

# **AN OVERVIEW OF THE PRODUCT DATA HYPERSTANDARD CD-ROM PROTOTYPE**

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**November 1990**



**U.S. DEPARTMENT OF COMMERCE  
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# *An Overview of the Product Data HyperStandard CD-ROM Prototype*

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## *Abstract*

This paper describes the contents of the Product Data HyperStandard CD-ROM Prototype containing information related to product data standards. HyperStandard is a generic term describing the application of hypertext and multimedia technologies to standards in general. The CD-ROM contains both browsers for perusing the documents, and a number of other items of interest to the product data community. These include: IGES Version 5; the CALS specifications; preliminary STEP drafts, PDES, Inc. technical documents; the NIST PDES Toolkit; plus miscellaneous other pieces of information. (The sources of data for the document browsers on the CD-ROM prototype were the original electronic documents used to print those documents.) All of these data combined should serve as a useful repository of information for the community of technical experts developing product data standards. This variety of information has been assembled to demonstrate that CD-ROM's are a convenient and cost-effective medium for use by the people involved in product data standardization efforts.

## *Background*

The PDES (Product Data Exchange using STEP) activity [Furlani90, Smith88] and STEP (Standard for the Exchange of Product Model Data) standards effort are creating an evolving series of standards for product data exchange. In December of 1988 most of the PDES documents were collected into a "first working draft" and circulated to the international community for comment. One major portion of this document was called the IPIM (Integrated Product Information Model) and it was used as source material for the interactive browsers

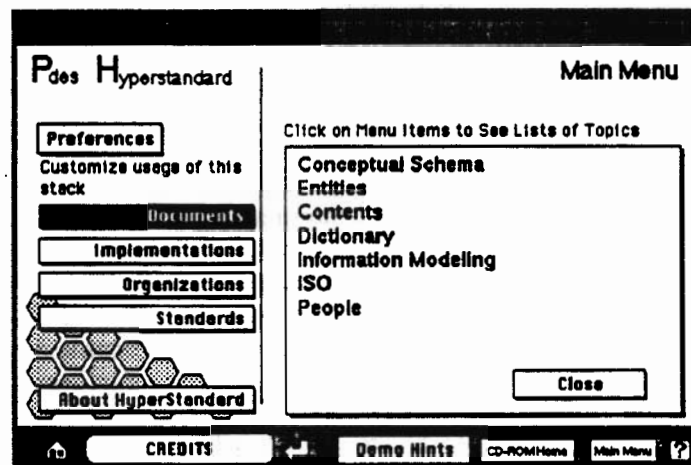
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discussed in this paper. Subsequently the IPIM was broken up into a series of documents now referred to as Parts. These Parts will go forward as a set of related ISO standards under TC184/SC4, collectively known informally as the STEP standards.

One of the end results of these efforts, as with all standards, will be paper documents. These documents must eventually be read and used as reference material. The information in the standards must function both as educational material and as specifications to be implemented. Reading over a thousand pages of dense technical material consisting primarily of data structure definitions is not a pleasant task. An on-line form of the document that can be searched and browsed would clearly be useful, especially when the documents are to serve as reference material.

The information contained in the Product Data HyperStandard (PDH) CD-ROM Prototype has been gathered over a period of almost two years. An initial proof of concept was implemented on a Macintosh computer using HyperCard [RES88]. Figure 1 illustrates the opening card for that prototype. This proof of concept was an overview which explored some of the possibilities for using an on-line dynamic medium like HyperCard [Apple87] for browsing standards documents and for educational purposes.

