NIST important responsibilities for improving the utilization and management of computer and related telecommunications systems in the Federal Government. The NIST, through its Computer Systems Laboratory, provides leadership, technical guidance, and coordination of Government efforts in the development of standards and guidelines in these areas.

Comments concerning Federal Information Processing Standards Publications are welcomed and should be addressed to the Director, Computer Systems Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899.

James H. Burrows, Director
Computer Systems Laboratory

Abstract

This publication is a revision of FIPS PUB 119 and supersedes that document in its entirety. This publication announces the adoption of American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995, as a Federal Information Processing Standard (FIPS). American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995, specifies the form and meaning of programs written in Ada. The purpose of the standard is to promote portability of Ada programs for use on a variety of data processing systems. The standard is for use by implementors as the reference authority in developing compilers, interpreters, or other forms of high level language processors; and by other computer professionals who need to know the precise syntactic and semantic rules of the standard.

Key words: Federal Information Processing Standard (FIPS); Ada; Ada Joint Program Office; programming language standards; software; standards conformance.

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U.S. Department of Commerce
Springfield, VA 22161

Federal Information Processing Standards Publication 119-1

1995 March 13

Announcing the Standard for

Ada

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology (NIST) after approval by the Secretary of Commerce pursuant to Section 111 (d) of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235.

1. **Name of Standard.** Ada (FIPS PUB 119-1).
2. **Category of Standard.** Software Standard, Programming Language.
3. **Explanation.** This publication is a revision of FIPS PUB 119 and supersedes that document in its entirety.

This publication announces the adoption of American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995, as a Federal Information Processing Standard (FIPS). American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995, specifies the form and meaning of programs written in Ada. The purpose of the standard is to promote portability of Ada programs for use on a variety of data processing systems. The standard is for use by implementors as the reference authority in developing compilers, interpreters, or other forms of high level language processors; and by other computer professionals who need to know the precise syntactic and semantic rules of the standard.

4. **Approving Authority.** Secretary of Commerce.
5. **Maintenance Agency.** U.S. Department of Commerce, National Institute of Standards and Technology (NIST), Computer Systems Laboratory (CSL).
6. **Cross Index..** American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995.
7. **Related Documents.**
 - a. Federal ADP and Telecommunications Standards Index, U.S. General Services Administration, Information Resources Management Service, April 1994 (updated periodically).
 - b. Federal Information Resources Management Regulations (FIRMR) subpart 201.20.303, Standards, and subpart 201.39.1002, Federal Standards.
 - c. FIPS PUB 29-3, Interpretation Procedures for FIPS Software, 29 October 1992.
 - d. NBS Special Publication 500-117, Selection and Use of General-Purpose Programming Languages.
 - e. NIST, Validated Products List, (republished quarterly). Available by subscription from the National Technical Information Service (NTIS).

- f. ISO 6429: 1992(E)—Information Technology—Control Functions for Coded Character Sets.
- g. ISO 646 Information Processing—7-bit Single-Byte Coded Character Set.
- h. ISO 8859-1:1987(E)—Information Processing—8 bit Single-Byte Coded Character Sets—Part 1: Latin Alphabet No. 1.
- i. ISO 10646-1:1993 Information Technology—Universal Multiple-Octet Coded Character Set (UCS)—Part 1: Architecture and Basic Multilingual Plane.

8. Objectives. Federal standards for high level programming languages permit Federal departments and agencies to exercise more effective control over the production, management, and use of the Government's information resources. The primary objectives of Federal programming language standards are:

- to encourage more effective utilization and management of programmers by insuring that programming skills acquired on one job are transportable to other jobs, thereby reducing the cost of programmer re-training;
- to reduce the cost of program development by achieving the increased programmer productivity that is inherent in the use of high level programming languages;
- to reduce the overall software costs by making it easier and less expensive to maintain programs and to transfer programs among different computer systems, including replacement systems;
- to protect the existing software assets of the Federal Government by insuring to the maximal feasible extent that Federal programming language standards are technically sound and that subsequent revisions are compatible with the installed base.

Governmentwide attainment of the above objectives depends upon the widespread availability and use of comprehensive and precise standard language specifications.

9. Applicability.

a. Federal standards for high level programming languages should be used for computer applications that are either developed or acquired for government use. FIPS Ada is one of the high level programming language standards provided for use by all Federal departments and agencies. FIPS Ada is suitable for use in programming and any applications for which there is no specific language available specifically targeted to that application.

- b. The use of FIPS Ada is recommended for the following applications and situations:
- those involving control of real-time or parallel processes.
 - very large systems.
 - systems with requirements for very high reliability.
 - systems which are to be developed with reusable software packages.
 - when it is anticipated that the life of an application will be longer than the life of the presently utilized equipment.
 - the application or program is under constant review for updating of the specifications, and changes may result frequently.

- the application is being designed and programmed centrally for a decentralized system that employs computers of different makes, models and configurations.
- the program will or might be run on equipment other than that for which the program is initially written.
- the program is to be understood and maintained by programmers other than the original ones.
- the advantages of improved program design, debugging, documentation and intelligibility can be obtained through the use of this high level language.
- the program is or is likely to be used by organizations outside the Federal Government (i.e., State and local governments, and others).

