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Information technology — Data Management —

Part 3:
IRDS export/import facility

Technologies de l'information — Gestion de données —

Partie 3: Aide export/import IRDS



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 13238-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management services*.

ISO/IEC 13238 consists of the following parts, under the general title *Information technology — Data Management*:

— *Part 1: Export/import framework*

— *Part 2: SQL import/export*

— *Part 3: IRDS export/import facility*

Annex A forms an integral part of this part of ISO/IEC 13238. Annexes B to E are for information only.

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Introduction

ISO/IEC 13238 is a three part standard. Part 1 defines an overall framework for Export/Import facilities.

Part 2 defines facilities for export from and import to SQL databases that conform to ISO/IEC 9075.

This part, Part 3, defines facilities for export from and import to an IRD and or an IRD Definition that conform to ISO/IEC 10728.

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Information technology — Data Management —

Part 3:
IRDS export/import facility

1. Scope

This part of ISO/IEC 13238 enables the bulk transfer of all or part of the data contained in an Information Resource Dictionary (IRD) or in an Information Resource Dictionary Definition conforming to ISO/IEC 10728:1993 IRDS Services Interface.

This part of ISO/IEC 13238 defines a format for such a transfer and also services to generate the export file and services to import the file. These services are additional to the existing services defined in the IRDS Services Interface.

This version of this part of ISO/IEC 13238 defines a limited set of Export and Import services. It is expected that implementations will also provide more sophisticated services based on the use of the Transfer File structure defined in this part of ISO/IEC 13238.

The physical way in which the transfer takes place is outside the scope of this part of ISO/IEC 13238. Each transfer may be effected in one of several ways including the physical transfer of the data using a transportable storage device.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 13238. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 13238 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 6429:1992, *Information technology - Control functions for coded character sets.*

ISO/IEC 9075:1992, *Information technology - Database languages - SQL.*

ISO/IEC 10027: 1990, *Information technology - Information Resource Dictionary System (IRDS) framework.*

ISO/IEC 10646-1:1993, *Information technology - Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane.*

ISO/IEC 10728: 1993, *Information technology - Information Resource Dictionary System (IRDS) Services Interface.*

ISO/IEC 13238-1:—[1], *Information technology - Data Management - Part 1: Export/import framework.*

[1] To be published.

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3. Definitions

For the purposes of this part of ISO/IEC 13238, the following definitions apply.

3.1 Terms from ISO/IEC 10027 IRDS Framework

3.1.1 Application level

3.1.2 IRD

3.1.3 IRD definition level

3.1.4 IRD definition schema level

3.1.5 IRD level

3.1.6 IRD schema

3.1.7 IRDS

3.2 Terms from ISO/IEC 10646-1 Universal Multiple-Octet Coded Character Set (UCS)

3.2.1 Basic Multilingual Plane (BMP)

3.2.2 Character

3.3 Terms from ISO/IEC 10728 IRDS Services Interface

3.3.1 IRD Object

3.3.2 Name

3.3.3 Object

3.3.4 Object Version

3.3.5 Variation Name

3.4 Additional definitions

3.4.1 **Clear text file encoding**. A class of techniques for representing data based on first defining a human readable representation using some specific character repertoire and then defining an encoding for that repertoire.

3.4.2 **Export IRD**. The export of data from an origin or source IRDS into a Transfer File.

3.4.3 **Export process**. The process of generating a Transfer File from a source environment.

3.4.4 **Exporter**. The agent of the export process.

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3.4.5 Import IRD. The import of data to a destination or target IRDS from an Transfer File.

3.4.6 Import process. The process of incorporating the content of a Transfer File into a target environment.

3.4.7 Importer. The agent of the import process.

3.4.8 IRDS-data. A collection of data comprising the content of all or part of an IRD Definition and/or an IRD. This is a generic term used for convenience to describe the content of a Transfer File.

3.4.9 IRDS Transfer File. A Transfer File containing data which defines and describes the content of an IRD or a subset of an IRD. It is made up of three components: Transfer File Header component, Transfer File IRD Definition component, and Transfer File IRD Content component.

3.4.10 Transfer file. A file containing data to be interchanged. It is made up of a header, and a number of components. Components contain either data, or data definition data.

3.4.11 Transfer File Header. The first component of a Transfer File. This component contains data that uniquely defines the Transfer File. It contains details of the export IRD identification and time stamp.

3.4.12 Transfer File IRD Definition. The second (and optional) component of a Transfer File. This component contains the IRD definition that defines the following IRD content.

3.4.13 Transfer File IRD Content. The third (and optional) component of a Transfer File. This component contains the IRD content to be interchanged.

4. Abbreviations

Abbreviations used in this part of ISO/IEC 13238 are:

a) BMP Basic Multilingual Plane ;

b) BNF Bachus Naur Form;

c) IRDS Information Resource Dictionary System;

d) IRD Information Resource Dictionary;

e) TF Transfer File;

f) UTC Co-ordinated Universal Time.

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5. Conventions

5.1 Definition of Data in the Transfer File

An extended Bachus Naur Form (BNF) is used to describe the sequence of data in the Transfer File. The form of BNF used is that defined in ISO/IEC 9075, 3.2.

The names of the syntax units start with a lower case alphabetic character and intermediate characters are capitalised when they start a word.

5.2 Definition of Services

The conventions used to define services in clause 8 are those used in ISO/IEC 10728:1993 and where operations on the abstract data structure are defined, they are in terms of the data structure defined in Clause 6 of ISO/IEC 10728.

6. Concepts and facilities

6.1 Overview

This clause describes the Transfer File format and the services which are used to export and import IRDS data.

The services specified provide for the creation of an operating system file of characters of a specified encoding and in a defined sequence and its subsequent use in the same or a different real system. The physical transfer of an Transfer File from one real system to another may take place by any appropriate means.

The character encoding to be used is specified by this International Standard and hence no translation of the Transfer File is required or permitted when the file is transferred from one real system to another.

6.2 Transfer File

6.2.1 Structure

An IRDS Transfer File may contain an IRD Definition (which contains information which defines the content of an IRD) or a subset of an IRD Definition and/or an IRD or a subset of an IRD. For ease of reference each of these combinations is referred to in this part of this International Standard as IRDS-data.

An IRDS Transfer File is made up of three components as follows:

a) Transfer File Header;

b) Transfer File IRD Definition;

c) Transfer File IRD Content.

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The Transfer File header is a mandatory component. Both the Transfer File IRD Definition data and the Transfer File IRD Content are optional. However, one of the two must be present. The presence or absence of each is indicated in the Transfer File Header.

There may be many Transfer File IRD Definition Data components and/or Transfer File IRD Content components. This standard requires one component per IRD Working Set.

The reason for the optionality of the IRD Definition Data component is to allow it to be omitted in situations where data conforming to the same IRD Definition is being transferred frequently between the same exporter and importer.

Optionality of the IRD Content component allows an IRD Definition to be exported without any conforming IRD Content. This facility may be used prior to a set of Transfer Files being created using the same IRD Definition, but containing different IRD Content.

The IRD Definition Data and the IRD Content are each composed of a number of sets of rows. Each set of rows represents selected data from a single working set.

All IRD Definition and IRD level tables can be exported. In the data for a working set, all the IRD Object and IRD Object Version rows are included that are referenced by any other rows selected from the working set.

In the data for a working set, rows from the IRD_REFERENCE_PATH table are included to describe all of the reference paths used by foreign keys in the rows selected from the working set.

6.2.2 Transfer File Header

The Transfer File header contains information about the Transfer File, such as date time of file creation and information about the source of the file such as the person responsible for creation. Further user defined information may be added.

6.2.3 Transfer File IRD Definition

The Transfer File IRD Definition data consists of the definition of IRD Content which may then be exported as other components of a Transfer File IRD Content in the same or subsequent Transfer Files.

A Transfer File IRD Definition is for a set of IRD tables that a user of an IRDS-implementation has created and that a user wishing to export IRDS-data has selected.

Each IRD Definition has a name conforming to the rules for names in ISO/IEC 10728. This name is assigned by the exporter of the Transfer File in which the IRD Definition is used.

6.2.4 Transfer File IRD Content component

This component is the IRD Content. The Transfer File IRD Content shall conform (in the IRDS sense) to an IRD Definition which is named in the Transfer File header. The IRD Definition may or may not be present in the same Transfer File.

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6.3 Export/import services

6.3.1 Export services

There are the following export services:

a) Open a Transfer File for export;

b) Select the rows to be exported from specified tables; this service may be invoked many times, to select multiple tables and/or multiple sets of rows from a single table;

c) Clear a previous selection;

d) Export the contents of a Working Set; this service may be invoked many times, to export both IRD Definition and IRD level working sets;

e) to close the export file and make it available to other users.

The Open Export File Service generates the Transfer File header component.

The Export Working Set Service converts a working set in an IRD Definition or an IRD into the format defined for the Transfer File.

6.3.2 Import services

There are the following import services:

a) Open a Transfer File for import;

b) Import Working Set;

c) Close IRDS Import File.

Successful invocation of an Import Working Set service applied to an IRD Definition Working Set contained in the Transfer File, creates appropriate rows in the IRD Definition tables in the importing IRDS implementation.

Successful invocation of an Import Working Set service applied to an IRD Working Set contained in the Transfer File, creates appropriate rows in the IRD tables in the importing IRDS implementation.

If the Transfer File contains an IRD Working Set and the Transfer File IRD Definition component is not included, the import service makes use of the name of the IRD Definition given in the Transfer File header component to locate the named IRD Definition in the importing IRDS-implementation.

6.4 Working Sets

Each invocation of the export service generates rows from the single working set that represents the current or specified context. If Full Context is specified, additional rows may

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be exported from referenced working sets, depending on the selection criteria. The tables from which rows are to be extracted can be selected using the IRDSSelectForExport service.