**FIGURE 1. Opening Card of the Original HyperStandard proof-of-concept**



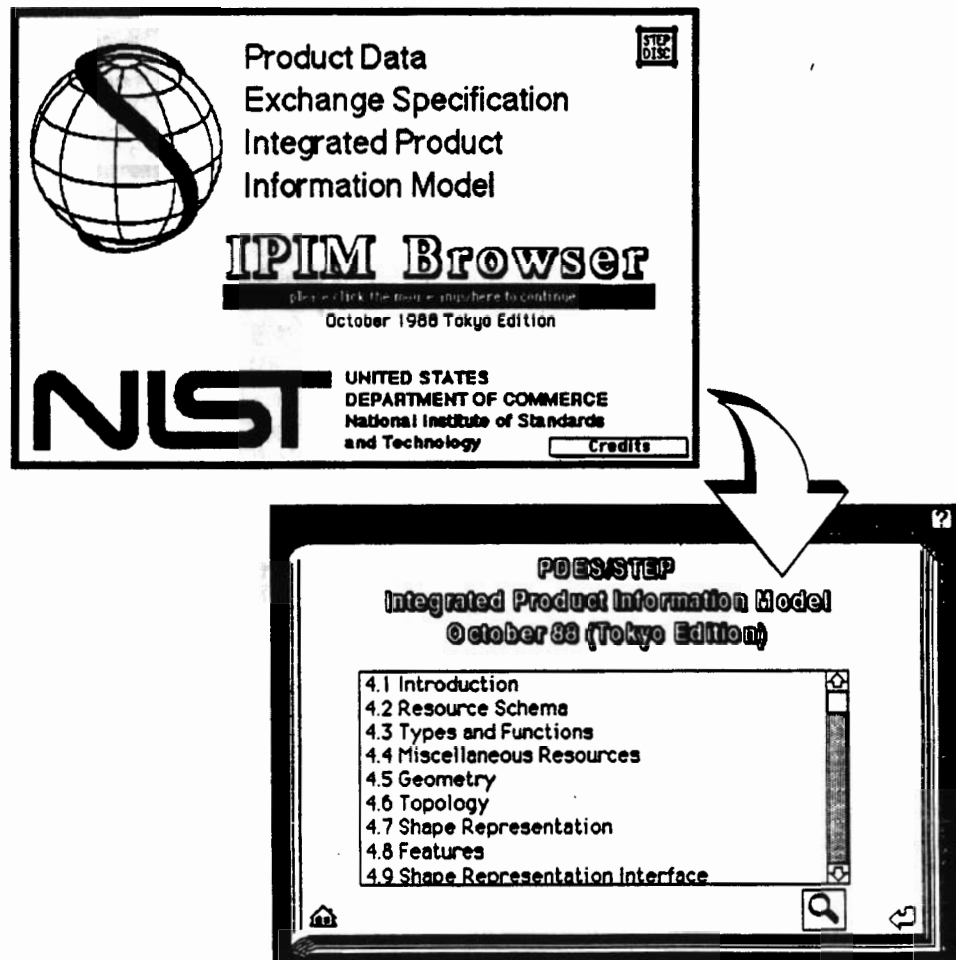
Some development work, particularly the PDES/STEP standards activities taking place at the present time, are not simply the codification of existing practices but require new technical research and development efforts. No one really knows all the answers about how to represent correctly the many elements involved in product data. This raises the importance of educating the existing engineering and technical professionals who will be expected both to use and understand STEP. Interactive multimedia systems which include the standards as well as coherent demonstrations should prove to be a step in the right direction.

## The Browsers

Two browsers, utilities to enable interactive reading[Nielson89], have been built. One functions on the Macintosh and was created using HyperCard. The second runs on PC-compatible machines and was created using Quantum Leap (QL)[Quantum90], a software utility for building databases intended to be placed onto a CD-ROM.

On the Macintosh two versions of essentially the same browser exist. One is called the IPIM Browser, the other is called the STEP Browser. They are different primarily in the organization of the content, not in their usage. The IPIM Browser (see figure 2) consists of two HyperCard stacks (a stack is the term used to describe a HyperCard file) containing a representation of the Table of Contents (TOC) and the entity definitions.

