FIPS PUB 127-1

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION
(Supersedes FIPS PUB 127—1987 March 10)

DATABASE LANGUAGE SQL

CATEGORY: SOFTWARE STANDARD  SUBCATEGORY: DATABASE

1990 FEBRUARY 2
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(c) 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 National 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, National Computer Systems Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899.

James H. Burrows, Director
National Computer Systems Laboratory

Abstract


This publication is a revision of FIPS PUB 127 that offers new conformance alternatives, new programming language interfaces, a new integrity enhancement option, clarification and correction of existing specifications, and additional considerations for use in procurements. This revision supersedes FIPS PUB 127. It does not contain any new requirements that would make an existing conforming implementation nonconforming.

The purpose of FIPS SQL is to promote portability of database application programs and programmers among different installations. The standard is used by implementors as the reference authority in developing a FIPS conforming relational model database management system and by application programmers to help write SQL conforming applications.

Key words: ANSI standard; data manipulation language; database; database language standard; Embedded SQL; Federal Information Processing Standard (FIPS); ISO standard; module language; schema definition language; software; Structured Query Language (SQL).
Federal Information
Processing Standards Publication 127-1

1990 February 2

Announcing the Standard for

DATABASE LANGUAGE SQL

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology 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. Database Language SQL (FIPS PUB 127-1).


3. Explanation. This publication is a revision of FIPS PUB 127 and supersedes FIPS PUB 127 in its entirety. FIPS PUB 127-1 offers new conformance alternatives, new programming language interfaces, a new integrity enhancement option, clarification and correction of existing specifications, and additional considerations for use in procurements. It does not contain any new requirements that would make an existing conforming implementation nonconforming.


ANSI X3.135-1989 is a revision of ANSI X3.135-1986 that specifies syntax and semantics of SQL language interfaces for defining and accessing SQL databases. These interfaces include:

- A schema definition language, for declaring the structures and integrity constraints of a database.

- A module language, including SQL statements, for declaring the database procedures and executable statements of a specific database application. The module language specification includes language bindings for programming languages COBOL, FORTRAN, Pascal, or PL/I.

ANSI X3.135-1989 includes an addendum to ANSI X3.135-1986 that specifies an optional "integrity enhancement" feature. This feature includes referential integrity constraints, check clauses, and default clauses.

ANSI X3.135-1989 also includes various clarifications and correction of several errors known to exist in the ANSI X3.135-1986 specification. ANSI X3.168-1989 specifies embedded syntax for inserting SQL statements into application programs. It includes module language bindings for programming languages Ada or C, and specifies embedded syntax for inserting SQL statements into programming languages Ada, C, COBOL, FORTRAN, Pascal, or PL/I.

The purpose of FIPS SQL is to promote portability of database application programs and programmers among different installations. The standard is used by implementors as the reference authority in developing a FIPS conforming relational model database management system, with standard programming language interfaces to that database management system. The standard is used by application programmers to help write SQL conforming applications and by other computer professionals who need to know the precise syntactic and semantic rules of Database Language SQL.

4. Approving Authority. Secretary of Commerce.

6. Cross Index.
   a. American National Standard Database Language SQL with Integrity Enhancement, ANSI X3.135-

7. Related Documents.
   a. Federal Information Resources Management Regulation 201-39, Acquisition of Federal Information
      Processing Resources by Contracting.
   c. Federal Information Processing Standards Publication 110, Guideline for Choosing a Data Management
   d. NBS Special Publication 500-108, Guide on Data Models in the Selection and Use of Database

8. Objectives. Federal standards for database management systems 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 database management system standards are:
   - to encourage more effective utilization and management of database application programmers by
     ensuring that skills acquired on one job are transportable to other jobs, thereby reducing the cost
     of database programmer retraining.
   - to reduce overall software costs by making it easier and less expensive to maintain database
     definitions and database application programs and to transfer these definitions and programs
     among different computers and database management systems, including replacement database
     management systems.
   - to reduce the cost of software development by achieving increased database application pro-
     grammer productivity through the understanding and use of database methods employing standard
     structures and operations, standard data types, standard constraints, and standard interfaces to
     programming languages.
   - to protect the software assets of the Federal government by ensuring to the maximal feasible
     extent that Federal database management system standards are technically sound and that subse-
     quent revisions are compatible with the installed base.

Government-wide attainment of the above objectives depends upon the widespread availability and use of
comprehensive and precise standard database management system specifications.

   a. Federal standards for database management systems should be used for computer database
      applications and programs that are either developed or acquired for government use. The Database
      Language SQL is one of the database management system standards provided for use by all Federal
      departments and agencies. The Database Language SQL is suited for use in database applications that employ
      the relational data model. The relational data model is appropriate for applications requiring flexibility in the
      data structures and access paths of the database. The relational data model is desirable where there is a
      substantial need for ad hoc data manipulation by end users who are not computer professionals, in addition
      to the need for access by applications under production control.

Although this standard does not specifically address interactive database access through fourth gener-
ation languages, the SQL statements specified by this standard are appropriate for such use. This standard
may be used to define the syntax and semantics of database access from such fourth generation lan-

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Although this standard does not specifically address distributed database applications, it may be used, along with facilities for remote database access and/or distributed transaction processing, to access relational structured data at remote nodes in a distributed system.

b. The use of FIPS database languages is strongly recommended for database applications when one or more of the following situations exist:

1. It is anticipated that the life of the database application will be longer than the life of the presently utilized equipment or database management system, if any.

2. The database application is under constant review for updating of the specifications, and changes may result frequently.

3. The database application is being designed and developed centrally for a decentralized system that employs computers of different makes and models or database software acquired from a different vendor.

4. The database application will or might be run under a database management system other than that for which the database application is initially written.

5. The database application is to be understood and maintained by programmers other than the original ones.

6. The database application is or is likely to be used by organizations outside the Federal government (i.e., State and local governments, and others).

c. Nonstandard language features should be used only when the needed operation or function cannot reasonably be implemented with the standard features alone. A needed language feature not provided by the FIPS database languages should, to the extent possible, be acquired as part of an otherwise FIPS conforming database management system. Although nonstandard language features can be very useful, it should be recognized that their use may make the interchange of programs and future conversion to a revised standard or replacement database management system more difficult and costly.

d. It is recognized that programmatic requirements may be more economically and efficiently satisfied through the use of a database management system employing a different data model than those provided by the FIPS database languages or the use of a database management system that functionally conforms to a FIPS database language but does not conform to all other aspects of the FIPS. The use of any facility should be considered in the context of system life, system cost, data integrity, and the potential for data sharing.

e. Programmatic requirements may be more economically and efficiently satisfied by the use of automatic program generators or by database access through other high-level language information processing systems. However, if the final output of a program generator or high-level language system is language that accesses a relational database, then that language should conform to the conditions and specifications of SQL.