6.5 Import Control Tables

Tables are defined in clause 8 which can be populated by the IRDS User and by the import services to assist the process of matching objects in an import file with objects already stored in the IRD or IRD Definition.

6.6 Content Modules

Those rows that represent objects contained within one or more IRDS Content Modules may be selected by using the IRDSSelectForExport service and specifying the tables required and a WHERE clause that includes appropriate references to IRD_MODULE_OBJ_KEY and IRD_MODULE_WS_KEY defined in ISO/IEC 10728, 6.1.4.1 Table IRD Object.

7. Specification of the Transfer File

7.1 Character Set

An IRDS Transfer File shall consist of a string of the characters from the Basic Multilingual Plane (BMP) of ISO/IEC 10646-1.

The file header (syntax element <tfIrdHeader> defined in 7.6.2 below) shall contain only characters from Table 1 of ISO/IEC 10646-1.

7.2 Character Coding

Characters in a Transfer File shall be coded using the UCS-2 coding of ISO/IEC 10646.

7.3 Tokens

7.3.1 Terminal Tokens

The characters defined in ISO 9075, 5.1 and indirectly referenced below by reference to clauses in ISO/IEC 9075 are defined to be the respective characters defined in ISO/IEC 10646-1 Table 1.

The following terminal BNF tokens are used in the definition of the Transfer File:

<space> ::=	Defined as the character at row 0 column 002 in ISO/IEC 10646-1.
<carriage return> ::=	Defined as the character at row D column 000 in ISO/IEC 10646-1.

Note: This conforms to ISO/IEC 6429:1992, 8.3.15.

<exclamation> ::=	Defined as the character at row 1 column 002 in ISO/IEC 10646-1.

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<line feed> ::= Defined as the character at row A column 000 in ISO/IEC 10646-1.

Note: This conforms to ISO/IEC 6429:1992, 8.3.75.

<tab> ::= Defined as the character at row 9 column 000 in ISO/IEC 10646-1.

Note: This conforms to ISO/IEC 6429:1992, 8.3.61.

<double quote> ::= " Defined as the character at row 2 column 002 in ISO/IEC 10646-1 and referenced in ISO/IEC 9075, 5.3.

<any character except double quote and newline> ::= any character defined in the basic multilingual plane of ISO/IEC 10646-1 except <double quote> as defined above and <newline> as defined below.

<column name>::= as defined in ISO/IEC 9075, 5.4.

<right brace> ::= } Defined as row D column 007 in ISO/IEC 10646-1 and referenced in ISO/IEC 9075, 5.4.

<left brace> ::= { Defined as row B column 007 in ISO/IEC 10646-1 and referenced in ISO/IEC 9075, 5.4.

<minus sign> ::= - Defined as row D column 002 in ISO/IEC 10646-1 and referenced in ISO/IEC 9075, 5.1.

<search condition>::= as defined in ISO/IEC 9075, 8.12.

<SQL language identifier> ::= as defined in ISO/IEC 9075, 5.4.

<table name> ::= as defined in ISO/IEC 9075, 5.4.

<timestamp literal> ::= as defined in ISO/IEC 9075, 5.3.

<unsigned integer> ::= as defined in ISO/IEC 9075, 5.3.

7.3.2 Commonly used tokens

The following BNF tokens are used in a number of places in the definition of the file structure:

<newline> ::= <carriage return> | <line feed>

<double quote in character string literal> ::= <double quote><double quote>

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<character string literal> ::= <double quote>
{ <character string literal element > } ...
<double quote>

<character string literal element > ::=

<any character except double quote and newline> |
<double quote in character string literal> |
<newline>

<any character except newline>::=
<any character except double quote and newline> |
<double quote>

<startComment> ::= <exclamation><exclamation>

<comment> ::= <startComment>
{ <any character except newline> } ...
<newline>

<separator> ::= { <comment> | <space> | <newline > | <tab> } ...

<endSeq> ::= <right brace>

<startSeq> ::= <left brace>

<quoted SQL language identifier> ::=
<double quote> <SQL language identifier> <double quote>

7.4 White Space

The syntactic token <separator> defines characters that are potentially white space.

Where such characters fall inside < character string literal > as defined above, they are part of the literal. Where such characters fall outside such character string literals they are termed "white space" and are ignored except in so far as they act to separate one token from another.

Rules for including <separator>s in the export/import file are as follows:

1. If two tokens in the BNF definition ARE NOT separated by a space , then <separator>s ARE NOT PERMITTED in the generated result. E.g. <double quote><double quote>.
2. If two tokens in the BNF definition ARE separated by a space, then <separator>s ARE PERMITTED in the generated result.
3. Where the BNF definition includes a constant value (e.g. TABLE_NAME), a <separator> is REQUIRED after this value, even though this is not explicitly shown in the BNF definition.
4. If a <separator> is REQUIRED between two tokens, this is explicitly shown in the syntax definition.

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7.5 IRDS Transfer File Structure

7.5.1 Content

The IRDS **Transfer File** contains IRDS-data. It is made up of three components as:

(1) Transfer File Header;

(2) Transfer File IRD definition; and

(3) Transfer File IRD content.

The **Transfer File Header** is the first component of a Transfer File and it contains information that uniquely defines the Transfer File such as the export IRD identification and time stamp. The **Transfer File IRD definition** components are the next optional components of the Transfer File and they contain the IRD definition that defines IRD content that may or may not be included in the same Transfer File. The **Transfer File IRD content** components are the last optional components of the Transfer File and contain the IRD objects that were defined by a previous (in this file or another) Transfer File IRD definition.

7.5.2 Definition

Figure 1 defines the syntax of an <irdsTransferFile>.

<irdsTransferFile> ::=
<tfIrdHeader> <tfComponent> [, <tfComponent>] ...

<tfComponent> ::=
<tfIrdDefinition> | <tfIrdContents>

Figure 1: File Syntax

7.5.3 General Rules

1. <tfIrdHeader> and at least one <tfComponent> must be present.

2. When both <tfIrdDefinition> components and <tfIrdContent> components are present, the <tfIrdDefinition> components shall precede all <tfIrdContent> components.

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7.6 Transfer File Header

7.6.1 Content

The Transfer File Header identifies the file as an IRDS Transfer File and is mandatory. The Transfer File Header contains the following groups of properties:

a) Transfer File Attributes;

b) Transfer Source Attributes;

c) Transfer User Parameters.

7.6.2 Definition

Figure 2 defines the syntax of a <tfIrdHeader>.

```
<tfIrdHeader> ::=
        <startSeq>
            <tfAttributes><tfSourceAttributes>
                                [<tfUserParameters>]
        <endSeq>
<tfAttributes> ::=
        <startSeq>
            <tfSignature>,
            TITLE  <tfTitle>,
            SYNTAX <tfSyntax>,
            ENCODING <tfEncoding>,
            TAGS <tfTableRowTags>,
            CODESET <tfCodeset>,
            TIMESTAMP <tfTimestamp>
        <endSeq>
<tfSignature> ::= DMEI-IRDS
<tfTitle> ::=  "ISO/IEC 13238-3:1998 IRDS TRANSFER FILE"
<tfSyntax> ::= BNF
<tfEncoding> ::=  CLEAR
<tfTableRowTags> ::=FULL  | SHORT  |  NUMBER  | UNLABELLED
<tfCodeset> ::= "ISO/IEC 10646-1 level 1 UCS-2"
<tfTimestamp> ::= <double quote> <timestamp literal> <double quote>
<tfSourceAttributes> ::=
        <startSeq>
```

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```
                SOURCE_NAME     <publisherName> ,
                SOURCE_SYSTEM_NAME          <publisherSystemName>

                [, SOURCE_FILE_VERSION      <publisherVersion>]
                [, SOURCE_ENVIRONMENT       <exporterToolPlatform>]
                [, SOURCE_PROGRAM_NAME      <exporterToolName>]
                [, SOURCE_PROGRAM_VERSION       <exporterToolVersion>]
                [,SOURCE_PROGRAM_VENDOR <exporterToolVendor>]
        <endSeq>