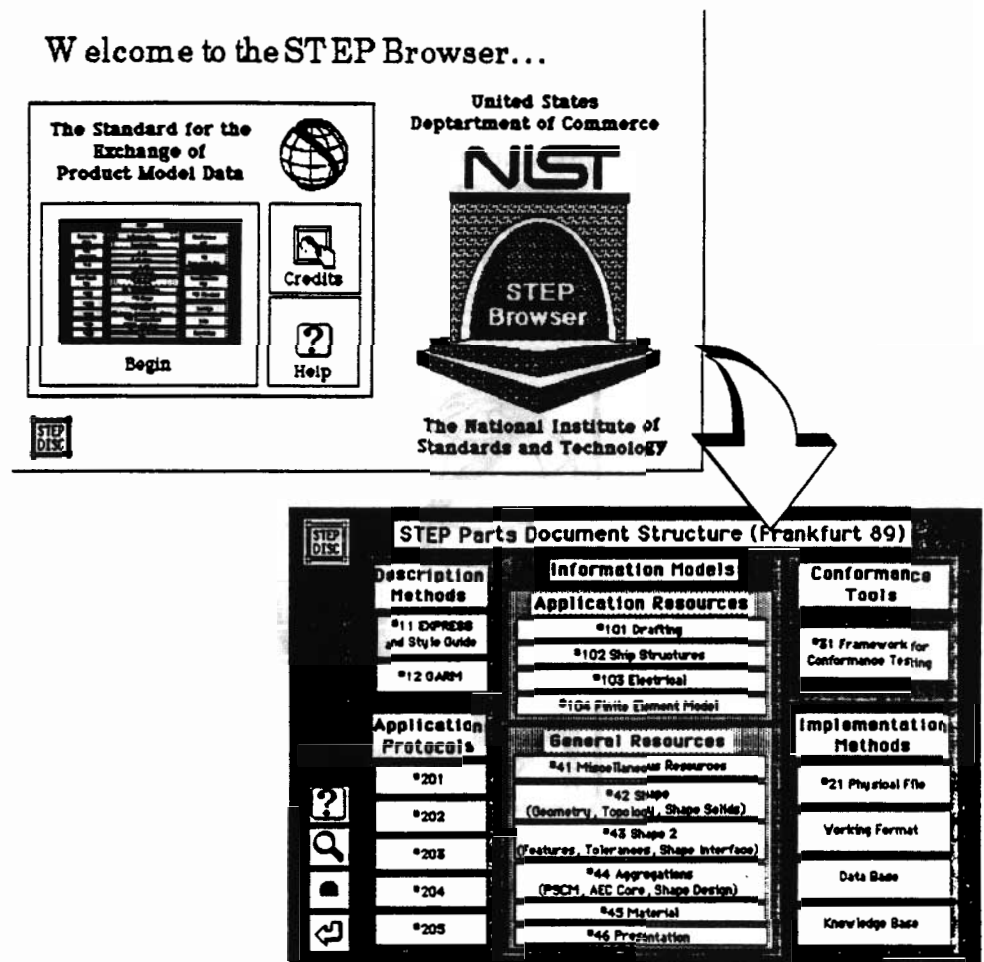
FIGURE 2. IPIM Browser Opening and Initial Cards



The STEP Browser (see figure 3) is a more modularized version of the IPIM Browser (just as the new document structure for STEP is more modularized