10. Specifications.

10.1 Adoption of ANSI SQL Specifications. FIPS SQL includes all provisions from ANSI X3.135-1989, Database Language SQL with Integrity Enhancement, and ANSI X3.168-1989, Database Language Embedded SQL, with the following exceptions:

a. FIPS SQL does not recognize Level 1 of ANSI SQL or partial conformance to just DDL or DML. Instead, the FIPS SQL specification is for "Full SQL conformance to level 2" as specified in section 3.4 of X3.135-1989.

b. FIPS SQL does not include PL/I language bindings, since PL/I is not a FIPS programming language.

c. FIPS SQL does not recognize conformance solely by "direct invocation of SQL data manipulation language statements" as specified in section 3.4 of X3.135-1989, because that concept is not adequately specified in ANSI SQL and implementations cannot be tested for conformance. Conformance to FIPS SQL requires a Module Language or Embedded SQL interface to one or more FIPS programming languages.

d. FIPS SQL includes a "FIPS Flagger" requirement as specified below.
10.2 FIPS Flagger. An implementation that provides additional facilities not specified by this standard shall also provide an option to flag nonconforming SQL language or conforming SQL language that may be processed in a nonconforming manner.

a. ANSI SQL allows a conforming implementation to provide facilities beyond those specified in the standard. The following paragraph appears in section 3.4 of ANSI X3.135-1989:

"A conforming implementation may provide additional facilities or options not specified by this standard. An implementation remains conforming even if it provides user options to process nonconforming SQL language or to process conforming SQL language in a nonconforming manner."

The FIPS Flagger is included in FIPS SQL in order to assist application programmers in developing portable application programs. It allows informed use of implementor extensions when they are appropriate (see paragraph 9c).

b. The FIPS Flagger is intended to effect a static check of SQL language. Normally this check is applied at syntax compilation time, but for interpreted SQL language it can be enforced when the SQL language is interpreted by the implementation. There is no requirement to detect extensions that cannot be determined until execution time.

c. An implementation need only flag SQL language that is not otherwise in error as far as that implementation is concerned. An implementation may choose to check SQL language in two steps; first through its normal syntax analyzer and secondly through the flagger. The first step produces error messages for nonstandard SQL language that the implementation cannot process or recognize. The second step produces flagger messages for nonstandard SQL language that it could process. Any such two-step process should be transparent to the end user.

d. Any SQL language that violates Format or Syntax Rules, except privilege enforcement rules, is an extension and must be flagged.

e. The granularity of extension detection shall be no coarser than at the statement level. If a system is processing SQL language that contains errors, then it may be very difficult within a single statement to determine what is an error and what is an extension. However, if an implementation is processing SQL language that contains no errors as far as that implementation is concerned, then it should be able to detect and flag all extensions at the same time.

f. In order to provide upward compatibility for its own customer base, or to provide performance advantages under special circumstances, a conforming SQL implementation may provide user options to process conforming SQL language in a nonconforming manner. If this is the case, then it is required that the implementation also provide a flagger option, or some other implementor defined means, to detect SQL conforming language that may be processed differently under the various user options. This flagger feature allows an application programmer to identify conforming SQL language that may perform differently in alternative processing environments provided by a conforming SQL implementation. It also provides a valuable tool in identifying SQL elements that may have to be modified if an application is to be moved from a nonconforming to a conforming SQL processing environment.

g. In certain circumstances (see paragraph 9c) an application programmer may choose to use a nonstandard language extension provided by an implementation (e.g., a COMPLEX data type for FORTRAN applications). It is required that the flagger detect all direct occurrences of such extensions. In addition, it is desirable (not required) that the flagger or the implementation provide support (e.g., a crosslisting of variables and database identifiers) for detecting all secondary references to such extensions. Secondary references may include variables, parameters, views, or other database identifiers that do not themselves violate syntax rules, but refer to an object that is or contains an extension. This additional feature would allow an application programmer to identify all SQL language occurrences that may have to be modified if an application is to be moved from a nonconforming to a conforming SQL processing environment.

11. Implementation. Implementation of this standard involves three areas of consideration: acquisition of FIPS SQL implementations, interpretation of FIPS SQL, and validation of FIPS SQL implementations.

11.1 Acquisition of SQL Implementations.

a. This publication is effective February 2, 1990. It is a revision of an existing FIPS that offers new conformance alternatives, a new integrity option, clarification and correction of existing specifications, and
additional considerations for use in procurements. It does not contain any new requirements that would make an existing conforming implementation nonconforming. No delayed effective date or transition period is necessary.

b. Relational model database management systems acquired for Federal use should implement FIPS SQL. Conformance to FIPS SQL should be considered whether SQL implementations 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.

11.2 Interpretation of FIPS SQL. NIST provides for the resolution of questions regarding FIPS SQL specifications and requirements, and issues official interpretations as needed. All questions about the interpretation of FIPS SQL should be addressed to:

Director
National Computer Systems Laboratory
ATTN: Database Language SQL Interpretation
National Institute of Standards and Technology
Gaithersburg, MD 20899
Telephone: (301) 975-3251

11.3 Validation of SQL Implementations. A suite of automated validation tests for SQL implementations is currently available. It is planned that an enhancement of this test suite will be the basis of a future “certificate of validation” offered to implementations claiming conformance to this standard. For more information on SQL validation tests, or the availability of certificates of validation, contact:

Director
National Computer Systems Laboratory
ATTN: Software Standards Testing Program
National Institute of Standards and Technology
Gaithersburg, MD 20899
Telephone: (301) 975-3258

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 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 or 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, 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. Sec. 552(b), shall be part of the procurement documentation and retained by the agency.
13. Special Procurement Considerations. FIPS SQL includes various alternatives for interfacing to programming languages, specifies "integrity enhancement" as an optional component of the standard, and does not specify any minimum requirements for the size or number of occurrences of database constructs. Any invocation of this standard in a procurement should indicate the programming languages to which it interfaces, whether direct invocation of SQL statements is required, whether module language, embedded SQL, or both are required for each language, whether the optional integrity feature is to be included, and what the sizing and occurrence requirements are. Any use of this standard in a broader database management system (DBMS) procurement should be accompanied with functional requirements for other DBMS components and facilities.

13.1 Integrity Enhancement Feature. References to this standard in a procurement should indicate whether or not the "integrity enhancement" feature (an optional component of X3.135-1989) is required. Failure to make this indication means that the feature is not required.

13.2 Programming Language Interfaces. References to this standard in a procurement should indicate which programming languages (e.g., Ada, C, COBOL, FORTRAN, or Pascal) are to be supported for language interface. Failure to make this indication means that support for any one of these languages satisfies the FIPS SQL requirement.

13.3 Style of Language Interface. References to this standard in a procurement should indicate, for each programming language identified above, whether the language interface is to support Module Language, Embedded SQL, or both. Failure to make this indication means that support for any one interface style satisfies the FIPS SQL requirement.

13.4 Interactive SQL. References to this standard in a procurement should indicate whether or not "direct invocation of SQL statements" is required and, if required, which SQL statements are to be directly invocable. Failure to make this indication means that direct invocation of SQL statements is not required. A requirement for direct invocation of SQL statements that fails to identify which statements are invocable means that interactive availability of the following statements satisfies the requirement:

- CREATE TABLE statement
- CREATE VIEW statement
- GRANT privilege statement
- INSERT INTO statement
- SELECT statement, with ORDER BY instead of INTO
- UPDATE statement: searched
- DELETE statement: searched
- COMMIT WORK statement
- ROLLBACK WORK statement

In Interactive SQL, if a statement causes an exception resulting in a non-zero SQLCODE, then the system shall display a message indicating that the statement failed and should give a textual description of the failure. Also, in Interactive SQL, an implementation shall provide some implementor specified symbol for representing null values.