<publisherName> ::=     < character string literal>

<publisherSystemName> ::=       < character string literal>

<publisherVersion> ::=  <character string literal>

<exporterToolPlatform> ::=      <character string literal>

<exporterToolName> ::= <character string literal>

<exporterToolVersion> ::=       <character string literal>

<exporterToolVendor> ::=        <character string literal>

<tfUserParameters> ::=
        , USER_PARAMETERS < character string literal>
```

Figure 2: Header Syntax

7.6.3 General Rules

1. The identifiers shall consist of:

   a) <tfTitle> “ISO/IEC 13238-3:1998 IRDS Transfer File” as a constant.

   b) <tfSyntax>: always BNF. This is the only syntax supported by this International Standard. The field is included to allow for further syntax forms to be prescribed in future versions of this standard or of other standards with a similar file structure.

   c) <tfEncoding>: always CLEAR. This is the only token encoding supported by this International Standard. The field in included to allow for further token encoding forms to be prescribed in future versions of this standard or of other standards with a similar file structure.

   d) <tfCodeset> "ISO/IEC 10646-1 level 1 UCS-2".

      Note: ISO/IEC 10646-1 defines a number of conformance levels, of which level 1 is prescribed for an IRDS Transfer File. ISO/IEC 10646-1 defines a number of forms of a coded character set, of which UCS-2 is prescribed for an IRDS Transfer File.

   e) <tfTableRowTags> One of FULL, SHORT, NUMBER OR UNLABELLED

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constants. FULL means that the actual column names are used. SHORT means that the first three characters of each word in the column name, excluding the "IRD" prefix are used as column identifiers. NUMBER means that the column position is used as the tag. UNLABELLED means that the column values are not identified, and are placed in the file in the order of their definition.

f) <tfTimestamp> provides the date and time that the file was created in the format of an SQL <timestamp literal> expressed as UTC.

2. The other parameters are implementation or user defined:

a) <publisherName> is used to identify the person or group responsible for the preparation of the Transfer File. It is supplied on the IrdsOpenExportFile call.

b) <PublisherSystemName>: is a globally unique identifier assigned to the publisher's system, such as an OSI Directory name, a DNS name, or an IP Address. It is supplied on the IrdsOpenExportFile call.

c) <publisherVersion>: is a version number assigned to the file by its publisher. It is supplied on the IrdsOpenExportFile call.

d) <exporterToolPlatform> identifies the hardware/system software platform of the tool used by the publisher.

e) <exporterToolName> is a unique identifier for the exporting tool or product.

f) <exporterToolVersion> enables the exporter name to be qualified with a version identifier.

g) <exporterToolVendor> identifies the provider of the tool used by the publisher.

3. <tfUserParameters>, the user parameters, are optional. If required they are supplied on the IrdsOpenExportFile call.

7.7 Transfer File IRD definition

7.7.1 Content

The IRD Definition component serves to define the data that may follow in the IRD Content component of the same or a subsequent Transfer File. The IRD Definition component is made of the following parts:

a) a component header part;

b) a component content part.

The component content part contains tables.

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7.7.2 Definition

Figure 3 defines the syntax of a <tfIrdDefinition>.

```
<tfIrdDefinition> ::=
        <startSeq>
            <tfIrdDefinitionHeader>,
            <irdDefWorkingSetExport> [, <irdDefWorkingSetExport>] ...
        <endSeq>

<tfIrdDefinitionHeader>::=
            COMPONENT_TYPE <tfComponentType> ,
            COMPONENT_TITLE  <tfIrdDefTitle>,
            COMPONENT_NAME <irdDefName>

<tfComponentType> ::= DMEI-IRDS-DEFINITION

<tfIrdDefTitle> ::= "ISO/IEC 10728:1993 IRDS SERVICES INTERFACE IRD
DEFINITION"

Note:  A later version of the International Standard may be referenced.

<irdDefName> ::= <quoted SQL language identifier> .

<irdDefWorkingSetExport> ::=
        <startSeq>
            <workingSetTableRow>,
            <tfTable> [, <tfTable>] ...
        <endSeq>
```

Figure 3: IRD Definition Export Syntax

7.7.3 General Rules

1. The <irdDefWorkingSetExport> contains data extracted from a single working set. If more than one working set needs to be exported, then multiple <irdDefWorkingSetExport> components are used.

2. Any Time or Timestamp data types within the exported data shall be expressed in UTC.

3. All data are exported from the abstract data structures defined in Chapter 6 of ISO/IEC 10728 IRDS Services Interface and are not reproduced in this International Standard. While any table may be exported, the most relevant tables are IRD specific as listed in the services interface subclause 5.3. The list in the following table is provided as an example for reference only by naming tables 8 through 24 as a typical requirement. The export user may select any set of IRD tables that are considered to be relevant.

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#	Code	Table Name
08	SGR	IRD_SCHEMA_GROUP
09	SCH	IRD_SCHEMA
10	SRE	IRD_SCHEMA_REFERENCE
11	DTD	IRD_DATA_TYPE_DESCRIPTOR
12	DOM	IRD_DOMAIN
13	TAB	IRD_TABLE
14	VIE	IRD_VIEW
15	COL	IRD_COLUMN
16	VTU	IRD_VIEW_TABLE_USAGE
17	VCU	IRD_VIEW_COLUMN_USAGE
18	TCO	IRD_TABLE_CONSTRAINT
19	KCU	IRD_KEY_COLUMN_USAGE
20	RCO	IRD_REF_CONSTRAINT
21	CCO	IRD_CHECK_CONSTRAINT
22	CTU	IRD_CHECK_TABLE_USAGE
23	CCU	IRD_CHECK_COLUMN_USAGE
24	ASS	IRD_ASSERTION

Figure 4: IRD Tables

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7.8 Transfer File IRD content

7.8.1 Content

The dictionary contents are held in the third component as the Transfer File data. IRD content to be exported will be in the context of a current user session.

The IRD content component is made of the following parts:

a) a component header part;

b) a component content part.

The component content part contains tables.

7.8.2 Definition

Figure 5 defines the syntax of a <tfIrdContents>.

```
<tfIrdContents> ::=
        <startSeq>
            <tfIrdContentsHeader>,
            <irdWorkingSetExport> [, <irdWorkingSetExport>]  ...
        <endSeq>

<tfIrdContentsHeader>::=
            COMPONENT_TYPE <tfComponentType>,
            COMPONENT_TITLE  <tfIrdTitle>,
            COMPONENT_NAME <irdDicName>,
            COMPONENT_DEFINITION_NAME <irdDefName>,
            COMPONENT_SCHEMA_GROUP_NAME
                <irdSchemaGroupName>

<tfComponentType> := DMEI-IRDS-CONTENT

<tfIrdTitle> ::=
        " ISO/IEC 10728:1993 IRDS SERVICES INTERFACE IRD CONTENT"

Note:  A later version of the International Standard may be referenced.

<irdDicName> ::=            <quoted SQL language identifier>

<irdDefName> ::=            <quoted SQL language identifier>.

<irdSchemaGroupName> ::= <quoted SQL language identifier>

<irdWorkingSetExport>  ::=
        <startSeq>
            <workingSetTableRow>,
            <tfTable>[, <tfTable>] ...
        <endSeq>
```

Figure 5: IRD Content Syntax

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7.8.3 General Rules

1. The <irdWorkingSetExport> contains data extracted from a single working set. If more than one working set needs to be exported, then multiple <irdWorkingSetExport> components are used.

2. Any Time or Timestamp data types within the exported data shall be expressed in UTC.

7.9 Transfer File Table Transfer Syntax

7.9.1 Content

IRD definition and dictionary content are transferred using the same tabular structure, referred to as <tfTable>

The Table Transfer Structure is made of the following parts:

a) a table header part;

b) a table rows part.

The table rows part contains column values for each row.

7.9.2 Definition

Figure 6 defines the syntax of a <tfTable>.

```
<tfTable> ::=
        <startSeq>
                <tfTableHeader> ,
                <tfRow>   [, <tfRow>]  ...
        <endSeq>

<tfTableHeader>::=
                TABLE_NAME <tfTableName>
                [, TAGS <tfTableRowTags> ]

<tfTableName>::=  " <table name> "

<tfTableRowTags> ::=  FULL  | SHORT  |  NUMBER  | UNLABELLED

<tfRow>::=
        <startSeq>
                <tfColumn>  [, <tfColumn>]  ...
        <endSeq>
```

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```
<tfColumn> ::= [ <tfColumnId> <separator>]  <tfColumnValue>

<tfColumnId>  ::=  <tfColumnName>  | <tfColumnTag>  | <tfColumnNumber>

<tfColumnName> ::=   <double quote> <column name> <double quote>

<tfColumnTag> ::= <SQL language identifier>

<tfColumnNumber>  ::= <unsigned integer>

<tfColumnValue> ::= <character string literal>

<workingSetTableRow> ::=
        <startSeq>
                TABLE_NAME  IRD_WORKING_SET,
                [, TAGS <tfTableRowTags> ]
                <tfRow>
                        !! for a row from the IRD Working Set Table
        <endSeq>
```

Figure 6: Table Transfer Syntax

7.9.3 General Rules

1. If the value of a column in a row is null, then no instance of <tfColumn> is to be written to the file.

2. <tfTableRowTags> shall be one of FULL, SHORT, NUMBER or UNLABELLED constants. FULL means that the actual column names are used. SHORT means that the first three characters of each word in the column name, excluding the "IRD" prefix are used as column identifiers. NUMBER means that the column position is used as the tag. UNLABELLED means that the column values are not identified, and are placed in the file in the order of their definition.

3. If <tfTableRowTags> = FULL then

   <tfColumn> ::= <tfColumnId><separator><tfColumnValue>

   <tfColumnId> ::= <tfColumnName>

4. If <tfTableRowTags> = SHORT then

   <tfColumn> ::= <tfColumnId><separator><tfColumnValue>

   <tfColumnId> ::= <tfColumnTag>

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5. If <tfTableRowTags> = NUMBER then

   <tfColumn> ::= <tfColumnId><separator><tfColumnValue>

   <tfColumnId> ::= <tfColumnNumber>

6. If <tfTableRowTags> = UNLABELLED then

   <tfColumn> ::= <tfColumnValue>

7. If <tfTableRowTags> is omitted in <tfTableHeader>, the value from <tfIrdHeader> is used. If <tfTableRowTags> is present in <tfTableHeader>, its value overrides, for this table, the value specified in <tfIrdHeader>.

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8. Specification of the Import Control Tables

The tables specified in this clause are an extension of the IRD Definition specified in ISO/IEC 10728.

8.1 Table IRDS Dictionary Import Control

8.1.1 Function

This table has one row for each external Dictionary for which Import Control data is to be maintained. The rows in the table are created by the IrdsImportWorkingSet service, based on information in the <tfIrdHeader>, and/or they may be maintained by an IRDS User to control future imports.