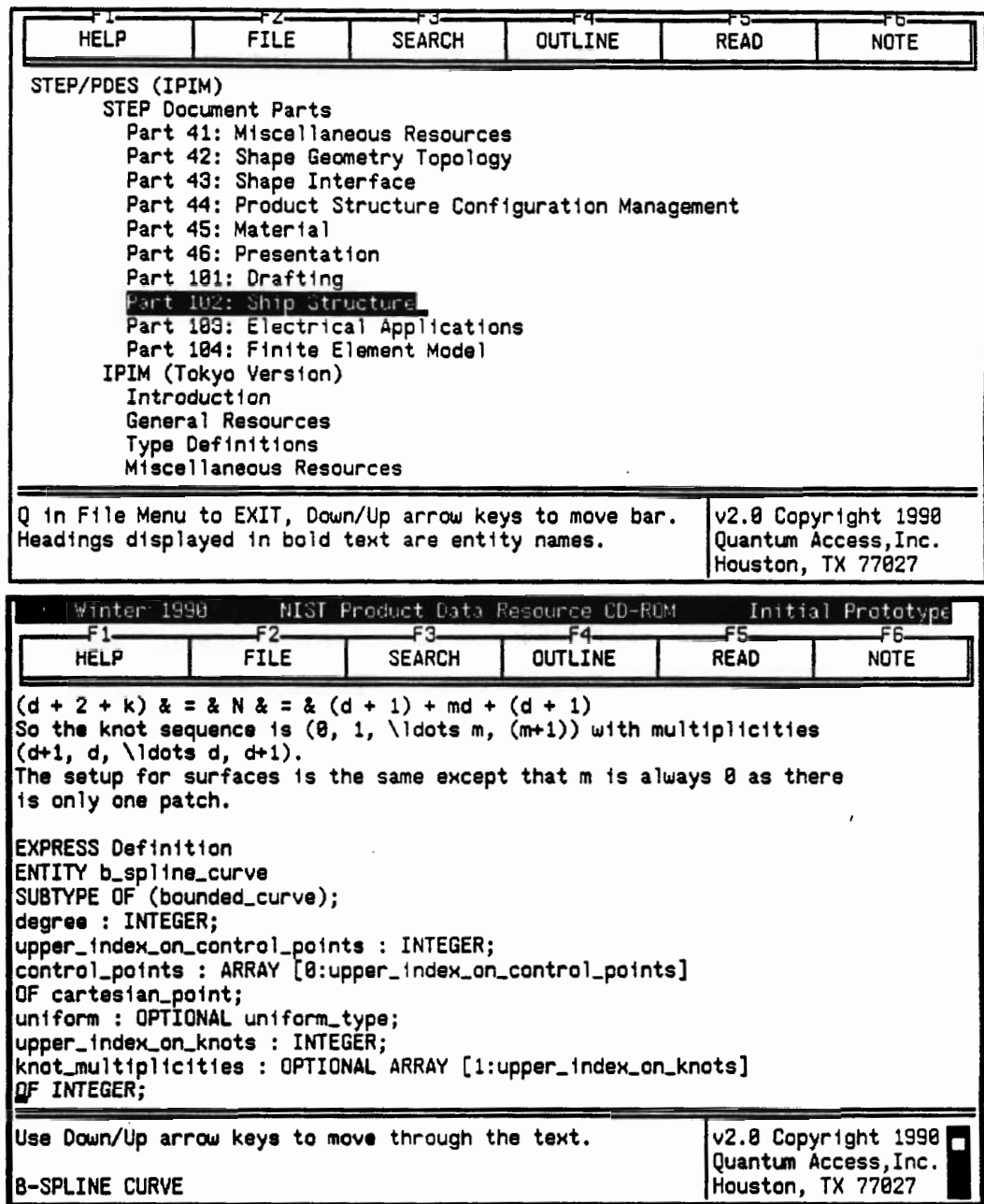
than the original IPIM) in that a separate HyperCard stack exists for each Part. The TOC mechanism is used again for the STEP Browser but is physically in the same stack as the entities, however the user need not be aware of or know its physical location.

FIGURE 3. The STEP Browser Opening and Initial Cards



A completely different browser (see figure 4) was developed for PC compatible platforms using a CD-ROM development system by Quantum Access called Quantum Leap (QL). Although the software and user interface is quite different from the HyperCard browsers, some similarities remain. Most important of these is that the same source of information was used, the LaTeX [Lamport86] electronic documents.

FIGURE 4. Browser using Quantum Leap on a PC



Just as the HyperCard browsers use a Table of Contents paradigm, QL also uses what Quantum Access refers to as an outline. Both mechanisms are user interface techniques allowing access to the document and both are basically the same conceptual paradigm.

## *Items on the CD-ROM*

The Product Data HyperStandard CD-ROM Prototype serves a variety of functions. These include data repository, educational mechanism, "snapshot in time" of standards versions, hypertext experiment, multimedia test and others. A variety of information has been assembled in the hopes of demonstrating that CD-ROM's are a convenient and cost-effective medium for use those people involved in product data standardization efforts.

The contents of each of the top-level directories and files on the CD-ROM prototype are described below. Some file types are followed by "(Mac)" indicating that it can be used only on a Macintosh. Others which can be used only on a PC, are followed by "(PC)". ASCII files, usable on all platforms and are labeled "(Generic)". Each of the descriptions are followed by a line stating the file name and file type (if a directory, which file to start looking at). In addition each directory on the CD-ROM prototype has a README file describing the contents.

File/Directory Name	File Types	Description
MACMAIN	HyperCard (Mac)	The place to start browsing on the Mac. Use the OVERVIEW stack.
README	ASCII (Generic)	Description of CD-ROM prototype contents.
EXPRESS	LaTeX (Generic)	The EXPRESS Manual N362, April 30, 1990
IPIM	LaTeX (Generic)	A set of directories comprising the Tokyo IPIM version of STEP.
STEP	LaTeX (Generic)	The original breakup of the IPIM into Parts in June of 1989 colloquially known as the "post Frankfurt" breakup.
TESTBED	HyperCard (Mac)	A stack describing the National PDES Testbed.
HS_DEMO	HyperCard (Mac)	Start with the file PDESHS to view the original HyperStandard Prototype.
IPIM_BR	HyperCard (Mac)	The IpimBrowser HyperCard stacks. Start with the PDESINTR stack.