13.5 Sizing for Database Constructs. References to this standard in a procurement should indicate minimum requirements for the precision, size, or number of occurrences of database constructs. Failure to make this indication means that the values detailed below are by default the minimum requirements.

a) Length of an identifier 18
b) Length of CHARACTER type 240
c) Decimal precision of NUMERIC type 15
d) Decimal precision of DECIMAL type 15
e) Decimal precision of INTEGER type 9
f) Decimal precision of SMALLINT type 4
g) Binary precision of FLOAT type 20
h) Binary precision of REAL type 20
i) Binary precision of DOUBLE PRECISION type 30
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j) Columns in a table 100
k) Values in an INSERT statement 100
l) Set clauses in an UPDATE statement 20
m) Length of a row (see Note 1) 2000
n) Column specifications in a UNIQUE constraint 6
o) Length of UNIQUE constraint (see Note 1) 120
p) Column specifications in a GROUP BY clause 6
q) Sort specifications in an ORDER BY clause 6
r) Referencing columns in a FOREIGN KEY 6
s) Table references in an SQL statement 10
t) Cursors simultaneously open 10

Note 1: The length of a collection of columns is defined to be the sum of: twice the number of columns, length of each character column, decimal precision plus 1 of each exact numeric column, binary precision divided by 4 plus 1 of each approximate numeric column.

13.6 Character Data Values. The set of character values for the character data type and the collating sequence of characters in SQL are both implementor-defined. References to this standard in a procurement should indicate any additional character data requirements. For example, applications running in a specific programming language environment may wish to specify that the SQL character values coincide with the character values and the collating sequence of that programming language. Failure to indicate specific character set requirements means that support for representation of the 95-character graphic subset of ASCII (FIPS PUB 1-2), in an implementor specified collating sequence, is by default the minimum requirement.

13.7 DBMS Procurement. Database software is normally purchased as a complete package called a database management system (DBMS). A DBMS is an implementation of one or more data models (e.g., the network model or the relational model), together with other components, features, or data interfaces for efficient data administration. These additional facilities are not specified by this standard, so each procurement should itself specify the functional requirements of each additional feature desired.

Additional facilities most often contained in a DBMS package include: schema manipulation, dynamic SQL, system catalog tables, special data types (e.g., date, time), database import and export tools, data dictionary, data storage specification, natural language query, report writer, query by forms, menu driven data access, application development system, graphics display, or upload and download between mainframes and workstations. Emerging specifications for an expanded SQL database language in ANSI and ISO standardization bodies may result in future standardization for some of these facilities; others may always remain implementation specific.

DBMS performance is often a critical factor in a DBMS procurement. This standard is silent on the topic of performance. The SQL test suite (see 11.3) also makes no attempt to test the performance aspects of a conforming system. Whenever performance requirements are known in advance, they may be included as an integral part of the procurement specification.

A DBMS may also provide additional data structures, such as indices, or software, such as query optimizers, to enhance performance. User requirements for monitoring database activity or tools for tuning database performance should be specified explicitly.

Some database management systems must operate in a highly secure environment that requires “trustworthy” database access control beyond the GRANT privilege facility and the VIEW definition capability specified in this standard. Procurements for systems that operate in these environments should include explicit additional requirements that must be supported.

13.8 Integration. In many cases a database or a database management system must be integrated with other information processing systems operating in the same environment. Examples of other systems might include: the operating system, document processing systems, engineering CAD/CAM systems, graphics systems, an information resource dictionary system, statistical analysis systems, a transaction processing system, or an artificial intelligence system. In addition, distributed data under the control of different vendor’s database management systems may require integration into a coordinated global view through remote database access or open distributed processing. All such integration is beyond the scope of this standard and, if desired, must be specified explicitly as part of procurement requirements.
14. 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. (Sale of the included specification documents, ANSI X3.135-1989 and ANSI X3.168-1989, is by arrangement with the American National Standards Institute.) When ordering, refer to Federal Information Processing Standards Publication 127-1 (FIPS PUB 127-1), and title. Payment may be made by check, money order, or deposit account.
June 15, 1993

MEMORANDUM FOR Agency Senior Management Officials and Technical Contacts for ADP Standards

From: James H. Burrows, Director
Computer Systems Laboratory

Subject: Planned Federal Information Processing Standards (FIPS)

Attached is a recent Federal Register notice that provides information on the status of planned, proposed, and completed Federal Information Processing Standards (FIPS). The FIPS planned for 1993-1994 will continue to support the development of open systems that are based on standards and that protect sensitive information. NIST is working with national and international standards organizations, industry consortia, and NIST-sponsored workshops to achieve off-the-shelf solutions that will work in a multi-vendor environment. FIPS that are proposed for Federal agency use will be sent to you for review and comments.

I thank you for your past interest, and invite your comments on our planned activities and your needs for future standards and guidelines.

Attachment
DOC Semiannual Regulatory Agenda
dtd 4/26/93
Monday
April 26, 1993

Part IV

Department of Commerce

Semiannual Regulatory Agenda
### DEPARTMENT OF COMMERCE (DOC)

**Office of the Secretary**

**13 CFR Ch. III**


**19 CFR Ch. III**

**37 CFR Chs. I, IV, and V**

**48 CFR Ch. 13**

**50 CFR Chs. II, III, and VI**

**Semiannual Agenda of Regulations**

**AGENCY:** Office of the Secretary, Commerce.

**ACTION:** April 1993 regulatory agenda.

**SUMMARY:** In compliance with Executive Order (E.O.) 12291 entitled “Federal Regulation” and the Regulatory Flexibility Act (Pub. L. 96-354), the Department of Commerce, in April and October of each year, publishes in the Federal Register an agenda of the rulemaking actions covered by section 1 of E.O. 12291 that the Department plans to conduct or review over the next 12 months. Rulemaking actions are grouped according to the rulemaking actions completed since the October 1992 agenda. The purpose of the agenda is to provide information to the public on regulations currently under review, being proposed, or issued by the Department. The agenda is intended to facilitate comments and views by interested members of the public.

The Department’s April 1993 regulatory agenda includes regulatory activities that are expected to be conducted during the period April 1, 1993, through March 31, 1994.

**FOR FURTHER INFORMATION CONTACT:**

**Specific:** For additional information about specific regulatory actions listed in the agenda, contact the individual identified as the contact person.

**General:** Comments or inquiries of a general nature about the agenda should be directed to Michael A. Levitt, Assistant General Counsel for Legislation and Regulation, U.S. Department of Commerce, Washington, DC 20230; telephone: 202-482-0846.