8.1.2 Definition

```
CREATE TABLE IRDS_DICTIONARY_IMPORT_CONTROL
    (
    IRDS_EXT_DICT_OBJ_KEY IRDS_KEY NOT NULL,
    IRDS_EXT_DICT_WS_KEY IRDS_KEY NOT NULL,
    PRIMARY KEY (IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY),
    IRDS_EXT_SYSTEM_NAME CHAR(255) NOT NULL,
    IRDS_EXT_DICT_NAME CHAR(255) NOT NULL,
    UNIQUE (IRDS_EXT_SYSTEM_NAME, IRDS_EXT_DICT_NAME)
    )
```

8.1.3 Description

1. IRDS_EXT_DICT_OBJ_KEY and IRDS_EXT_DICT_WS_KEY together form the primary key of the IRD Dictionary Import Control Table.
2. IRDS_EXT_DICT_NAME identifies the Dictionary within the system named IRDS_EXT_SYSTEM_NAME, from which a Transfer File was created, whose data is to be imported to the local IRDS.
3. IRDS_EXT_SYSTEM_NAME and IRDS_EXT_DICT_NAME uniquely identify the Dictionary.
4. The size of IRDS_EXT_SYSTEM_NAME and of IRDS_EXT_DICT_NAME is not constrained by the local implementation limit on IRDS Names, because the exporting system may have different values.

8.2 Table IRD Object Import Control

8.2.1 Function

This table has one row for each IRD Object to be mapped from an external dictionary to a local dictionary. The rows in the table are created by the IrdsImportWorkingSet service,

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based on the results of object matching, and/or they may be maintained by an IRDS User to control future imports.

8.2.2 Definition

```
CREATE TABLE IRD_OBJECT_IMPORT_CONTROL
    (
    IRDS_EXT_DICT_OBJ_KEY IRDS_KEY NOT NULL,
    IRDS_EXT_DICT_WS_KEY IRDS_KEY NOT NULL,
    IRD_IMP_CONT_OBJ_KEY IRDS_KEY NOT NULL,
    PRIMARY KEY (IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY,
        IRDS_IMP_CONT_OBJ_KEY),
    CONSTRAINT IMPORTED_OBJECT_COMES_FROM_EXTERNAL_DICTIONARY
        FOREIGN KEY (IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY)
            REFERENCES IRDS_DICTIONARY_IMPORT_CONTROL
            ON DELETE CASCADE,
    IRD_OBJECT_KEY IRDS_KEY,
    CONSTRAINT IMPORTED_OBJECT_MAPS_TO_IRD_OBJECT
        FOREIGN KEY (IRD_OBJECT_KEY)
            REFERENCES IRD_OBJECT
            ON DELETE CASCADE
    )
```

8.2.3 Description

1. IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY and IRDS_IMP_CONT_OBJ_KEY together form the primary key of the Ird Object Import Control table.

2. IRDS_IMP_CONT_OBJ_KEY is the key of an object in the Transfer File that is to be mapped to an object in the local IRDS.

3. IRD_OBJECT_KEY is the key of an object (a row in IRD_OBJECT table) in the local IRDS to which the object in the Transfer File is mapped.

8.3 Table IRD Working Set Import Control

8.3.1 Function

This table has one row for each IRD Working Set that has been imported from an E/I file to a local working set. The rows in the table are created by the IrdsImportWorkingSet service, based on the parameters provided to the service, and/or they may be maintained by an IRDS User to control future imports.

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8.3.2 Definition

```
CREATE TABLE IRD_WORKING_SET_IMPORT_CONTROL

        (
        IRDS_EXT_DICT_OBJ_KEY IRDS_KEY NOT NULL,
        IRDS_EXT_DICT_WS_KEY IRDS_KEY NOT NULL,
        IRD_IMP_CONT_WS_KEY IRDS_KEY NOT NULL,
        IRD_WORKING_SET_KEY IRDS_KEY NOT NULL,
        PRIMARY KEY (IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY,
                IRDS_IMP_CONT_WS_KEY, IRD_WORKING_SET_KEY),
        CONSTRAINT IMPORTED_WS_COMES_FROM_EXTERNAL_DICTIONARY
                FOREIGN KEY (IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY)
                        REFERENCES IRDS_DICTIONARY_IMPORT_CONTROL
                        ON DELETE CASCADE,
        CONSTRAINT IMPORTED_WS_MAPS_TO_IRD_WORKING_SET
                FOREIGN KEY (IRD_WORKING_SET_KEY)
                        REFERENCES IRD_WORKING_SET
                        ON DELETE CASCADE
        )
```

8.3.3 Description

1. IRDS_EXT_DICT_OBJ_KEY, IRDS_EXT_DICT_WS_KEY and IRDS_IMP_CONT_WS_KEY and IRD_WORKING_SET_KEY together form the primary key of the Ird Working Set Import Control table.

2. IRDS_IMP_CONT_WS_KEY represents the WS_KEY part of primary and foreign keys in the content of an Transfer File, that is to be mapped to a working set in the local IRDS.

3. IRD_WORKING_SET_KEY is the key of a row in the IRD_WORKING_SET table in the local IRDS, to which the WS_KEY in the Transfer File is mapped.

4. When the IrdsImportWorkingSet service is invoked, a row will be created (if it does not already exist) mapping the working set to be imported, to the local working set into which the data is to be imported.

Irds users may insert other rows in this table to allow foreign key references in one working set to be mapped to another in the local IRDS.

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9. Specification of the export/import services

9.1 Relationship to the IRDS Services Interface

The services defined in this clause are additional to those defined in ISO/IEC 10728 Services Interface under subclause 9.2 Level Independent Services. In this Part of 13238 Pascal Language Bindings are given.

9.2 Services provided

Services are provided to:

a) Open the Transfer File for Export;

b) Select the rows to be exported from specified tables;

c) Clear a previous selection;

d) Export a single working set or a related set of working sets;

e) Close the Export File;

f) Open the Transfer File for Import;

g) Import a single Working Set;

h) Import the entire Transfer File;

i) Close the Import File.

9.3 Selection of data to be exported

Selection takes place within the context of an IRDS Session.

When not all tables are to be exported, the required tables are specified by invoking the IRDSSelectForExport service prior to invoking the IRDSExportWorkingSet service. This service also allows specific rows to be selected.

Each invocation of an IRDSSelectForExport service selects a set of rows from a named table.

The IRDSSelectForExport service may be invoked many times. The effect of multiple calls is to define multiple sets of rows for export by the IRDSExportWorkingSet service. Multiple IRDSSelectForExport service calls may name the same table. The effect is to select several sets of rows from the same table. Although a row may thus be selected several times, a selected row is exported exactly once.

A previously established set of selection criteria may be cancelled by invoking the IRDSClearExportSelection service.

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9.4 Service Data Types and Data Structures

This subclause defines data types and data structures used in the definition of the export/import services.

The following are defined in ISO/IEC 10728:

IrdsRetCode

The following are defined in this clause:

```
type IrdsTFileHandle = integer;

type MissingTablesController = (
      kCreateMissingTables,
      kSkipMissingTables,
      kFailOnMissingTable);

type SkipFailingRowsController = (
      kSkipFailingRows,
      kDontSkipFailingRows);

type SqlCommitController = (
      kCommitAtEndOfFile,
      kCommitAfterEachTable,
      kCommitAfterEachTableAndEveryNRows);

type UpdateExistingRowsController = (
      kUpdateExistingRows,
      kDontUpdateExistingRows);
```


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9.5 Open IRDS Export File

9.5.1 Function

Invocation of this service causes an output file to be opened and the header defined by <tfIrdHeader> to be written to the file.

9.5.2 Format

```
procedure IrdsOpenExportFile
  ( ExpFilePath:              String;
    ExpFileName:              String;
    UserParm:                 IrdsText;
    Tags:                     String;
    PublisherName:            String;
    PublisherSystemName:      String;
    PublisherVersion:         String;
    var CurrTFileHandle:      IrdsTFileHandle;
    var RetCode:              IrdsRetCode  );
```

9.5.3 Input

The following variables may be set:

ExpFilePath := when not null, the path to the directory in which the file is to be placed. When null, a default path will be used.

ExpFileName := when not null, the name to be used for the export file . When null, a default file name will be used.

UserParm = when not null, the value is user defined to add extra user information to the TF header.

Tags = one of the values defined for <tfTableRowTags> in 7.9.2.

PublisherName= the value to be included in the header as <publisherName>.

PublisherSystemName= the value to be included in the header as <PublisherSystemName>.

PublisherVersion= the value to be included in the header as <publisherVersion>

9.5.4 Output

The following variables shall be set:

CurrTFileHandle := a system handle for the opened export file.

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RetCode := with the following error states:

State Class	Subclass
92	901: The user does not have the appropriate operating system file access privileges.
92	902: Invalid File Name
92	903: Specified File Path does not exist
92	904: Other Operating System File Error
92	905: Invalid TAGS parameter.

9.5.5 General Rules

1. More than one IRDS Transfer File may be open at any one time. Use of the CurrTFileHandle allows the IRDS to relate specific invocations of IrdsSelectForExport, IrdsClearExportSelection, IrdsExportWorkingSet and IrdsCloseExportFile to a specific Transfer File.

2. If the file identified by the combination of “ExpFilePath“ and “ExpFileName“ does not exist, it is created. If the file already existed, its contents are replaced by the data exported by the series of “IrdsExportWorkingSet” services between an IrdsOpenExportFile and the following IrdsCloseExportFile.

3. An instance of <tfIrdHeader> is written to the file. Constant fields are given the values specified in clause 7. The variable fields are completed as follows:

   a) <tfTimestamp> to be a time between the start and end of the invocation of the IrdsOpenExportFile service.

   b) <exporterToolName> an implementor defined name of the tool generating the Transfer File.

   c) <exporterToolVersion> an implementor defined version name of the tool generating the Transfer File.

   d) <publisherName> the UserID of the IRDS User from the IRDSOpen service invocation that established the current session.

   e) <tfUserParameters> the value of the UserParm parameter supplied to the IrdsOpenExportFile call.