File/Directory Name	File Types	Description
LIB_DB	HyperCard (Mac)	A test of extracting information from an Oracle database. The resulting stack contains information about documents located at the Testbed library. Use the LIB-DB stack.
STEP_BR	HyperCard (Mac)	The Step Browser. Use the STEP_BR stack to browse through the "post Frankfurt" document breakup.
STEPBRTL	ASCII (Generic)	Snobol code and HyperCard stacks. Tools to help build the STEP Browser from the LaTeX source documents.
NPT	FrameMaker	The National PDES Testbed Report Series. Most files are FrameMaker documents describing the NIST PDES Toolkit.
HOTPICS	HyperCard (Mac)	A stack and C source code for a HyperCard XCMD to link PICT files to HyperCard stacks.
PROJDEMO	MacroMind Director (Mac)	An animated overview of the National PDES Testbed from Oct. 89. Versions for 13" and 19" monitors (PROJOVCD.13 & PROJOVCD.19).
PC_BR	Quantum Leap (PC)	This is the main directory for the PC based browser. The DEST directory contains the data. The various "app" directories contain different versions of the browser.



File/Directory Name	File Types	Description
PDESSOFT	C Source Code	The NIST PDES Toolkit [CLARK90] both in a single tar (a UNIX utility) file and a set of directories. Also the directory fedex.101 contains the version of Fed-ex (The NIST EXPRESS compiler) which corresponds to the 1st committee draft version of EXPRESS TC184/SC4 Document N64.
TEX	TeX Processor (Mac)	A public domain version of TeX for the Macintosh. Including PicTeX a utility to create graphics in native TeX commands.
IPIM_PRS	EXPRESS (Generic)	A single file of the IPIM version of PDES in EXPRESS with fixes so that it will parse with the FedEx parser.
IAPP	HyperCard (Mac)	Start with the stack STANDARD and browse through information about product data standards projects and standards activities.
IGESV5	LaTeX (Generic)	The text of IGES Version 5 (3rd working draft, Jan 90), not including illustrations.
CALS	various	The entire contents of the CALS Bulletin Board as of Oct 1990. Includes the major CALS specifications as WordPerfect, MS Word and ASCII files.
PDESINC	WordPerfect (PC,Mac)	The complete set of PDES, Inc., Phase I deliverable documents. Almost everything is WordPerfect 4.2 for use on PC's. The file PITAR is a duplicate of the entire set of documents in tar format.

One brief technical note: The ISO 9660 CD-ROM standard [ISO9660] has a limited name space for file names. File names must be eight uppercase alpha or numeric characters followed by a period followed by a three-character extension.

Because of this restriction file names were changed. However inside files such as source code, LaTeX "\include" statements and others, references to the old longer file names still exist. Check before trying any significant compilation or document processing. The new names are similar to the old. It may be a requirement to copy the files on to a hard disk in order for some software to function properly. This is true of software which refers to specific files names, such as OzTex.

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### *Future Directions*

One area ripe for great improvement is the document processing procedures. As LaTeX documents were the source of the content, many implicit heuristics were used to derive structure from these documents. It is clear that the use of SGML (Standard Generalized Markup Language) which would make the document structure explicit, would greatly improve the document conversion process. However for this to occur the organizations generating the content, ISO TC184/SC4, the IPO (IGES/PDES Organization) and NIST must all start to use SGML in the authoring phase of these product data standards. Only then will the production of timely and accurate CD-ROMs become a reality.

Another area for future work is the user interface. Overall the interface is not consistent across the entire set of information. The fragmented user interface is the result of gathering the information in bits and pieces over the period of two years, during which the information structure changed radically. From the user's point of view the browsing must become more coherent and software for using the CD's on UNIX workstations should also be explored. Since much of the software being developed in the STEP/PDES world is occurring on UNIX workstations it would only be natural to start an effort to bring useful browsers to those platforms.

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### *Summary and Conclusions*

This Product Data HyperStandard CD-ROM Prototype represents a large collection of information of use by the general community of technical experts involved in the creation of product data standards. The STEP and original PDES specifications are also included in formats browsable on both IBM PC and Macintosh platforms.

Production of this CD-ROM is another example of the "chicken and the egg" problem. Most of these technical experts do not have a CD-ROM player because useful information does not exist on CD-ROM's. It is hoped that this CD-ROM will encourage this technical community to start examining the use of CD-ROMs both as a medium for publishing information and as an aid in technology transfer.

