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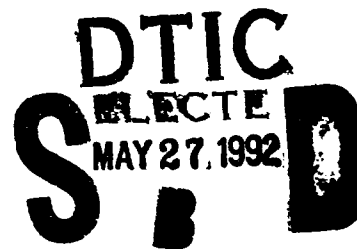
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Volume V  
Part 45



INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)  
Volume V - Common Data Model subsystem  
Part 45 - CDM Compare Utility User's Manual

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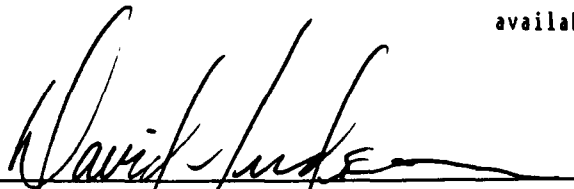
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FOREWORD

This technical report covers work performed under Air Force Contract F33600-87-C-0464, DAPro Project. This contract is sponsored by the Manufacturing Technology Directorate, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. It was administered under the technical direction of Mr. Bruce A. Rasmussen, Branch Chief, Integration Technology Division, Manufacturing Technology Directorate, through Mr. David L. Judson, Project Manager. The Prime Contractor was Integration Technology Services, Software Programs Division, of the Control Data Corporation, Dayton, Ohio, under the direction of Mr. W. A. Osborne. The DAPro Project Manager for Control Data Corporation was Mr. Jimmy P. Maxwell.

The DAPro project was created to continue the development, test, and demonstration of the Integrated Information Support System (IISS). The IISS technology work comprises enhancements to IISS software and the establishment and operation of IISS test bed hardware and communications for developers and users.

The following list names the Control Data Corporation subcontractors and their contributing activities:

<u>SUBCONTRACTOR</u>	<u>ROLE</u>
Control Data Corporation	Responsible for the overall Common Data Model design development and implementation, IISS integration and test, and technology transfer of IISS.
D. Appleton Company	Responsible for providing software information services for the Common Data Model and IDEF1X integration methodology.
ONTEK	Responsible for defining and testing a representative integrated system base in Artificial Intelligence techniques to establish fitness for use.
Simpact Corporation	Responsible for Communication development.

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Virtual Terminal Interface, and Network  
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development, implementation, and  
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Arizona State University

Responsible for test bed operations  
and support.

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SECTION 1

INTRODUCTION

CDM Compare is a utility used to compare two versions of a CDM and report differences in the internal, conceptual and external schemas as well as the conceptual-internal, conceptual-external and complex schema mappings.

The CDM Compare utility is composed of three parts or phases:

- o Extract Phase - obtains the pertinent information from a CDM and saves the information in a file. This data extraction must be done for each version of the CDM.
- o Compare Phase - performs a comparison of the information obtained from the extract phase and saves the results in a table.
- o Report Phase - displays the results of the comparison.

The CDM Compare utility queries the database tables of the CDM and presents its report to a terminal, a file, or a hardcopy device. Neutral Data Manipulation Language (NDML) is used to obtain the required information from the CDM during the extract phase. You must have access privileges to the IISS environments containing the CDM versions to be compared.

Intended Audience

This document is intended to be used by CDM administrators (CDMA), those who are responsible for making changes to the CDM and ensuring it remains in a consistent state.



## SECTION 2

### DOCUMENTS

#### 2.1 Reference Documents

- [1] ICAM Documentation Standards, IDS150120000C, 15 September 1983.
- [2] D.Appleton Company, CDM Administrator's Manual, UM 620341000, 31 March 1988.
- [3] D.Appleton Company, CDM1, An IDEF1 Model of the Common Data Model, CCS620141000, 15 May 1985.
- [4] Control Data Corporation, Neutral Data Definition Language User's Guide, 31 March 1988.
- [5] C. J. Date, An Introduction to Database Systems, Addison-Wesley Publishing Company, Inc, 1977.
- [6] IBM, DATABASE 2 Reference release 1.0, IBM, December 1984.
- [7] Cincom Systems, TOTAL Database Administration Reference Manual, release 8.1 1978, Cincom Systems.

#### 2.2 Terms and Abbreviations

Application Process: (AP), a cohesive unit of software that can be initiated as a unit to perform some function or functions.

Common Data: (CD), all the data of an enterprise.

Common Data Model: (CDM), IISS subsystem that describes common data of an enterprise and includes conceptual, external and internal schemas and schema transformation operators.

Common Data Model Administrator: (CDMA), the person or group of persons responsible for creating and maintaining an enterprises's Common Data Model. The CDMA manages the common data rather than managing applications that access data.

Common Data Model Processor: (CDMP), a component of the Common Data Model subsystem which is the distributed database manager of the IISS.

Conceptual Schema: (CS), the standard definition used for all data in the enterprise. It is based on IDEF1 information modelling.

External Schema: (ES), an application's view of the CDM's conceptual schema.