9.5.6 Operations on the Abstract Data Structure

None.

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9.6 Select For Export Service

9.6.1 Function

This service identifies selection criteria for a set of rows from a named IRD Definition or IRD Level table, for use in a subsequent Export Working Set service. The selection criteria are specified in the form of a SQL <search condition>.;

9.6.2 Format

```
procedure IRDSSelectForExport  (
            CurrTFileHandle:        IrdsTFileHandle;
            Tablename:              IrdsName;
            SelectionExpression:    String;
            var RetCode:            IrdsRetCode );
```

9.6.3 Input

The following variables are to be set:

CurrTFileHandle:= the handle of the Transfer File previously opened by a successful invocation of IrdsOpenExportFile and not yet the subject of an invocation of IrdsCloseExportFile.

Tablename := the name of an IRD or IRD Definition Level table whose rows are to be selected for export.

SelectionExpression := an SQL <search condition> for use in a subsequent Export Working Set service to select rows that conform to the <search condition>.

9.6.4 Output

The following variable shall be set:

RetCode := with the following error states:

State Class	Subclass
07	000: Invalid column name
02	008: Table does not exist
25	004: Invalid Transfer File handle
42	000: User does not have the appropriate privileges
10	000: Syntax error in <search condition>

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9.6.5 General Rules

1. Tablename shall identify an IRD or IRD Definition Level table.

2. SelectionExpression shall be a valid <search condition> as defined in ISO/IEC 9075.

3. The <search condition> shall be validated against the specified table for the current user.

4. The IRDSSelectForExport function may be invoked many times before the IrdsExport is called.

5. The accumulated selection criteria remain in effect until the invocation of a Clear Export Selection service or a Close IRDS service for the specified IRDS session.

9.6.6 Operations on the Abstract Data Structure

None.

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9.7 Clear Export Selection Service

9.7.1 Function

This service clears any previously established selections for export to the nominated Transfer File.

9.7.2 Format

```
procedure IRDSClearExportSelection  (
            CurrTFileHandle:  IrdsTFileHandle;
            var RetCode:      IrdsRetCode );
```

9.7.3 Input

The following variable is to be set:

CurrTFileHandle:= the handle of the Transfer File previously opened by a successful invocation of IrdsOpenExportFile and not yet the subject of an invocation of IrdsCloseExportFile.

9.7.4 Output

The following variable shall be set:

RetCode := with the following error states:

State Class	Subclass
25	004: Invalid Transfer File handle

9.7.5 General Rules

None.

9.7.6 Operations on the Abstract Data Structure

None.

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9.8 Export Working Set

9.8.1 Function

This service exports data from a working set to the nominated Transfer File. The working set identification functionality of this service is closely related to that of the Open Cursor service.

> Note: Working Sets from more than one IRD or IRD Definition may be exported to the same Transfer File.

9.8.2 Format

```
procedure IrdsExportWorkingSet
  ( CurrTFileHandle:    IrdsTFileHandle;
    CurrSessId:         IrdsSessId;
    UseContext:         boolean;
    WkgSetName:         IrdsName;
    WkgSetVerId:        IrdsName;
    FullContext:        boolean;
    ExpDef:             boolean;
    var RetCode: IrdsRetCode  );
```

9.8.3 Input

The following variables may be set:

CurrTFileHandle:= the handle of the Transfer File previously opened by a successful invocation of IrdsOpenExportFile and not yet the subject of an invocation of IrdsCloseExportFile.

CurrSessId := the current session identifier returned by a previous Open IRDS service.

UseContext := when true, indicates that only the object versions in the current context are to be exported and the values of “WkgSetName” and “WkgSetVerId” are to be ignored; when false, indicates that the variables “WkgSetName” and “WkgSetVerId” are to be used in establishing the context of the scope of export.

WkgSetName := when “UseContext” is false, provides the name of the working set to be used as the context of the export.

WkgSetVerId := when “UseContext” is false, provides the version identifier of the working set to be used as the context of the export.

FullContext := when true, a full context is to be used; when false, a single context is to be used.

ExpDef := when true, then the export definition is to be exported. When false, then the export definition is not exported and the IRD names are used to identify the definition to the importer.

9.8.4 Output

The following variables shall be set:

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RetCode := with the following error states:

State Class	Subclass
02	003: Working set does not exist
03	001: No data selected
25	001: Invalid Session identifier
25	004: Invalid Transfer File handle
25	007: Attempt to export IRD Definition Level Working Set after exporting an IRD Level Working Set to the same file
42	000: User does not have the appropriate privileges
54	000: No current working set context has been established

9.8.5 General Rules

1. A successful call to IrdsOpen shall be made prior to calling IrdsExportWorkingSet and the session id returned by the IrdsOpen call shall be passed to the IrdsExportWorkingSet call.

2. A successful call to IrdsOpenExportFile shall be made prior to calling IrdsExportWorkingSet and the CurrTFileHandle returned by the IrdsOpenExportFile shall be passed to the IrdsExportWorkingSet call.

3. The first call to IrdsExportWorkingSet for a particular IrdsSessId generates a <tfIrdDefinitionHeader> if the current session is an IRD Definition Level session or a <tfIrdContentsHeader> component if the current session is an IRD Level session.

4. <irdDefName> is to be taken from the irdDefName parameter of the IrdsOpen service invocation that established the current IRDS session.

5. <irdDicName> is to be taken from the IrdDicName parameter of the IrdsOpen service invocation that established the current IRDS session if the session is an IRD Level session.

6. Invocation of this service generates one or more entries in the Transfer File with the structure defined by either <irdDefWorkingSetExport>, if the current session is an IRD Definition Level session or by <irdWorkingSetExport> if the current session is an IRD Level session.

7. When Full Context is true an <irdDefWorkingSetExport> or a <irdWorkingSetExport> is generated for each of the working sets in the full context for which one or more rows have been selected directly or by reference from another selected row.

8. When “UseContext” is false, “WkgSetName” and “WkgSetVerId” shall together specify a working set and this shall be used as the context specifier for the export;

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when “UseContext” is true, there shall already be a current working set context and this shall be used as the context specifier for the export. When “FullContext” is true, the full context defined by the context specifier shall be used; when “FullContext” is false, the single context shall be used.

9. If no calls to IRDSSelectForExport have been made, all objects within the specified context are exported. If calls to IRDSSelectForExport have been made, all selected objects within the specified context are exported.

10. A single instance of <workingSetRow> containing the column values for the selected working set, followed by instances of <tfTable> are written to the Export File until a complete <irdDefWorkingSetExport> or <irdWorkingSetExport> has been written. Within each <tfTable> the name of the table being exported is written to the <tfTableName>. For every selected row in the table a <tfRow> is written to the export file. A row is selected if either: (i) no Select For Export Services has been invoked since the previous Clear Export Selection or IRDS Export Working Set Service or (ii) the row meets the selection condition of any Select For Export Service invoked since the previous Clear Export Selection or IRDS Export Working Set Service.

11. If ExpDef is true, an instance of <tfIrdDefinition> is written to the file.

12. The IRDS User who invokes this service shall have a select privilege on the current working set when UseContext is true, or on the specified working set when UseContext is false.

13. Information on implementor limits may be exported for the benefit of the importer, but the implementor limits themselves can not be imported, since the importing implementation's limits are set by the importing implementation itself.

14. Usage Tables (those with the word “usage” as part of their names) may be exported for the benefit of the importer, but are not to be imported and their rows are to be recreated when the appropriate check or view column values are imported.

15. Successive calls to IrdsExportWorkingSet for a particular IrdsSessId generate new instances of <irdDefWorkingSetExport> or <irdWorkingSetExport> as appropriate within the same <tfComponent>. A call to IrdsExportWorkingSet for a different IrdsSessId initiates a new <tfComponent>.

16. For a particular Transfer File, all invocations of this service for IRD Definition Level sessions must precede all invocations of this service for IRD Level sessions.

17. Once an IrdsExportWorkingSet service has been invoked, committed updates by other users or by other sessions of the invoking user shall not be visible until the service invocation completes. Thus, what is exported is a snapshot of the working set at the time that the service invocation starts.

Note: No facilities for maintaining consistency across multiple invocations of IrdsExportWorkingSet are specified in this International Standard.

9.8.6 Operations on the Abstract Data Structure

None.

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9.9 Close IRDS Export File

9.9.1 Function

Invocation of this service causes the output file to be closed and the file made accessible by other users.

9.9.2 Format

```
procedure IrdsCloseExportFile
  ( CurrTFileHandle:  IrdsTFileHandle;
    var RetCode: IrdsRetCode  );
```

9.9.3 Input

The following variables shall be set:

CurrTFileHandle:= the handle of the Transfer File previously opened by a successful invocation of IrdsOpenExportFile and not yet the subject of a previous invocation of IrdsCloseExportFile.

9.9.4 Output

The following variables shall be set:

RetCode := with the following error states:

State Class	Subclass
25	004: Invalid Transfer File handle
25	005: No successful prior call to IrdsOpenExportFile
92	904: Other Operating System File Error

9.9.5 General Rules

1. A successful call to IrdsOpenExportFile shall be made prior to calling IrdsCloseExportFile, and the CurrTFileHandle returned by the IrdsOpenExportFile shall be passed to the IrdsCloseExportFile call.

9.9.6 Operations on the Abstract Data Structure

None.

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9.10 Open IRDS Import File

9.10.1 Function

Invocation of this service causes an input file to be opened, the header defined by <tfIrdHeader> to be read from the file and its contents returned.