10. Specifications. FIPS Ada specifications are the language specifications contained in American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995 standard.

The American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995 standard document specifies the form of a program written in Ada, the effect of translating and executing a program, predefined library entities that must be supplied, and detection of compilation and/or link errors.

The standard does not specify limits on the size or complexity of programs, the results when the rules of the standard fail to establish an interpretation, the means of supervisory control of programs, or the means of transforming programs for processing.

11. Implementation. The implementation of FIPS Ada involves four areas of consideration: the effective date, acquisition of Ada processors, interpretation of FIPS Ada, and validation of processors.

11.1 Effective Date. This revised standard becomes effective July 10, 1995. Ada Processors acquired for Federal use after this date should conform to FIPS PUB 119-1.

A transition period provides time for industry to produce Ada language processors conforming to the standard. The transition period begins on the effective date and ends March 1, 1997. The provisions of FIPS PUB 119-1 apply to orders placed after the effective date of this publication. If, during the transition period, a processor conforming to FIPS PUB 119-1 is not available, a processor conforming to FIPS PUB 119 may be acquired for interim use during the transition period.

This transition period is intended to give implementations that conform to FIPS PUB 119 time to make the enhancements necessary to enable conformance to FIPS PUB 119-1. No further transitional period is necessary.

11.2 Acquisition of Ada Processors. Conformance to FIPS Ada should be considered whether Ada processors are developed internally, acquired as part of an ADP system procurement, acquired by separate procurement, used under an ADP leasing arrangement, or specified for use in contracts for programming services. Recommended terminology for procurement of FIPS Ada is contained in the U.S. General Services Administration publication Federal ADP & Telecommunications Standards Index, Chapter 4 Part 1.

11.3 Interpretation of FIPS Ada. The National Institute of Standards and Technology provides for the resolution of questions (see FIPS PUB 29-3, Interpretation Procedures for FIPS Software, 29 October 1992) regarding the specifications and requirements, and issues official interpretations as needed. All questions about the interpretation of this standard should be addressed to:

Director
Computer Systems Laboratory
Attn: FIPS Ada Interpretation
National Institute of Standards and Technology
Gaithersburg, MD 20899
Voice: 301-975-2490
FAX: 301-948-6213
e-mail: dashiehl@alpha.ncsl.nist.gov

11.4 Validation of Ada Processors. Implementations of FIPS Ada shall be validated in accordance with the NIST Computer Systems Laboratory (CSL) validation procedures for FIPS Ada. Recommended procurement terminology for validation of FIPS Ada is contained in the U.S. General Services Administration (GSA) publication *Federal ADP & Telecommunications Standards Index*, Chapter 4 Part 2. This GSA publication provides terminology for three validation options: Delayed Validation, Prior Validation Testing, and Prior Validation. The agency shall select the appropriate validation option and shall specify whether a Validation Summary Report or Certificate of Validation is required. The agency shall specify appropriate time frames for validation and correction of nonconformities. The agency is advised to refer to the NIST publication *Validated Products List* for information about the validation status of Ada products. This information may be used to specify validation time frames that are not unduly restrictive of competition.

The agency shall specify the criteria used to determine whether a Validation Summary Report (VSR) or Certificate is applicable to the hardware/software environment of the Ada implementation offered. The criteria for applicability of a VSR or Certificate should be appropriate to the size and timing of the procurement. A large procurement may require that the offered version/release of the Ada implementation shall be validated in a specified hardware/software environment and that the validation shall be conducted with specified hardware/software features or parameter settings; e.g., the same parameter settings to be used in a performance benchmark. An agency with a single/license procurement may review the *Validated Products List* to determine the applicability of existing VSRs or Certificates to the agency's hardware/software environment.

Ada implementations shall be evaluated using a NIST approved test suite.

For further information contact:

Director
Computer Systems Laboratory
Attn: FIPS Ada Validation
National Institute of Standards and Technology
Gaithersburg, MD 20899
Voice: 301-975-2490
FAX: 301-948-6213
e-mail: dashiehl@alpha.ncsl.nist.gov

12. Waivers. Under certain exceptional circumstances, the heads of Federal departments and agencies may approve waivers to Federal Information Processing Standards (FIPS). The head of such agency may re-delegate such authority only to a senior official designated pursuant to section 3506(b) of Title 44, U.S. Code. Waivers shall be granted only when:

- a. Compliance with a standard would adversely affect the accomplishment of the mission of an operator of a Federal computer system, or
- b. Cause a major adverse financial impact on the operator which is not offset by Governmentwide savings.

Agency heads may act upon a written waiver request containing the information detailed above. Agency heads may also act without a written waiver request when they determine that conditions for meeting the standard cannot be met. Agency heads may approve waivers only by a written decision which explains the basis on which the agency head made the required finding(s). A copy of each such decision, with procurement sensitive classified portions clearly identified, shall be sent to: National Institute of Standards and Technology, ATTN: FIPS Waiver Decisions, Technology Building, Room B-154, Gaithersburg, MD 20899.