**SUPPLEMENTARY INFORMATION:** E.O. 12291 requires all executive agencies to publish semiannually an agenda of those regulations that are under consideration pursuant to this order. By memorandum of December 9, 1992, the Office of Management and Budget (OMB) issued guidelines and procedures for the preparation and publication of the April 1993 Unified Agenda of Federal Regulations. E.O. 12291 and the OMB guidelines require that each agency’s agenda report the following information on nonexempt regulatory activities being conducted or planned to be conducted by the agency during the 12-month period succeeding publication: The title of the regulation; the name, title, address, and phone number of an agency person who is knowledgeable about the regulation; whether the action is expected to have a significant economic impact on a substantial number of small entities; and whether it will affect levels of government; the section(s) of the Code of Federal Regulations which will affect or be affected by the action; the section of the United States Code, Public Law, or Executive order that authorizes the action; an indication of whether or not the entry is a significant regulatory action included in the Administration’s Regulatory Program and if the agency considers it a priority action; an abstract describing the problem the regulation addresses, alternatives to the regulation being considered, and potential costs and benefits of the action; legal deadline, if any; and a timetable of dates and, if available, Federal Register citations for past stages of the action. In addition, OMB requires that procurement-related regulatory actions include additional information on all actions that are covered by section 22 of the Office of Federal Procurement Policy Act Amendments of 1988. This information will be used by the Office of Federal Procurement Policy in preparing the “Procurement Regulatory Activity Report.”

The Regulatory Flexibility Act requires agencies to prepare a regulatory flexibility analysis where there is a positive finding that a rule will have a significant economic impact on a substantial number of small entities. E.O. 12291 requires agencies to prepare a regulatory impact analysis for any regulation considered to be a “major rule” as defined in the order.

**Explanation of Information Contained in the Agenda**

Within the Department, the Office of the Secretary and various operating units may issue regulations. Operating units, such as the Economic Development Administration, the Bureau of Export Administration, the International Trade Administration, the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and the Patent and Trademark Office, issue the greatest share of the Department’s regulations.

A large number of regulatory actions reported in the agenda are proposed or final Federal Information Processing Standards (FIPS) issued by NIST under Public Law 100-235. FIPS consist of standards and guidelines to improve Federal Government use and management of computers and information technology. The standards, while often of great use to industry and the public, apply only to the Federal Government. In developing the standards and guidelines and in providing technical guidance and coordination to Federal agencies, NIST works closely with private industry standard-setting organizations.

Another large number of regulatory actions reported in the agenda deal with fishery management programs of NOAA’s National Marine Fisheries Service (NMFS). To avoid repetition of programs and definitions, as well as to provide some understanding of the technical and institutional elements of the NMFS programs, a section on “Explanation of Information Contained in NMFS Regulatory Entries” is provided below.

**Explanation of Information Contained in NMFS Regulatory Entries**

The Magnuson Fishery Conservation and Management Act of 1976 (16 U.S.C. 1801 et seq.) (Act) governs the management of fisheries within the Exclusive Economic Zone (EEZ). The EEZ refers to those waters from the outer edge of the State boundaries, generally 3 nautical miles, to a distance of 200 nautical miles. Fishery Management Plans (FMPs) are to be prepared for fisheries which require conservation and management measures. Regulations implementing these FMPs regulate domestic fishing and foreign fishing where permitted. Foreign fishing can be conducted in a...
fishery for which there is no FMP only if a preliminary fishery management plan has been issued to govern that foreign fishing. Under the Act, eight Regional Fishery Management Councils (Councils) prepare FMPs or amendments to FMPs for fisheries within their respective areas. In the development of such plans or amendments and their implementing regulations, the Councils are required by law to conduct public hearings on the draft plans and to consider the use of alternative means of regulating.

The Council process for developing FMPs and amendments makes it difficult for NMFS to determine the significance and timing of some regulatory actions under consideration by the Councils at the time the semiannual regulatory agenda is published.

The DOC April 1993 regulatory agenda follows.

Carol C. Barr,
Acting General Counsel.
National Institute of Standards & Technology—Proposed Rule Stage

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<th>Regulation Identifier Number</th>
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<td>0693-AB07</td>
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<td>0693-AB09</td>
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<td>0693-AB10</td>
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<td>425</td>
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</table>
DEPARTMENT OF COMMERCE (DOC)
National Institute of Standards & Technology (NIST)

396. FIPS FOR POSIX SYSTEM ADMINISTRATION
Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: This standard will adopt a set of specifications on an interim basis to provide functional system administration requirements for POSIX operating system implementations. Actual utility names and options for system administration will be specified in a future revision to this FIPS. This standard will facilitate the interchange of computer programs among different vendor systems and architectures.
Timetable: Next Action Undetermined
Small Entities Affected: None
Government Levels Affected: Federal
Sectors Affected: 357 Computer and Office Equipment
Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151
Technology, Gaithersburg, MD 20899, 301 975-2833
RIN: 0693-AA71

397. FIPS FOR IRDS EXPORT/IMPORT FILE FORMAT
Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: This standard will adopt an American National Standard being developed by Standards Committee X3H4. The standard will specify the
precise format of files used to exchange information between IRDSs. The specification will complete the IRD-IRD Interface, the functionality of which is specified in FIPS PUB 156.

**Timetable:** Next Action Undetermined

**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**RIN:** 0693-AA76

#### 398. FIPS FOR DIGITAL SIGNATURE STANDARD

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This standard will specify a Digital Signature algorithm appropriate for digital signature applications. The standard will enable users to verify the integrity of the data and the origin of messages sent between computers, and to verify the integrity of data and programs that are stored in computers.

**Timetable:**

<table>
<thead>
<tr>
<th>Action</th>
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<tbody>
<tr>
<td>NPRM</td>
<td>08/30/93</td>
<td>56 FR 42980</td>
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<td>NPRM Comment</td>
<td>02/28/92</td>
<td>56 FR 67001</td>
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**RIN:** 0693-AA76

#### 399. PROPOSED REVISION OF FIPS 71-1, ADVANCED DATA COMMUNICATION CONTROL PROCEDURES (ADCCP)

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This revision will adopt revised international standards for data communications control procedures. This revision will facilitate the transfer and control of information across telecommunications links, and improve interoperability between different equipment and systems.

**Timetable:**

<table>
<thead>
<tr>
<th>Action</th>
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**RIN:** 0693-AB12

#### 400. PROPOSED FIPS FOR ODA RASTER DAP

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This revision will adopt revised international standards for data communications control procedures. This revision will facilitate the transfer and control of information across telecommunications links, and improve interoperability between different equipment and systems.

**Timetable:**

<table>
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<tr>
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<tr>
<td>NPRM</td>
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**RIN:** 0693-AB13

#### 401. REVISION OF FIPS 177, INITIAL GRAPHICS EXCHANGE SPECIFICATION (IGES)

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This revision will update FIPS 177 by adopting revised voluntary industry specifications for IGES. The revision will enable the Federal Government to maintain compatibility with industry practices for the representation and exchange of product definition data used in computer-aided design and computer-aided manufacturing systems.