9.10.2 Format

```
procedure IrdsOpenImportFile
  ( ImpFilePath:  String;
    ImpFileName:  String;
    UpdateExistingRowsIndicator: UpdateExistingRowsController;
    SkipFailingRowsIndicator: SkipFailingRowsController;
    MissingTablesControlIndicator: MissingTablesController;
    ErrorFilePath: String;
    ErrorFileName: String;
    CommitControlIndicator: SqlCommitController;
    CommitAfter: Integer;
    var CurrTFileHandle: IrdsTFileHandle;
    var UserParm: IrdsTxt;
    var RetCode: IrdsRetCode  );
```

9.10.3 Input

The following variables may be set:

ImpFilePath := when not null, the specified import path will be used. When null, a default import path will be used.

ImpFileName:= when not null, the specified file name will be used, in conjunction with the specified path. When null, a default file name will be used.

UpdateExistingRowsIndicator:= An indicator that controls whether existing rows are to be updated or not.

MissingTablesControlIndicator:= An indicator that controls the action to be taken when a table is found in the import file that is not in the importing IRD, IRD Definition or was not included in the IRD Definition being imported. Allowable actions are:

a) to create the missing table (kCreateMissingTable);

b) to halt the import (kFailOnMissingTable);

c) to skip the table in error (kSkipMissingTables).

SkipFailingRowsIndicator:= An indicator that controls whether when a row that fails constraints is encountered, the import halts (kDontSkipFailingRows) or is skipped (kSkipFailingRows).

ErrorFilePath:= The path for the directory in which the error file will be created. If null an implementor defined default path will be used.

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ErrorFileName:= The name of the error file that will be created. If null an implementor defined default name will be used.

CommitControlIndicator:= An indicator that controls how often updates should be committed during the import.

CommitAfter:= The number of rows after which a commit will take place if CommitControlIndicator is set to kCommitAfterEachTableAndEveryNRows.

9.10.4 Output

The following variables shall be set:

CurrTFileHandle := a system handle for the opened import file.

UserParm := the value of the UserParameter in the TF Header; null if no such parameter is present.

RetCode := with the following error states:

State Class	Subclass
25	004: Invalid Transfer File Handle
92	901: The user does not have the appropriate operating file system access privileges
92	902: Invalid File Name
92	903: Specified File Path does not exist
92	904: Other Operating System File Error

9.10.5 General Rules

1. Only one IRDS Import file may be open at one time within a specific IRDS Session.

2. If the file identified by the combination of “ImpFilePath” and “ImpFileName” does not exist, an error is raised.

9.10.6 Operations on the Abstract Data Structure

None.

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9.11 Retrieve Import File Working Set Details

9.11.1 Function

Each invocation of the IrdsRetrieveImportFileWorkingSetDetails service retrieves the details of a Working Set in the currently open IRDS Import file.

9.11.2 Format

```
procedure IrdsRetrieveImportFileWorkingSetDetails
(
      CurrTFileHandle:  IrdsTFileHandle;
      ImpWSCols:        IrdsColList;
      var RetCode:      IrdsRetCode
);
```

9.11.3 Input

The following variables shall be set:

CurrTFileHandle := the system handle for the import file returned by a previous IrdsOpenImportFile call.

9.11.4 Output

The following variables shall be set:

RetCode

Possible error states are:

State Class	Subclass
03	002: No further data (No more Working Sets in Import File).
23	005: Syntax error in import file.
25	004: Invalid Transfer File Handle.
25	006: No IRDS Import File open.

ImpWSCols

Each invocation of the service returns the values of the columns of a Working Set written to the Transfer File as an instance of <WorkingSetTableRow>.

9.11.5 General Rules

1. The first invocation of the IrdsRetrieveImportFileWorkingSetDetails service following a successful invocation of the IrdsOpenImportFile service returns the columns describing the first working set in the file in ImpWSCols.

2. Each successive call returns the details of the next Working Set in the file until the end of the file is reached when error code 03 subclass 002 is returned.

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9.12 Import Working Set

9.12.1 Function

The Import Working Set service shall copy data contained in a single <irdDefWorkingSetExport> or <irdWorkingSetExport> from the Transfer File to a Working Set in the target IRDS. The working set may already exist or may be created by the service.

9.12.2 Format

```
procedure IrdsImportWorkingSet
  ( CurrSessId:               IrdsSessId;
    CurrTFileHandle:          IrdsTFileHandle;
    SearchWkgSetName:         IrdsName;
    SearchWkgSetVerId:        IrdsName;
    RepContext:               boolean;
    NewWkgSetName:            IrdsName;
    NewWkgSetVerId:           IrdsName;
    NewDcs:                   IrdsName;
    BasisWkgSetName:          IrdsName;
    BasisWkgSetVerId:         IrdsName;
    UseImportedVersionability: boolean;
    Versionable:              boolean;
    SetTimestamp:             boolean;
    SetUser:                  boolean;
    var RetCode:              IrdsRetCode );
```

9.12.3 Input

The following variables shall be set:

CurrSessId := the current session identifier returned by a previous Open IRDS service.

CurrTFileHandle := the system handle for the import file returned by a previous IrdsOpenImportFile call.

RepContext := when true, indicates that imported objects with the same unique identifier as those already in the same working set version are to be replaced; when false, indicates that the imported objects that match existing objects in the same working set version are to be rejected.

SetTimestamp := if True, use the imported timestamp; if False, use the current date and time.

SetUser := if True, use the imported User; if False, use the identification of the importing User.

UseImportedVersionability := if True the value of Versionable for the Working Set being imported is used if a new working set is created by this service. if False the value of Versionable is used.

Versionable := the value to be used for the Versionable Column (See ISO/IEC 10728, 6.1.4.2) if a new working set is created by this service.

The following variables may be set:

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SearchWkgSetName := the working set name of the working set to be searched for in the Import file. If SearchWkgSetVerId is not null then SearchWkgSetName shall not be null.

SearchWkgSetVerId := the working set version ID of the working set to be searched for in the Import file.

NewWkgSetName := when not null, provides the name of a new working set to be used as the context of the import; when null, the current working set is used as import context. If NewWkgSetVerId is not null then NewWkgSetName shall not be null.

NewWkgSetVerId := when not null, provides the version identifier of a new working set to be used as the context of the import; when null, see General Rules 6 & 7 below.

NewDcs := the initial IRD content status of the new working set.

BasisWkgSetName := when not null, provides the name of a working set on which the new working set is to be based; when null, the new working set is to be initially empty. If "BasisWkgSetVerId" is not null then "BasisWkgSetName" shall not be null.

BasisWkgSetVerId := when not null, provides the version identifier of a working set on which the new working set version is to be based; when null the current working set version is used. If "BasisWkgSetName" is not null then "BasisWkgSetVerId" shall not be null.

9.12.4 Output

The following variables shall be set:

RetCode := with the following error states:

State Class	Subclass
02	003: Working set does not exist (applies to the basis working set.)
03	001: No data selected
02	008: Table does not exist
03	003: Search Working Set does not exist in import file
22	All subclasses are applicable.
23	003: Row failed constraint(s)
23	004: Row in file does not match definition for table
23	005: Table in Import file is not in existing dictionary and MissingTablesControlIndicator is kFailOnMissingTable.
23	006: Basis Working Set specified for existing Working Set
25	001: Invalid session identifier

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25	004: Invalid Transfer File Handle
25	006: No IRDS Import File Open
42	000: User does not have the appropriate privileges
53	000: Content status rule violation
54	000: No current working set context has been established
91	904: IRDS Processor has run out of rollback/recovery resources
91	905: Database full

9.12.5 General Rules

1. A successful call to “IrdsOpen” shall be made prior to calling “IrdsImportWorkingSet” and the session id returned by the “IrdsOpen” call shall be passed to the “IrdsImportWorkingSet” call.

2. A successful call to IrdsOpenImportFile shall be made prior to calling IrdsImportWorkingSet and the CurrTFileHandle returned by the IrdsOpenImportFile shall be passed to the IrdsImportWorkingSet call.

3. If both SearchWkgSetName and SearchWkgSetVerId are specified then the import file is searched for a Working Set with the given Working Set Name and Version ID and this Working Set is imported.

4. If SearchWkgSetName is specified and SearchWkgSetVerId is not specified then the import file is searched for the first or next Working Set with the given Working Set Name and this Working Set is imported.

5. After a call to “IrdsImportWorkingSet”, the client program may call “IrdsCommit” or “IrdsRollback” in order to secure the imported data or nullify the effect of the import, respectively.

6. If “NewWkgSetName” and “NewWkgSetVerId” are both specified then the data is imported into the named working set. If the working set specified does not exist, it is created.

7. If “NewWkgSetName” is specified but “NewWkgSetVerId” is not, then the working set version id from the data being imported are combined with the specified working set name and used to identify the working set into which the data is to be imported. If the working set specified does not exist, it is created.

8. If “NewWkgSetName” and “NewWkgSerVerId” are both not specified then working set name and version id in the import file are used to identify the working set into which the data is to be imported. If the working set specified does not exist, it is created.

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9. The IRDS User who invokes this service shall have a select privilege on the basis working set when one is specified. The row in the IRDS User table corresponding to this shall have a value of true for 'IRDS User May Create WS'.

10. The value specified for “NewDcs” shall be the name of an IRD Control Status which references the uncontrolled IRD content status class.

11. When a basis working set is specified, the new working set shall initially have the same reference paths to other working sets as those of the basis working set.

12. When a value of false is specified for Versionable, BasisWkgSetName and BasisWkgSetVerId must be null.

13. When importing into an existing working set, BasisWkgSetName and BasisWkgSetVerId must be null.

9.12.6 Operations on the Abstract Data Structure

1. If “NewWkgSetName” and “NewWkgSetVerId” are both specified and the referenced Working set does not exist, it is created.