Integrated Information Support System: (IISS), a computing environment used to investigate, demonstrate, test the concepts and produce application for information management and information integration in the context of Aerospace Manufacturing. The IISS addresses the problems of integration of data resident on heterogeneous data bases supported by heterogeneous computers interconnected via a Local Area Network.

Internal Schema: (IS), the definition of the internal model, the storage structure definition, which specifies how the physical data are stored and how they can be accessed. It is represented in terms of the physical database components, including record types and inter-record relationships.

Neutral Data Definition Language: (NDDL), a language used to manipulate and populate information in the Common Data Model (CDM) or IISS System Database.

Neutral Data Manipulation Language: (NDML), a language developed by the IISS project to provide uniform access to common data, regardless of database manager or distribution criteria. It provides distributed retrieval and single node update.

Presentation Schema: (PS), the totality of the form fields in an application which are targets of data derivative from the common data.

SECTION 3

USING THE CDM COMPARE UTILITY

The CDM Compare is a software utility available in the IISS environment. The programs which comprise the utility consist of functions which compare one version of a CDM with another version of the CDM and report the results of the comparison. The CDM Compare consists of three phases which are executed from the IISS Function Screen as separate applications.

The following sections explain how to execute each phase.

3.1 The Extract Phase

The Extract Phase is accessed through the IISS Function Screen. At this step you specify the schemas and mappings to be compared and the name of the output data file. You must execute an extraction separately for each version of the CDM that you want to compare. The result of each extraction is a data file. The result of the Extract Phase will be two data files, one for each CDM to be compared.

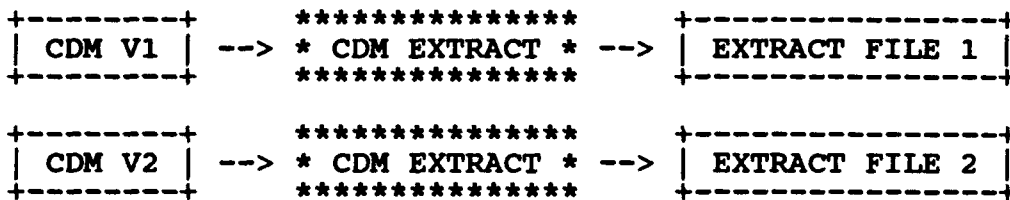


Figure 3-1 Extract Phase Block Diagram

3.1.1 Extract Phase Input

You access the Extract Phase by entering "CDMXTRCT" in the Function field on the IISS Function Screen. Figure 3-2 shows the input screen that is then displayed.

```
-----  
INTEGRATED INFORMATION SUPPORT SYSTEM  
  
      CDM COMPARE UTILITY  
  
      ** EXTRACT PHASE **  
  
      CDM Version Identifier: _____  
  
      Output Data File Name: _____  
  
      Place an "X" by each object to be compared  
      and press <enter> when your selections are  
      complete.  
  
      _Internal Schema           _Conceptual-Internal Schema Mappings  
      _Conceptual Schema        _Conceptual-External Schema Mappings  
      _External Schema          _Complex Mapping  
  
      Msg: 0                                                              application  
-----
```

Figure 3-2 Extract Phase Input Screen

The CDM Version Identifier field is a one to ten character field that you fill in to identify the CDM during the comparison process. The Output Data File Name field is a one to forty character field that you fill in to name the output data file. Both fields accept the characters A-Z, and the numbers 0-9 as long as the contents of the field starts with an alphabetic character. You select the objects to be compared by placing an "X" by the desired objects. You may select one comparison or as many as six comparisons at a time. When you press the <ENTER> key, a message is displayed in the message field (at the bottom of the screen) telling you which extraction is being performed. When the extraction is complete, the IISS Function Screen is displayed with a completion message in the message field. At this time you can execute another extraction or continue with the Compare Phase of the utility.

### 3.1.2 Extract Phase Output

The Extract Phase creates an output data file with the name you specify on the input screen. This file is used as input to the Compare Phase of this utility. A description of the record layout for this file is contained in Appendix A.

### 3.2 The Compare Phase

The Compare Phase is also accessed through the IISS Function Screen. In this phase you must specify the names of the files containing the results of the Extract Phase operation.

This part of the CDM Compare utility performs a comparison of the two files created during the Extract Phase. The output from the compare populates a table named Compare Results, which resides in the CDM data base. This table contains all the results of the compare.



Figure 3-3 Compare Phase Block Diagram

3.2.1 Compare Phase Input

You access the Compare Phase by entering "CDMCM PAR" in the Function field on the IISS Function Screen. Figure 3-4 shows the input screen that is then displayed.