**Timetable:**

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<tr>
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**RIN:** 0693-AB12
### 404. ADVANCED TECHNOLOGY PROGRAM

**Legal Authority:** PL 102-245  
**CFR Citation:** 15 CFR 295  
**Legal Deadline:** None

**Abstract:** The American Technology Preeminence Act of 1992 (Public Law 102-245), made changes in the legal authority for the Advanced Technology Program that must be incorporated into the ATP program procedures. Changes address: (1) participation by foreign companies in ATP; (2) the establishment of a patent policy different from the governmentwide policy set out by the Bayh-Dole Act; and (3) a new requirement that "joint research and development ventures" be industry-led. Further, requirements for royalty-sharing by ATP recipients with the Federal government for inventions funded under ATP have been repealed by the Act, and are thus to be removed from the regulations. Similarly, ATP authority to provide direct funding to independent research organizations has been repealed, and appropriate revisions to the regulations are needed. Also, changes not required by the Act will be proposed, including changes to simplify and clarify the selection criteria and to streamline the internal operations of ATP, including the selection process.

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**Small Entities Affected:** None  
**Government Levels Affected:** Federal  
**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**RIN:** 0693–AB14

### 405. NATIONAL VOLUNTARY CONFORMITY ASSESSMENT SYSTEMS EVALUATION

**Legal Authority:** 15 USC 271 et seq  
**CFR Citation:** 15 CFR 286  
**Legal Deadline:** None

**Abstract:** The National Institute of Standards and Technology (NIST) will propose to establish the National Voluntary Conformity Assessment System Evaluation (NVCASE) Program. The program will enable the Department of Commerce, acting through NIST, to evaluate and recognize competitively conducted conformity assessment activities. The results of NIST evaluations will provide a basis for the U.S. Government to assure foreign governments that qualified conformity assessment bodies are competent to satisfy their regulatory requirements. The program is complementary to those of other Federal agencies and is intended, together with those programs, to provide the basis for U.S. Government negotiations with foreign governments to gain their recognition of U.S.-based conformity assessment bodies as providing results acceptable for regulatory purposes. The program is intended to cover organizations engaged in product sample testing, product certification, and quality system registration and, most especially, their accreditors. NIST will offer its evaluations, based on publicly developed requirements, on a fee-for-service basis and will provide those meeting the requirements.

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**Small Entities Affected:** Undetermined  
**Government Levels Affected:** Undetermined  
**Sectors Affected:** Multiple

**Additional Information:** ABSTRACT CONT: with a certificate of recognition. NIST will maintain lists of all recognized organizations and, in the case of recognized accreditation bodies, lists of conformity assessment bodies accredited by them.

**Agency Contact:** Stanley Warshaw, Director, Office of Standards Services, Department of Commerce, National Institute of Standards & Technology, Administration Building, Room A603, Gaithersburg, MD 20899, 301 975-4000

**RIN:** 0693–AB17
406. REVISION OF FIPS 140, GENERAL SECURITY REQUIREMENTS FOR EQUIPMENT USING THE DATA ENCRYPTION STANDARD

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: This revision will bring the standard up to date to cover new encryption applications, and new policies for testing for conformance to the standard.

Timetable:

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<td>53 FR 49722</td>
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<td>01/08/91</td>
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Small Entities Affected: None

Government Levels Affected: Federal

Sectors Affected: 357 Computer and Office Equipment

Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

RIN: 0693-AAA70

407. FIPS FOR POSIX SHELL AND UTILITY APPLICATION INTERFACE FOR COMPUTER OPERATING SYSTEMS ENVIRONMENTS

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: This standard will adopt, on an interim basis, Draft 9 of the Institute of Electrical and Electronics Engineers (IEEE) Standard for Shell and Application Utility Interface for Computer Operating Systems Environments (IEEE 1003.2/POSLX Shell and Tools). This standard will extend the functionality of the POSIX standard by providing an interactive interface for users to control processing.

Timetable:

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<td>09/05/89</td>
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408. FASTENER QUALITY

Significance: Regulatory Program

Legal Authority: PL 101-592


Abstract: This rule will implement the Fastener Quality Act. In 1990, Congress enacted the Fastener Quality Act (the Act) to protect public safety, deter introduction of nonconforming fasteners into commerce, improve traceability of fasteners used in critical applications, and provide customers with greater assurance that fasteners meet stated specifications. The Act requires that certain fasteners sold in commerce conform to the specifications to which they are represented to be manufactured; provides for accreditation of laboratories engaged in fastener testing; and requires the inspection, testing, and certification (in accordance with standardized methods) of fasteners used in critical applications.

Timetable:

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Small Entities Affected: None

Government Levels Affected: Federal

Sectors Affected: 357 Computer and Office Equipment

Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

RIN: 0693-AAA70

409. REVISION OF FIPS 128, COMPUTER GRAPHICS METAFILE (CGM)

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: This revised FIPS will adopt the redesignated version of the CGM standard, known as ANSI/ISO 8632.1-4:1991, and add a requirement for the use of profiles. A profile defines the options, elements, and parameters of ANSI/ISO 8632 necessary to accomplish a particular function and to maximize the probability of interchange between systems implementing the profile. The revised FIPS will also adopt MIL-D-28003, Computer-Aided Acquisition and Logistics Support (CALS), as the first CGM Application Profile.

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<td>09/11/90</td>
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410. FIPS FOR AUTOMATED PASSWORD GENERATOR

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: This standard will provide an algorithm that will be implemented in software systems. The algorithm will generate pronounceable passwords for authenticating users of an ADP system.

Timetable:

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<td>07/10/92</td>
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Small Entities Affected: None

Government Levels Affected: Federal

Sectors Affected: 357 Computer and Office Equipment

Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

RIN: 0693-AAA93
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**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**Legal Authority:** PL 100-235

**RIN:** 0693-AA99

### 411. PROPOSED FIPS FOR ISDN

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This standard will define the generic protocols necessary to establish transparent Integrated Services Digital Network (ISDN) connections among government networks and between government and conformant common carrier networks. This standard will facilitate the interconnection of Federal telecommunication systems to standard ISDN services.

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**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**Legal Authority:** PL 100-235

**RIN:** 0693-AA99

### 412. PROPOSED FIPS FOR SECURE HASH STANDARD

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This standard will adopt an algorithm which provides a formula for producing a numeric value (called a “message digest”) of a message (or any digital information). This standard will be used whenever a secure hash algorithm is needed to provide a mechanism to check the integrity of data.

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**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**Legal Authority:** PL 100-235

**RIN:** 0693-AA99

### 413. PROPOSED FIPS FOR STANDARD SECURITY LABEL FORMAT FOR GOSIP

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This standard will specify the format for security labels to be used with the Government Open Systems Interconnection Profile (GOSIP). Security labels will facilitate the institution of controls to prevent accidental or intentional disclosure, modification, or destruction of data.

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<tr>
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<tr>
<td>NPRM</td>
<td>05/26/92</td>
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**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**Legal Authority:** PL 100-235

**RIN:** 0693-AB00

### 414. PROPOSED REVISION OF FIPS 125, MUMPS

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This revision will adopt American National Standard for MUMPS, ANSI/MDC X11.1-1990. This revision will facilitate the interchange of application programs among different computer systems and improve the productivity of computer programmers.