**Acknowledgments**

This Product Data HyperStandard CD-ROM Prototype could not have been produced without the help of a number of individuals. First, thanks to Anne Gilman for writing many of the original HyperStandard proof-of-concept scripts, most of the IPIM Browser scripts and much of the visual design. Thanks to Scott Bodarky for bringing some coherence to the document processing tasks and for writing the Snobol code to translate the LaTeX documents into HyperCard. Thanks to Kent Reed for making IGES version 5 available and for many sanity checks. And thanks to Dave Bettwy for making the CALS Bulletin Board available and Curt Parks for making the IAPP HyperCard stacks available.

For the actual CD-ROM production:

Thanks to E. J. (Jerry) McFaul and Kevin Laurent of the USGS for letting me pick their brains about who to ask for answers to my CD-ROM questions. Thanks to John Garafolo of NIST for answering my many questions. Last and certainly not least thanks to Matthew Leak, Scot Fast and Rob Oglevee of Meridian Data for making the magical task of mastering for both Macintosh and PCs possible and for graciously allowing me to use their machines.

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|-------------|---|
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## *Appendix: Getting Started*

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### **On the Macintosh**

To begin the main browsing functions you must have HyperCard version 1.2 or later. Start with the OVERVIEW stack in the MACMAIN folder and it can lead you to all other useful HyperCard stacks on the disk.

To view the animated overview of the National PDES Testbed you must have MacroMind Director, a MacII with at least 4Mb of memory and a color 13" or 19" monitor. Use the appropriate Director overview document.

### **On an IBM PC or compatible**

You must have a PC with a CD-ROM player connected and the Microsoft extensions to MSDOS. To run the browsers set the environment variable QAROM as follows:

```
set QAROM=D:\PC_BR\DEST
```

where D: is the drive name of the CD-ROM drive

Next change directories into one of the app directories

```
cd D:\PC_BR\MAINAPP
```

and type

```
qaccess
```

Use the arrow keys to move around and functions keys to access the various menu options.

## BIBLIOGRAPHIC DATA SHEET

1. PUBLICATION OR REPORT NUMBER

NISTIR 4470

2. PERFORMING ORGANIZATION REPORT NUMBER

3. PUBLICATION DATE

NOVEMBER 1990

4. TITLE AND SUBTITLE

An Overview of the Product Data HyperStandard CD-ROM Prototype

5. AUTHOR(S)

Sandy Ressler

6. PERFORMING ORGANIZATION (IF JOINT OR OTHER THAN NIST, SEE INSTRUCTIONS)

U.S. DEPARTMENT OF COMMERCE  
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY  
GAITHERSBURG, MD 20899

7. CONTRACT/GRANT NUMBER

8. TYPE OF REPORT AND PERIOD COVERED

9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (STREET, CITY, STATE, ZIP)

10. SUPPLEMENTARY NOTES



DOCUMENT DESCRIBES A COMPUTER PROGRAM; SF-185, FIPS SOFTWARE SUMMARY, IS ATTACHED.

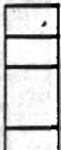
11. ABSTRACT (A 200-WORD OR LESS FACTUAL SUMMARY OF MOST SIGNIFICANT INFORMATION. IF DOCUMENT INCLUDES A SIGNIFICANT BIBLIOGRAPHY OR LITERATURE SURVEY, MENTION IT HERE.)

This paper describes the contents of a CD-ROM containing information related to product data standards. HyperStandard is a generic term describing the application of hypertext and multimedia technologies to standards in general. (The source of data for the document browsers on the CD-ROM was the original electronic documents used to print those documents.) The CD-ROM contains both browsers for perusing the documents and a number of the items of interest to the product data community. These include: IGES Version 5; the CALS specifications; PDES, Inc. technical documents; the NIST PDES Toolkit; plus miscellaneous other pieces of information. These references should serve as useful sources of data and information for the community of technical experts developing product data standards.

12. KEY WORDS (6 TO 12 ENTRIES; ALPHABETICAL ORDER; CAPITALIZE ONLY PROPER NAMES; AND SEPARATE KEY WORDS BY SEMICOLONS)

CD-ROM; Hypermedia; Hypertext; Product Data; PDES; STEP

13. AVAILABILITY



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14. NUMBER OF PRINTED PAGES

15

15. PRICE

A02

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