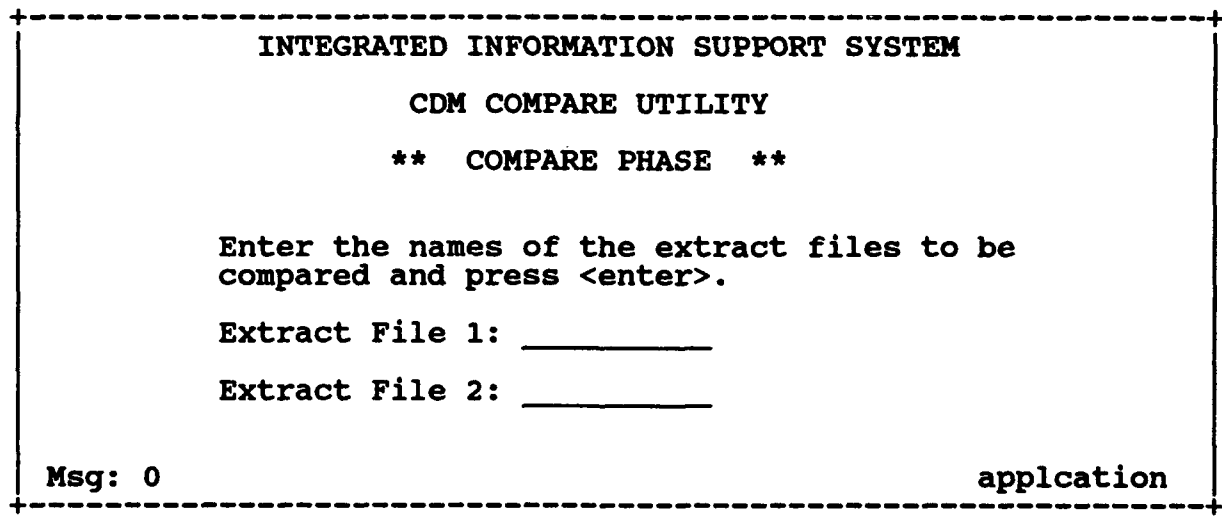


Figure 3-4 Compare Phase Input Screen

Input the names of the two extract files to be compared in the fields marked Extract File 1 and Extract File 2. The data files extracted from CDM 1 and CDM 2 correspond to the files: Extract File 1 and Extract File 2 respectively. The names of the two files may be one to forty characters long and can be comprised of alphanumeric characters as long as the first character is an alphabetic character. The extract files are sorted and compared with the differences identified and placed in the Compare\_Results table.

### 3.2.2 Compare Phase Output

The output from the Compare Phase populates the table Compare\_Results. The data which go into the table are: CDM version, schema id, category, level, item data and description of the difference for this item data occurrence. The Compare\_Results table must be created prior to using the CDM Compare utility the first time. Appendix B contains the NDDL statements necessary to define this table to the CDM.

### 3.3 The Report Phase

The Report Phase retrieves the comparison results from the Compare Results table and outputs the results to any appropriate output device supported by the User Interface Management System.



Figure 3-5 Report Phase Block Diagram

#### 3.3.1 Report Phase Input

The Report Phase is accessed through the IISS Function screen. The report program is accessed by entering "CDMRRPRT" in the Function field. If the report is to be displayed on the terminal, leave the other fields on the screen blank. If the report is to go to a disk file or hardcopy device, then "SDPRINTERZ" must be entered as the Device Type and the appropriate device name or file name must be entered in the Device Name field. The IISS Function Screen is shown in Figure 3-6.

```

+-----+
|          IISS      TEST      BED      VERSION      2.2          |
+-----+
| DATE: 6/27/86  TIME: 11:00:35  USER ID: myname  ROLE: manager |
|
| FUNCTION: CDMRRPRT  DEVICE TYPE: SDPRINTERZ  DEVICE NAME: <NAME> |
|
| Msg: 0                                               applcation |
+-----+

```

Figure 3-6 IISS Function Screen Used as Report Phase Input Screen

### 3.3.2 Report Phase Output

The results report is presented as shown in Figure 3-7.

```
-----+-----  
                          CDM COMPARE REPORT  
                          <Schema or mapping>  
                          <Category> - <Level>  
  
Item: model_name.ec_name.ac_name1  
Reason: not defined for CDM 2  
  
Item : model_name.ec_name.ac_name2  
Reason: definition different for CDM 2  
  
Msg: 0  
  
application  
-----+-----
```

Figure 3-7 Report Phase Output Display

The report produced during this phase has the format displayed in Figure 3-7. The schema or mapping is displayed at the top of the page. The category and level appear as the second line of the report. The category and level together uniquely identifies the part of the schema/mapping that is different. The item field names the command data definitions that are different. The reason field has two possible statements:

- o not defined for
- o definition different for

Appendix A contains more information concerning this hierarchy (category.level.item) and Appendix C shows which item type corresponds to the item name given in the above report (such as the one depicted above).

Figure 3-8 is an example of what one page of a report might be.

```
-----  
                          CDM COMPARE REPORT  
                          Conceptual Schema  
                          Entity-Class - Owned Attributes  
Item: integrated_model.attribute_class.attribute_class_key  
Reason: definition different for my_cdm  
  
Item: integrated_model.data_field_filler.df_filler_key  
Reason: not defined for your_cdm  
  
Msg: 0                               applcation  
-----
```

Figure 3-8 Example Report Phase Output Display