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<tr>
<td>NPRM</td>
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<td>57 FR 21963</td>
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**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**Legal Authority:** PL 100-235

**RIN:** 0693-AB00

### 415. PROPOSED REVISION OF FIPS 151-1, POSIX

**Legal Authority:** PL 100-235

**CFR Citation:** None

**Legal Deadline:** None

**Abstract:** This revision will adopt International Standard ISO/IEC 9945-1: 1990, Information Technology - Portable Operating System Interface (POSIX) - Part 1: System Application Program Interface (API) (C Language), which defines a C programming language source interface to an operating system environment. This standard will facilitate the portability of application programs among different computer systems.

<table>
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<td>NPRM</td>
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**Small Entities Affected:** None

**Government Levels Affected:** Federal

**Sectors Affected:** 357 Computer and Office Equipment

**Agency Contact:** Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

**Legal Authority:** PL 100-235

**RIN:** 0693-AB00
417. FIPS FOR STANDARD PAGE DESCRIPTION LANGUAGE

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: This standard will adopt the International Standards Organization International Electrotechnical Commission Standard Page Description Language (SPDL), ISO/IEC/DIS 10180, which defines a device-independent format for representing documents in their final fully formatted form, to printers or other presentation processes. It combines the image description technology of modern page description languages with a document structure which enables efficient processing and page image management.

Action: NPRM
Date: 05/04/92
FR Cite: 57 FR 19111

NPRM Comment
Period End
FR Cite: 57 FR 19111

Final Action
05/00/93

Small Entities Affected: None

Government Levels Affected: Federal

Sectors Affected: None

Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

RIN: 0693-AB03

418. PROPOSED REVISION OF FIPS 127-1, DATABASE LANGUAGE SQL

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: This revision to FIPS 127-1, Database Language SQL, will adopt the draft proposed American National Standard: Database Language SQL (dpANS X3.135-199X), which is expected to be approved as an American National Standard. This revision to FIPS 127-1 will provide a substantial, upward-compatible enhancement of Database Language SQL.

Action: NPRM
Date: 05/09/92
FR Cite: 57 FR 41126

NPRM Comment
Period End
FR Cite: 57 FR 41126

Final Action
05/00/93

Small Entities Affected: None

Government Levels Affected: Federal

Sectors Affected: 357 Computer and Office Equipment

Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

RIN: 0693-AB11

419. FIPS FOR INTEGRATION DEFINITION FOR FUNCTION MODELING (IDEF0) AND INTEGRATION DEFINITION FOR INFORMATION MODELING (IDEF1X)

Legal Authority: PL 100-235

CFR Citation: None

Legal Deadline: None

Abstract: Two FIPS will adopt non-proprietary IDEF modeling techniques developed by government and industry for use in the analysis and development of information systems. The first FIPS will adopt the IDEF0 modeling methodology which produces a structured representation of the processes and functions carried out by an information system. The second FIPS will adopt the IDEF1X modeling methodology which produces an information model of the structure and semantics of the information used by a system.

Action: NPRM
Date: 06/29/92
FR Cite: 57 FR 28829

NPRM Comment
Period End
FR Cite: 57 FR 28829

NPRM Correction Notice
Period End
FR Cite: 57 FR 61967

Final Action
09/00/93

Small Entities Affected: None

Government Levels Affected: Federal

Sectors Affected: 357 Computer and Office Equipment

Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833

RIN: 0693-AB05
420. PROPOSED REAFFIRMATION OF FIPS 46-1, DATA ENCRYPTION STANDARD (DES)

Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: A review will be conducted of Federal Information Processing Standard 46, Data Encryption Standard, which provides an algorithm to be implemented in electronic hardware devices and used for the cryptographic protection of computer data. The standard, which was issued in 1977 and reviewed in 1983 and 1987, will be reviewed again to assess the continued adequacy of the standard to protect computer data.

Timetable:

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<td>NPRM</td>
<td>09/11/92</td>
<td>57 FR 41727</td>
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Small Entities Affected: None
Government Levels Affected: Federal
Sectors Affected: 357 Computer and Office Equipment
Agency Contact: Shirely Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833
RIN: 0693-AB09

DEPARTMENT OF COMMERCE (DOC)
National Institute of Standards & Technology (NIST)

422. FIPS FOR DOCUMENT APPLICATION PROFILE (DAP) FOR THE OFFICE DOCUMENT ARCHITECTURE (ODA) AND INTERCHANGE FORMAT STANDARD

Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: This FIPS will be based on international standards for office document architecture and office document interchange formats. The profile will provide necessary functionality to enable documents developed on different manufacturers' equipment to be interchanged between systems.

Timetable:

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<td>NPRM</td>
<td>01/27/89</td>
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Withdrawn - not in best interest of the Government to propose FIPS

Small Entities Affected: None
Government Levels Affected: None
Sectors Affected: 357 Computer and Office Equipment
Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833
RIN: 0693-AA67

423. FIPS 179, GOVERNMENT NETWORK MANAGEMENT PROFILE (GNMP)

Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: This standard will specify a management protocol, management information, and management functions for interoperable multi-vendor networks that implement Open System Interconnection (OSI) standards. The standard will be based on the stable agreements reached by NIST Workshop for Implementors of OSI as developed by the Special Interest Group on Network Management.

Timetable:

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<td>07/31/91</td>
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Final Action 12/14/92 57 FR 59085
Final Action Effective 06/14/93 57 FR 59085
Small Entities Affected: None
Government Levels Affected: Federal
Sectors Affected: 357 Computer and Office Equipment
Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833
RIN: 0693-AA85
424. FIPS 177, INITIAL GRAPHICS EXCHANGE SPECIFICATION (IGES)

Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: This FIPS adopts the American National Standard Digital Representation for Communication of Product Definition Data, ASME/ANSI Y14.26M-1989, more commonly known as the Initial Graphics Exchange Specification (IGES). This FIPS establishes information structures for the digital representation and communication of product definition data and permits the compatible exchange of product definition data used by various computer-aided design and computer-aided manufacturing (CAD/CAM) systems.

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<td>01/02/92</td>
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425. FIPS 178, VIDEO TELECONFERENCING SERVICES AT 56 TO 1,920 KB/S

Legal Authority: PL 100-235
CFR Citation: None
Legal Deadline: None
Abstract: This standard adopts International Telegraph and Telephone Consultative Committee (CCITT) Recommendation H.320, H.221, H.242, H.261, and H.230 for video teleconferencing and video telephony systems. This standard provides Federal departments and agencies with a comprehensive description of the interoperability criteria for audiovisual systems used in video teleconferencing and videophone applications.

Timetable:

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<td>Final Action</td>
<td>12/21/92</td>
<td>57 FR 60506</td>
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<td>Final Action Effective</td>
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Small Entities Affected: None
Government Levels Affected: Federal
Sectors Affected: 357 Computer and Office Equipment
Agency Contact: Shirley Radack, Computer Specialist, Department of Commerce, National Institute of Standards & Technology, B151 Technology, Gaithersburg, MD 20899, 301 975-2833
RIN: 0693–AA88
National Institute of Standards and Technology
NOTICES
Information processing standards, Federal:
Database language SQL, 31364
Federal Register / Vol. 58, No. 104 / Wednesday, June 2, 1993 / Notices

National Institute of Standards and Technology
[Docket No. 920772-3048]
RIN 0693—AB05

Approval of Federal Information Processing Standards Publication 127—2, Database Language SQL

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 revision of Federal Information Processing Standard 127—1, Database Language SQL, which will be published as FIPS Publication 127—2. This publication announces adoption of American National Standard Database Language SQL, ANSI X3.135—1992, as the Federal Information Processing Standard for Database Language SQL (FIPS SQL). This revised standard supersedes FIPS 127—1 in its entirety.