In addition, notice of each waiver granted and each delegation of authority to approve waivers shall be sent promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published promptly in the *Federal Register*.

When the determination on a waiver applies to the procurement of equipment and/or services, a notice of the waiver determination must be published in the *Commerce Business Daily* as a part of the notice of solicitation for offers of an acquisition or, if the waiver determination is made after that notice is published, by amendment to such notice.

A copy of the waiver, any supporting documents, the document approving the waiver and any supporting and accompanying documents, with such deletions as the agency is authorized and decides to make under 5 U.S.C. Section 552(b), shall be part of the procurement documentation and retained by the agency.

13. Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, telephone (703) 487-4650. (Sale of the included specifications document is by arrangement with the American National Standards Institute.) When ordering, refer to Federal Information Processing Standards Publication 119-1 (FIPSPUB119-1), and title. Payment may be made by check, money order, or deposit account.

U.S. Department of Commerce

National Technical Information Service

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Monday
March 13, 1995

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MARCH 13 1995
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revised standard adopts the American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995, which specifies the form and meaning of programs written in Ada.

SUMMARY: On July 11, 1994 (59 FR 35315-35317), notice was published in the Federal Register that a revision to Federal Information Processing Standard 119, Ada was being proposed for Federal use.

The written comments submitted by interested parties and other material available to the Department relevant to the revised standard was reviewed by NIST. On the basis of this review, NIST recommended that the Secretary approve the revised standard as a Federal Information Processing Standards Publication, and prepared a detailed justification document for the Secretary's review in support of that recommendation.

The detailed justification document which was presented to the Secretary is part of the public record and is available for inspection and copying in the Department's Central Reference and Records Inspection Facility, Room 6020, Herbert C. Hoover Building, 14th Street between Pennsylvania and Constitution Avenues NW., Washington, DC 20230.

The FIPS contains two sections: (1) An announcement section, which provides information concerning the applicability, implementation, and maintenance of the standard; and (2) a specifications section which deals with the technical requirements of the standard. Only the announcement section of the standard is provided in this notice.

EFFECTIVE DATE: This revised standard becomes effective July 10, 1995.

ADDRESSES: Interested parties may purchase copies of this revised standard, including the technical specifications section, from the National Technical Information Service (NTIS). Specific ordering information from NTIS for this standard is set out in the Where to Obtain Copies Section of the announcement section of the standard.

FOR FURTHER INFORMATION CONTACT: Dr. William H. Dashiell, telephone (301) 975-2490, National Institute of Standards and Technology, Gaithersburg, MD 20899.

EXECUTIVE ORDER 12866: This FIPS notice has been determined to be "not significant" for purposes of E.O. 12866.

[Docket No. 950120022-5022-01]

**RIN 0693-AB25
Approval of
Federal Information Processing
Standards Publication 119-1, Ada**

AGENCY: National Institute of Standards and Technology (NIST), Commerce.

ACTION: The purpose of this notice is to announce that the Secretary of Commerce has approved a revised standard, which will be published as FIPS Publication 119-1, Ada. This

Dated: March 7, 1995.

Samuel Kramer,
Associate Director.

**Federal Information Processing
Standards Publication 119-1**

(date)

Announcing the Standard for Ada

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4. Approving Authority. Secretary of Commerce.

5. Maintenance Agency, U.S. Department of Commerce, National Institute of Standards and Technology (NIST), Computer Systems Laboratory (CSL).

6. Cross Index. American National Standard and the International Organization for Standardization Reference Manual for the Ada Programming Language, ANSI/ISO/IEC 8652:1995.

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of such agency may re-delegate such authority only to a senior official designated pursuant to section 3506(b) of Title 44, U.S. Code. Waivers shall be granted only when:

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Agency heads may act upon a written waiver request containing the information detailed above. Agency heads may also act without a written waiver request when they determine that conditions for meeting the standard cannot be met. Agency heads may approve waivers only by a written decision which explains the basis on which the agency head made the required finding(s). A copy of each such decision, with procurement sensitive classified portions clearly identified, shall be sent to: National Institute of Standards and Technology, Attn: FIPS Waiver Decisions, technology Building, Room B-154, Gaithersburg, MD 20899.

In addition, notice of each waiver granted and each delegation of authority to approve waivers shall be sent promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published promptly in the **Federal Register**.

When the determination on a waiver applies to the procurement of equipment and/or services, a notice of the waiver determination must be published in the Commerce Business Daily as part of the notice of solicitation for offers of an acquisition or, if the waiver determination is made after that notice is published, by amendment to such notice.

A copy of the waiver, any supporting documents, the document approving the waiver and any supporting and accompanying documents, with such deletions as the agency is authorized and decides to make under 5 U.S.C. Section 552(b), shall be part of the procurement documentation and retained by the agency.

13. Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161, telephone (703) 487-4650. (Sale of the included specifications document is by arrangement with the American National Standards Institute.) When ordering, refer to Federal Information Processing Standards Publication 119 (FIPSPUB119-1), and title. Payment may be made by check, money order, or deposit account.