2. Instances of <tfTable> are read from the Import File until a complete <irdDefWorkingSetExport> or <irdWorkingSetExport> has been read. Within each <tfTable> the name of the table being imported is taken from <tfTableName>. For every <tfRow> read, a row is inserted into the table identified by the preceding <tfTableName> provided that the data meets the constraints imposed by the active IRD Definition Schema. Columns that do not match are ignored.

Note: The Open IRDS Import File Service definition provides parameters for controlling processing of rows that are errored.

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9.13 Import Complete File

9.13.1 Function

Invocation of this service causes an input file to be opened, the header defined by <tfIrdHeader> to be read from the file, its contents returned and the whole of the contents of the file to be imported into the IRDS.

One or more IRD Definition level working sets are installed, according to the content of the file.

One or more IRD level working sets are installed, according to the content of the file. Each such working set must conform to its IRD Definition in the file.

This service specifies no facilities for matching data in the import file against data in an existing IRD Definition and/or IRD. The service is thus only specified to work without error when importing into an empty IRDS or an IRDS that contains none of the components in the import file.

The IrdsImportWorkingSet service, see clause 9.10, specifies facilities that provide the user with a greater degree of control.

9.13.2 Format

```
procedure IrdsImportCompleteFile
  ( IrdsUser:           UserId;
    ImpFilePath:        String;
    ImpFileName:        String;
    ErrorFilePath:      String;
    ErrorFileName:      String;
    var UserParm:       IrdsTxt;
    var RetCode:        IrdsRetCode  );
```

9.13.3 Input

The following variables may be set:

IrdsUser := the user’s name to be used in checking user access privileges.

ImpFilePath := when not null, the specified import path will be used. When null, a default import path will be used.

ImpFileName:= when not null, the specified file name will be used, in conjunction with the specified path. When null, a default file name will be used.

ErrorFilePath:= The path for the directory in which the error file will be created. If null an implementor defined default path will be used.

ErrorFileName:= The name of the error file that will be created. If null an implementor defined default name will be used.

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9.13.4 Output

The following variables shall be set:

RetCode := with the following error states:

State Class	Subclass
23	003: Row failed constraint(s).
23	004: Row in file does not match definition for table
23	005: Table in Import file is not in existing dictionary and MissingTablesControlIndicator is kFailOnMissingTable.
28	000: User Name not known
42	000: User does not have the appropriate privileges
91	904: IRDS Processor has run out of rollback/recovery resources
91	905: Database full
92	901: The user does not have the appropriate operating system file access privileges
92	902; Invalid File Name
92	903: Specified File Path does not exist
92	904: Other Operating System File Error

UserParm = the value of the UserParameter in the TF Header; null if no such parameter is present.

9.13.5 General Rules

1. If the file identified by the combination of “ImpFilePath” and “ImpFileName” does not exist, an error is raised.

2. After an invocation of “IrdsImportCompleteFile, the client program may invoke “IrdsCommit” or “IrdsRollback” in order to secure the imported data or nullify the effect of the import, respectively.

3. Instances of <tfTable> are read from the Import File. Within each <tfTable> the name of the table being imported is taken from <tfTableName>. For every <tfRow> read, a row is inserted into the IRD or IRD Definition table identified by the preceding <tfTableName> provided that the data meets the constraints imposed by the active IRD Definition Schema.

4. Instances of <tfRow> that fail constraints or which contain syntax errors are written to the file identified by ErrorFilePath and ErrorFileName along with helpful information

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concerning the error formatted as an instance of <comment>. This facilitates the possibility of re-input of the instances of <tfRow> that were in error after they have been corrected.

9.13.6 Operations on the Abstract Data Structure

1. For each <tfIrdDefinition>, if the IRD Definition does not already exist one is created.

2. For each <irdDefWorkingSetExport> in the <tfIrdDefinition> a corresponding working set is created.

3. Instances of <tfTable> are read from the Import File until a complete <irdDefWorkingSetExport> has been read. Within each <tfTable> the name of the table being imported is taken from <tfTableName>, and the corresponding table is created. For every <tfRow> read, a row is inserted into the table identified by the preceding <tfTableName> provided that the data meets the constraints imposed by the active IRD Definition Schema. Columns that do not match are ignored.

4. For each <tfIrdContents>, if the IRD does not already exist one is created.

5. For each <irdWorkingSetExport> in the <tfIrdContents> a corresponding working set is created.

6. Instances of <tfTable> are read from the Import File until a complete <irdWorkingSetExport> has been read. Within each <tfTable> the name of the table being imported is taken from <tfTableName>, and the corresponding table is created. For every <tfRow> read, a row is inserted into the table identified by the preceding <tfTableName> provided that the data meets the constraints imposed by the active IRD Definition Schema. Columns that do not match are ignored.

9.14 Close IRDS Import File

9.14.1 Function

Invocation of this service causes the input file to be closed.

9.14.2 Format

```
procedure IrdsCloseImportFile
  ( CurrTFileHandle:  IrdsTFileHandle;
    var RetCode: IrdsRetCode  );
```

9.14.3 Input

The following variable shall be set:

CurrTFileHandle := the system handle for the import file returned by a previous IrdsOpenImportFile call.

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9.14.4 Output

The following variable shall be set:

RetCode := with the following error states:

State Class	Subclass
25	004: Invalid Transfer File Handle
25	005: No successful prior call to IrdsOpenImportFile”
92	904: Other Operating System File Error

9.14.5 General Rules

1. A successful call to IrdsOpenImportFile shall be made prior to calling IrdsCloseImportFile and the CurrTFileHandle returned by the IrdsOpenImportFile shall be passed to the IrdsCloseImportFile call.

9.14.6 Operations on the Abstract Data Structure

None.

10. Conformance

10.1 File Format Conformance

Conformance with this International Standard may be claimed at the file format level only . A vendor claiming conformance to the file format only shall provide a product that exports and imports the file format defined in clause 7.

10.2 File Format and Services Conformance

A vendor claiming conformance to both the file format and the services shall provide a product that supports the services defined in clause 8 and the file format defined in clause 7.

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Annex A
(normative)

State Classes and Subclasses

A.1 Introduction

This Annex specifies the state classes and subclasses to be used by a conforming implementation in reporting the results of service invocations. For completeness and consistency all state classes and sub-classes defined in ISO/IEC 10728 have been defined along with those specific to IRDS Export/Import.

A.2 State classes

Classes and subclasses that begin with the characters '7' and '8' are reserved for implementation-specified conditions. Classes and subclasses beginning with any other character are returned only as specified in this part of ISO/IEC 13238.

The following state classes are defined for this part of ISO/IEC 13238.

'00' = Successful completion
'01' = Warning
'02' = Specified component does not exist
'03' = Object selection criteria not satisfied
'04' = No value specified for required column
'06' = Object already exists
'07' = Invalid column name
'08' = Current row must be in a subtable
'09' = Table containing current row does not
have specified table as a subtable
'10' = Syntax error in <search condition>
'21' = Specified component name already exists
'22' = Data exception
'23' = Constraint violation
'24' = Invalid cursor state
'25' = Invalid transaction state
'27' = Triggered data change violation
'28' = User name not known

'31' = Operation not available
'32' = Operation failed - no more specific state
class applicable
'35' = State number too high
'42' = User does not have appropriate privileges

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'43' = Invalid referential action
'44' = With check option violation
'45' = Specified query does not define an updatable cursor
'46' = Current session does not allow updating
'47' = Cursor specification includes a join that omits working set key
'52' = IRD must first be re-activated
'53' = Content status rule violation
'54' = No current working set context has been established
'55' = A value has been specified for a column which is system-maintained
'56' = The specified working set contains an IRD Schema Group that is referenced by one or more IRDs
'57' = The specified IRD is not deactivated

'58' = The specified IRD is already deactivated
'61' = Attempt to Drop working set which is in middle of basis chain
'62' = Reference path would clash with version path
'64' = Basis working set is not versionable
'65' = Cannot specify both basis working set and not versionable
'66' = A service cannot operate directly on an Internal table

'67' = Specified IRD has an open session
'68' = Invalid working set context

'69' = Reference path cannot be dropped while references that require it still exist

'91' = Transfer failure

'92' = Invalid file handling request

A.3 State subclasses

The following state subclasses are defined for this part of ISO/IEC 13238.

Where subclass values are not specified for a condition, or no specified subclass is applicable, then either subclass '000' or an implementation-specified subclass shall be returned.

The subclasses defined below are those relevant for the 'specified component does not exist' class (02).

'001' = IRD Definition does not exist
'002' = IRD does not exist
'003' = working set does not exist
'004' = content status does not exist
'005' = IRD schema group does not exist

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'006' = IRD schema group does not exist in the
current context
'007' = Reference path does not exist
'008' = Table does not exist

The subclasses defined below are those relevant for the 'object selection criteria not satisfied' class (03).

'001' = no data selected
'002' = no further data
'003' = Search Working Set does not exist in import file

The subclasses defined below are those relevant for the 'specified component name already exists' class (21).

'001' = IRD Definition name already exists
'002' = IRD name already exists
'003' = Working Set name already exists

The subclasses defined below are those relevant for the 'data exception' class (22).

'001' = string data, right truncation
'002' = null value, no indicator parameter
'003' = numeric overflow
'004' = numeric underflow
'005' = error in assignment
'006' = invalid fetch orientation
'007' = invalid datetime format
'008' = datetime field overflow
'009' = no current time displacement table
'011' = substring error
'012' = division by zero
'015' = interval field overflow
'018' = invalid character value for cast
'019' = invalid escape character
'020' = invalid limit value
'021' = character not in repertoire

The subclasses defined below are those relevant for the 'constraint violation' class (23).