SUMMARY: On September 9, 1992, notice was published in the Federal Register (57 FR 41126) that a revision of Federal Information Processing Standard 127—1, Database Language SQL, was being proposed for Federal use.

The written comments submitted by interested parties and other material available to the Department relevant to this standard were reviewed by NIST. On the basis of this review, NIST recommended that the Secretary approve the standard as a Federal Information Processing Standard (FIPS), 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.

This 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 standard is effective December 3, 1993.

ADDRESSES: Interested parties may purchase copies of this revised standard, including the technical specifications portion, 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 portion of the standard.

FOR FURTHER INFORMATION CONTACT:
Dr. Leonard Gallagher, National Institute of Standards and Technology, Gaithersburg, MD 20899, telephone (301) 975—3251.

Dated: May 26, 1993
Raymond G. Kammer,
Acting Director.

Federal Information Processing Standards Publication 127—2
June 2, 1993.

Announcing the Standard for Database Language SQL

Federal Information Processing Standards Publications (FIPS PUBS) are issued by the National Institute of Standards and Technology 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. Database Language SQL (FIPS PUB 127—2).


3. Explanation. This publication is a revision of FIPS PUB 127—1 and supersedes that document in its entirety. It provides a substantial, upward-compatible enhancement of Database Language SQL. It includes four levels of conformance: Entry SQL, Transitional SQL, Intermediate SQL, and Full SQL. Entry SQL is a minor enhancement over the minimum requirements of FIPS PUB 127—1. Intermediate SQL is a major enhancement over Entry SQL, and Full SQL is a major enhancement over Intermediate SQL. Transitional SQL is a temporary FIPS specification that falls approximately half way between Entry SQL and Intermediate SQL.

Conformance to Entry SQL is required in all Federal procurements of SQL products. Conformance to Transitional SQL, Intermediate SQL, or Full SQL are options that may be specified, explicitly, as requirements in a Federal procurement. Section 13 identifies the minimum requirements for conformance to Entry SQL in FIPS PUB 127—2 that differ from the minimum requirements for conformance to FIPS PUB 127—1, and Section 14 defines requirements for the three additional levels of conformance.

This publication announces adoption of American National Standard Database
Language SQL, ANSI X3.135—1992, as the Federal Information Processing Standard for Database Language SQL (FIPS SQL). The exact specification is in Section 10 of this standard.

ANSI SQL is a revision and replacement of two previous American National Standards, ANSI X3.135—1989 and ANSI X3.168—1989. It specifies the syntax and semantics of SQL language facilities for defining and accessing SQL databases. These facilities include:

- Schema definition, to declare the structure, integrity constraints, and access privileges of a database.
- Schema manipulation, to alter a schema definition.
- Data manipulation, to populate a database and access SQL-data.
- Transaction management, to define and manage SQL-transactions.
- Connection management, to establish and manage SQL-connections.
- Session management, to set the attributes of an SQL-session.
- Dynamic SQL, to provide facilities for dynamic construction and execution of SQL statements.
- Diagnostics management, to communicate constraint violations and warnings to applications.
- Information schema tables, to provide an SQL description of schema definitions.
- Programming language bindings, to declare database procedures that may be called from various programming languages.
- Embedded SQL, to define how SQL statements may be syntactically embedded into one of the following programming languages: Ada, C, COBOL, FORTRAN, MUMPS, Pascal, or PL/I. Embedded SQL was formerly defined in ANSI X3.168—1989.

ANSI SQL is specified in three levels: Entry SQL, Intermediate SQL, and Full SQL. Entry SQL is a minor enhancement of ANSI X3.135—1989 (see Section 13). Intermediate SQL adds provisions for schema manipulation, dynamic SQL diagnostics management, long identifiers, multiple module support, cascade delete for referential integrity, multiple schemas per authorization identifier, DATE and TIME data types, domains, variable length character strings, support for national character sets, and substantial enhancements for data manipulation. The data manipulation enhancements in Intermediate SQL include: a CASE expression, CAST functions between date types, string operations, natural join, outer join, union join, row value expressions, and subqueries in value expressions, as well as table operations for union, intersection, and complement. Full SQL adds provisions for connection management, session management, pre-defined character translations and form-of-use conversions, a BIT string data type, deferrable integrity constraints, derived tables in the FROM clause, subqueries in CHECK clauses, insensitive cursors, self-referencing data operations, assertions, and temporary tables. A list of optional FIPS SQL features, comprising all of the additional facilities in ANSI Intermediate SQL and Full SQL, is defined in Section 14 of this standard.

The purpose of FIPS SQL is to promote portability and interoperability of database application programs, to facilitate maintenance of database systems among heterogeneous data processing environments, and to allow for the efficient exchange of programmers among different database management projects. The standard is used by implementors as the reference authority in developing a FIPS conforming relational model database management system, with standard programming language interfaces to that database management system. The standard is used by application programmers to help write SQL conforming applications and by other computer professionals who need to know the precise syntactic and semantic rules of Database Language SQL.

4. Approving Authority. Secretary of Commerce.

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

6. Cross Index.


7. Related Documents.
   c. NIST, Validated Products List/Programming Languages, Database

Language SQL, Graphics, GOSIP, POSIX, Security; Judy B. Kailly, Editor, NISTIR 5103, issue No. 1, January 1993 (reproduced quarterly). Available by subscription from the National Technical Information Service (NTIS).

e. FIPS PUB 69—1, Programming Language FORTRAN, 1985.
f. FIPS PUB 109, Programming Language Pascal, 1985.
g. FIPS PUB 119, Programming Language Ada, 1985.
h. FIPS PUB 125—1, Programming Language MUMPS, 1993.


The database language standards improve widespread availability and use of database management systems. Comprehensive and precise standard database language standards should be used for all computer database applications and programs that are either developed or acquired for government use. FIPS SQL is particularly well suited for use in database applications that employ the relational data model. The relational data model is appropriate for applications requiring flexibility in the data structures and access paths of the database. The relational data model is desirable where there is a substantial need for ad hoc data manipulation, and data restructuring, in addition to the need for access by static applications under production control.

The primary objectives are:

- To promote communication and interoperability among data installations conforming to FIPS SQL and related GOSIP communications standards.
- To reduce the cost of software development by achieving increased database application programmer productivity through the understanding and use of database methods employing standard structures and operations, standard data types, standard constraints, and standard interfaces to programming languages.
- To protect the software assets of the Federal government by ensuring that skills acquired on one project are transportable to other projects, thereby reducing the cost of database programmer retraining.
- To reduce overall software costs by making it easier and less expensive to maintain database definitions and database application programs and to transfer those definitions and programs among different computers and database management systems, including replacement database management systems.
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- To reduce overall software costs by making it easier and less expensive to maintain database definitions and database application programs and to transfer those definitions and programs among different computers and database management systems, including replacement database management systems.

