## **Application Programmer's Interface** (API) Standards

Standards at the API promote program and programmer portability. A standard at this level specifies a set of operations on a variety of graphics objects. An API standard provides for the portability of applications across a wide range of computer hardware, operating systems, programming languages, and graphics devices. A program written to an API standard at one facility in one environment should be easily transferable to another facility in a different environment. Facility dependencies should be the major area requiring modification.

The specific functions supported by a particular API standard provide certain capabilities. The application programmer, by identifying the capabilities needed, determines the API better suited for the application. As shown in Figure 2, there are currently two graphics API standards, GKS and PHIGS.

GKS provides a functional description of a two-dimensional (2D) graphics interface. It provides the basic graphics support required by a wide variety of application requiring the production of computer-generated pictures. A procedural language binding of a functional standard specifies the exact name for each operation, its parameter sequence, and the data types for the parameters. FORTRAN, Pascal, Ada and C language bindings are parts of GKS.

GKS is suitable for use in graphics programming applications that employ a broad spectrum of graphics, from simple passive graphics output (where pictures are produced solely by output functions without interaction with an operator) to interactive applications; and which control a whole range of graphics devices, including but not limited to vector and raster devices, microfilm recorders, storage displays, refresh displays, and color displays.

PHIGS provides for the definition, display, modification, and manipulation of 2D and graphical data. It provides functionality to support storage of graphics and application data in a hierarchical form. Information may be inserted, changed, and deleted from the hierarchical data storage with the functions provided by PHIGS. Language binding specifications for PHIGS include FORTRAN, C and Ada.

PHIGS is specifically designed to meet the performance requirements of such demanding applications as Computer Aided Design/Computer Aided Engineering/Computer Aided Manufacturing, command and control, molecular modelling, simulation and process control.

Capabilities in PHIGS but not in GKS include: the centralized hierarchical data storage; the dynamic and responsive nature of interactions; the addition of a modeling capability; and support for color models other than Red-Green-Blue (RGB).

## **Interoperability Standards**

Graphics Interoperability standards allow graphical data to be interchanged between graphics devices. As shown in Figure 2, there are three graphics interoperability standards, CGM, (future) CGI, and IGES.

CGM is used for the storage and transfer of picture description information. It enables pictures to be recorded for long term storage, and to be exchanged between graphics devices, systems, and installations. As indicated in Figure 2, the storage mechanism for CGM is in the form of a neutral file format called a metafile. The software which creates the metafile is known as a CGM Generator. The software which reads and displays a CGM metafile is known as an Interpreter.

CGM specifies a semantic interface that describes 2D graphical entities using primitives (like polyline, text, and ellipse) and attributes (like color, line width, interior style, and fonts). CGM is compatible with the specification of 2D elements in GKS. A data encoding specifies the exact sequence of bits used to represent each operation and its parameters. CGM contains three types of data stream encodings (binary, character, and clear text) to provide the implementor choices depending on the particular application.

IGES provides a method for representing and storing geometric, topological, and non-geometric product definition data that is independent of any one system. Where CGM transfers graphical pictures, IGES transfers a graphical database which can be processed to represent a picture. Thus IGES represents more than just purely graphical data. As Figure 2 indicates, the storage mechanism for IGES is in the form of a neutral format that must be translated by a Preprocessor and Postprocessor for conversion between systems. IGES permits the compatible exchange of product definition data used by various computer aided design/ computer aided manufacturing (CAD/ CAM) systems.

The future CGI standard is designed to specify the exchange of information at the Virtual Device Interface. It will provide an interface between the device independent and device dependent parts of a graphic system. Since CGI contains information at a vitual level, it can be used to create a CGM. A CGM can also be output on a CGI device in a straightforward manner.

[FR Doc. 95–2103 Filed 1–26–95; 8:45 am] BILLING CODE 3510–CN–M

[Docket No. 940386-4338]

RIN 0693-AB22

## Approval of Federal Information Processing Standards Publication 172–1, VHSIC Hardware Description Language (VHDL)

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 172–1, VHSIC Hardware Description Language (VHDL). This FIPS adopts language specifications contained in ANSI/IEEE 1076–1993, IEEE Standard VHDL Language Reference Manual.

**SUMMARY:** On April 12, 1994 (59 FR 17336–17338), notice was published in the **Federal Register** that a revision to Federal Information Processing Standard 172, VHSIC Hardware Description Language (VHDL) 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.

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 revised standard becomes effective May 1, 1995. Prior to