9. Applicability

9.1 Database Language SQL is one of the database language standards provided for use by all Federal departments and agencies. These database language standards should be used for all computer database applications and programs that are either developed or acquired for government use. FIPS SQL is particularly well suited for use in database applications that employ the relational data model. The relational data model is appropriate for applications requiring flexibility in the data structures and access paths of the database. The relational data model is desirable where there is a substantial need for ad hoc data manipulation, and data restructuring, in addition to the need for access by static applications under production control.

9.2 FIPS SQL will be used for relational database applications and programs when one or more of the following situations exist:

- It is anticipated that the life of the database application will be longer than the life of the presently utilized equipment or database management system, if any.
- The database application is under constant review for updating of the specifications, and changes may result frequently.
- The database application is being designed and developed centrally for a decentralized system that employs computers of different makes and models or database software acquired from a different vendor.
- The database application will or might be run under a database management system other than that for which the database application is initially written.
- The database application is to be understood and maintained by programmers other than the original ones.
- The database application is one part of a distributed application that requires exchange of data or interoperation of the various parts.
- The database application is or is likely to be used by organizations outside the Federal government (e.g., Federal government contractors, State and local governments, and others).

9.3 Nonstandard language features shall be used only when the needed operation or function cannot reasonably be implemented with the standard features alone. A needed language feature not provided by the FIPS database languages should, to the extent possible, be acquired as part of an otherwise FIPS conforming database management system. Although nonstandard language features can be very useful, it should be recognized that their use may make the interchange of programs and future conversion to a revised standard or replacement database management system more difficult and costly.

9.4 Although this standard does not specifically address interactive database access through graphical user interfaces (GUI), the SQL statements specified by this standard are appropriate for such use. In a Client/Server environment, a GUI client may use SQL statements to access SQL conformant server databases.

9.5 Although this standard does not specifically address distributed database management systems on distributed database applications, the connection management statements defined in this standard may be used, along with facilities for remote database access (ISO/IEC 9579) and distributed transaction processing (ISO/IEC 10026), to access SQL data at remote nodes in a distributed system and to present a global view to application programs.

9.6 Although this standard does not specifically address user-defined data types, class hierarchies, inheritance, polymorphism, or other features of object database management system, such capabilities are upward compatible extensions of this standard and may be specified in a future revision of FIPS SQL (see Section 16.8).

9.7 It is recognized that some programmatic requirements may be more economically and efficiently satisfied through the use of a database management system employing a different data model than those provided by the FIPS database languages or the use of a database management system that functionally conforms to a FIPS database language but does not conform to all other aspects of the FIPS. The use of any facility should be considered in the context of system life, system cost, data integrity, and the potential for data sharing.

9.8 Some programmatic requirements may be more economically and efficiently satisfied by the use of automatic program generators or by database access through other high-level language information processing systems. However, if the final output of a program generator or high-level language system is language that accesses a relational database, then that language shall conform to the conditions and specifications of SQL.

10. Specifications. FIPS SQL adopts all provisions of ANSI X3, 135–1992, Database Language SQL, with the exceptions listed below:

a. FIPS SQL requires conformance to Entry SQL, Conformance to Transitional SQL, Intermediate SQL, or full SQL.
options that may be specified explicitly in SQL procurements (see Section 14).

b. FIPS SQL does not include PL/I language bindings, since PL/I is not a FIPS programming language.

c. FIPS SQL does not recognize conformance solely by "direct invocation and processing of SQL language" as specified in Subclause 23.2 of ANSI X3.135-1992, because direct invocation does not mandate all of the facilities desired in a FIPS SQL conforming product. Conformance to FIPS SQL requires a Module or Embedded SQL binding style to one or more FIPS programming languages.

d. FIPS SQL requires that the "SQL Flagger" be implemented in Entry SQL in addition to Intermediate SQL and FIPS SQL. This is because FIPS SQL has always included a flagger requirement, even from its first specification in 1987.

For conformance to Entry SQL or Transitional SQL, FIPS SQL requires "Entry SQL Flaggmg" with the "Syntax Only" implementation. Implementation requirements for language binding and language documentation are developed internally, acquired as a 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 SQL is contained in the U.S. General Services Administration publication Federal ADP & Telecommunications Standards Index, Chapter 4 Part 1.

11.3 Interpretation of FIPS SQL. NIST provides for the resolution of questions regarding FIPS SQL specifications and requirements, and issues official interpretations as needed. Procedures for interpretation are specified in FIPS- PUB 29-2. All questions about the interpretation of FIPS SQL should be addressed to: Director, Computer Systems Laboratory, ATTN: Database Language Interpretation, National Institute of Standards and Technology, Gaithersburg, MD 20899, Telephone: (301) 975-2833.

11.4 Validation of FIPS SQL Implementations. Implementations of FIPS SQL shall be validated in accordance with NIST Computer Systems Laboratory (CSL) validation procedures for FIPS SQL. Recommended procurement terminology for validation of FIPS SQL is contained in the U.S. General Services Administration 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 SQL 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 or Certificate is applicable to the hardware/software environment of the SQL 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 SQL implementation 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.

Implementations shall be evaluated using the NIST SQL Test Suite, a suite of automated validation tests for SQL implementations. The NIST SQL Test Suite was first released in August 1988 to help users and vendors determine compliance with FIPS SQL. Version 3.0 of the test suite was released in January 1992, to be used for validating conformance to FIPS PUB 127-1 after July 1, 1992. It is expected that Version 4.0 of the test suite will be available in mid-1993, to be used for testing conformance to Entry SQL of FIPS PUB 127-2 after the effective date. Results of validation by the SQL Testing Service are published on a quarterly basis in the Validated Products List, available from the National Technical Information Service (NTIS).

Each release of the test suite has provided additional interfaces and test cases to increase the test suite's coverage of the SQL language. Version 3.0 of the NIST SQL Test Suite provides 11 release types (interfaces): Embedded (pre-processor) Ada, Embedded COBOL, Embedded FORTRAN, Embedded Pascal, module language Ada, module language COBOL, module language FORTRAN, module language Pascal, and Interactive Direct SQL. Version 3.0 does not include tests for Embedded MUMPS or module language MUMPS because the MUMPS programming language interface is not defined in FIPS 127-1; such tests may be available in Version 4.0 for testing of FIPS 127-2. There are additional tests in Version 3.0 for the Integrity Enhancement Feature, default database size constructs, and the FIPS Flagger requirement of FIPS 127-1.

An SQL Test Suite license includes all of the tests described above, documentation, and automatic notifications of approved changes to the SQL Test Suite for a six month period. A license for SQL Test Suite Version 3.0 is a necessary requirement for an organization that wishes to be tested by the NIST SQL Testing Service between July 1, 1992 and the effective date of FIPS 127-2.

Current information about the NIST SQL Validation Service and validation procedures for FIPS SQL is available
12. Waivers. Under certain exceptional circumstances, the heads of Federal departments and agencies may approve waivers to Federal Information Processing Standards (FIPS). The heads of such agency may redelegate such authority only to a senior official designated pursuant to section 3506(h) 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 or 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. 552(b), shall be part of the procurement documentation and retained by the agency.