'001' = Specified working set is the target of a
reference path from one or more other
working sets
'002' = Schema/IRD consistency rules violated
'003' = Integrity constraint violation
'004' = Row in file does not match definition for table
'005' = Table in Import file is not in existing dictionary and MissingTablesControlIndicator is kFailOnMissingTable.
'005' = Syntax error in import file

'006' = Basis Working Set specified for existing Working Set

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The subclasses defined below are those relevant for the 'invalid transaction state' class (25).

'001' = Invalid session identifier
'002' = IRD Definition is in use
'003' = IRD is in use
'004' = Invalid Transfer File handle
'005' = No successful prior call to IrdsOpenExportFile
'006' = No IRDS Import File open
'007' =Attempt to export IRD Definition Level Working Set after exporting an IRD Level Working Set to the same file

The subclasses defined below are those relevant for the 'transfer failure' class (91).

'901' = medium failure
'902' = communications failure
'903' = catastrophic IRDS software failure
'904' = other catastrophic software failure
'904' = IRDS Processor has run out of rollback/recovery resources
'905' = Database full

The subclasses defined below are those relevant for the 'invalid file handling request' class (92).

'901' = The user does not have the appropriate operating system file access privileges
'902' = Invalid File Name
'903' = Specified File Path does not exist
'904' = Other Operating System File Error
'905' = Invalid TAGS parameter

A.4 State record

When a state record is returned in response to the Get Diagnostics service, the fields of the record will be set as follows:

IrdReturnedState is the state number that would have been returned if this had been the only condition raised.

IrdConstraintSchema, IrdConstraintName, IrdSchemaName, IrdTableName, IrdColumnNumber and IrdColumnName contain additional information depending on the state being reported. Their values are described fully below:

a) If the value of IrdReturnedState corresponds to 'constraint violation' with a subclass of 'integrity constraint violation' then:

i) The value of IrdConstraintSchema is the name of the schema containing the constraint or assertion, and the value of IrdConstraintName is the name of the constraint or assertion.

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ii) The values of IrdSchemaName and IrdTableName are the name of the schema that contains the table that caused the violation of the constraint or assertion, and the name of that table, respectively.

iii) If only a single column is involved in the constraint or assertion violation, then the value of IrdColumnNumber is the number of the column that is involved, and IrdColumnName is the name of the column involved if one exists. Otherwise the value of IrdColumnNumber is zero and the value of IrdColumnName is a string of spaces.

b) If the value of IrdReturnedState corresponds to 'data exception' or 'successful completion' with a subclass value other than '000', then:

i) The value of IrdSchemaName is the name of the schema that contains the table named in IrdTableName.

ii) The value of IrdTableName is the name of the table that contained the data that caused the exception.

iii) The value of IrdColumnNumber is the number of the column that caused the exception.

iv) The value of IrdColumnName is the name of the column whose number appears in IrdColumnNumber, if one exists for that column; otherwise the value of IrdColumnName is a string of spaces.

c) If the value of IrdReturnedState corresponds to 'invalid referential action', then the value of IrdConstraintSchema is the name of the schema containing the table constraint that caused the exception, and the value of IrdConstraintName is the name of that table constraint.

d) If the value of IrdReturnedState corresponds to 'with check option violation', then the value of IrdSchemaName and IrdTableName are the name of the schema that contains the view that caused the violation of the WITH CHECK OPTION and the name of that view, respectively.

e) The value of items where not otherwise specified by the preceding rules are the null value.

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Annex B
(informative)

Business Requirement

B.1 Overview of Requirements

The purpose of an export/import facility is to copy with transfer, IRD Content and/or IRD Definition Data between two different IRDS implementations without direct communication between those IRDS implementations during the copy.

Both or either IRD Definition Data and/or IRD Content may be transferred. When an IRD Definition is transferred, then it may be assigned a name that may be reused by future transfers. When IRD Content is to be transferred, the file may include the IRD definition or may include the name of an IRD Definition that has already been agreed. The registration of IRD Definition names may be a private matter between co-operating IRDS implementations.

Partial IRD and IRD Definition models may be transferred, such as changes-only from a model checked out of a master IRDS. The export selection mechanism may go down to a specific object occurrence to be processed. It is not a requirement of the transferred IRD Content to be consistent or complete in any way.

It is a business requirement to provide flexibility of content module definition regarding the structure of IRD Content. No restrictions or limitations are imposed on how IRD Content is structured, except that it must be defined by an IRD Definition.

A reporting facility may be provided that will summarise the success or failure of any export or import service, detailing import conflicts.

Services specify the actions to be taken when an importing object matches an existing object. Action may be to stop the import action, to replace the object or to create a new version of the object.

It is not a requirement to propagate deleted objects and/or properties, however new and changed versions of any object and/or property shall be transferred.

An example use of export/import would be in backup and restore facilities. IRDS data may transferred between what may be the same or different IRDS. It is a requirement to support the restore of IRD Content, even after the IRD Definition has been changed.

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Annex C
(informative)

Example Use Of the BNF syntax for transferring columns

C.1 Example of a Personnel Record

The following informative example of a simple hypothetical personnel record how data can be represented in BNF. This is a simplified example, and does not exactly conform to the format of a Transfer File. See Annex D for a fully worked example leading to a conforming Transfer File.

C.2 Informal Description of Personnel Record

The structure of the personnel record and its value for a particular individual are shown below.

```
Name:                          John P Smith
Title:                         Director
Employee Number:               51
Date Of Hire:                  1996_01_13
Name Of Spouse:                Mary T Smith
Number Of children:            2
Child Information:
      Name:                    Ralph T Smith
      Date Of Birth:           1957_11_11
Child Information:
      Name:                    Susan B Jones
      Date Of Birth:           1959_07_17
```

C.3 Example BNF Definition of the syntax for a Personnel Record

The structure of every personnel record is formally described below using the BNF notation.

```
< PersonnelRecord > ::=
'{ Name' < NAME >,
  'title'               characterString,
  < EmployeeNumber >,
  'dateOfHire'          characterString,
  ['nameOfSpouse'       < NAME >,]
  'Children'            { <ChildInformation> } ...
'}'

< ChildInformation >          ::=
'{' < NAME >
  'dateOfBirth'         characterString
'}'

< NAME >                      ::=
'{' 'givenName'         characterString,
  'initial'             characterString,
  'familyName'          characterString
'}'


< EmployeeNumber >      ::= 'number' characterString
```

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C.4 Example Personnel Record Occurrence

The value of John Smith's personnel record is formally described below using the standard notation for data values.

```
{ name
  { givenName                  "John",
    initial                    "P",
    familyName                 "Smith"
  },
  title                        "Director",
  number                       51,
  dateOfHire                   "19960113",
  nameOfSpouse
  { givenName                  "Mary",
    initial                    "T",
    familyName                 "Smith"
  },
  children
  {                          !! begin sequence of child information
    { name
      { givenName              "Ralph",
        initial                "T",
        familyName             "Smith"
      },
      dateOfBirth              "19570911"
    },
    { name
      { givenName              "Susan",
        initial                "B",
        familyName             "Jones"
      },
      dateOfBirth              "19590717"
    }
  }                        !!  end of sequence of child information
}                          !!  end of contents
```

The indentations and other white space above are included for human readability purposes only. The following file structure shows a more concise representation of the same contents.

```
{name{givenName "John",initial "P",familyName "Smith"},
title "Director",number 51,dateOfHire "19960113",nameOfSpouse
{givenName "Mary",initial "T",familyName "Smith"},children{
{name{givenName "Ralph",initial "T",familyName "Smith"},
dateOfBirth "19570911"},
{name{givenName "Susan",initial "B",familyName "Jones"},
dateOfBirth "19590717"}}}
```


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Annex D
(informative)

Sample Transfer File Format

D.1 Purpose Of This Annex

This informative annex has been provided to illustrate and prove the mechanism of using this International Standard. The recommended steps needed to create an Transfer File are documented for information purposes only. Many of these steps will usually be undertaken before a user needs to create an export file, but all are listed to show the context in which the Export/Import Facility will be used. The steps are:

D.1.1 Identify Requirement

Design an IRDS content module to support a business requirement using a specific implementation design. An IRDS content module may be an International Standard IRDS content module or an ad-hoc requirement as in the case of this example. See clause D.2 for the sample business requirement and implementation design used in the example.

D.1.2 Create IRDS Content Module

Record the content module as rows in the IRD definition level tables. See clause D.3 for the sample IRDS content module table values.

D.1.3 Populate IRDS With Requirement

Record the sample application at the IRD level. See clause D.4 for the sample application table values.

D.1.4 Export IRD Definition Data

Export the IRDS definition using the Export/Import Facility. The actual definition of the relevant data is illustrated as in clause D.5.

D.1.5 Export IRD Level Data

Export the IRD level application data using Export/Import Facilities. The actual file contents of the relevant data is illustrated as in clause D.6.

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D.2 Description Of Sample Application

D.2.1 Business Requirement

An example business requirement is to be able to record and manipulate information regarding programs, screens and fields contained in screens. The following business object classes have been identified and named as:

```
E1    Program
E2    Screen_Layout
E3    Field
```

These business objects have been further defined with the identification of the natural relationships between the objects as:

```
R1    Screen_Layout may have many Fields
R2    Program may use many Screen_Layouts
R3    Screen may use many Programs
```

Each business object has been defined in terms of its unique attributes that have been populated as the following requirement:

```
E1    Program
      A1    Program_Name
      A2    Screen_Count
E2    Screen_Layout
      A3    Screen_Name
      A4    Program_Count
      A5    Field_Count
E3    Field
      A6    Field_Name
      A7    Data_Type
      A8    Length
      A9    Line_Number
      A10   Column_Number
```

This requirement may be modelled using conventional entity-relationship diagramming representation as follows.

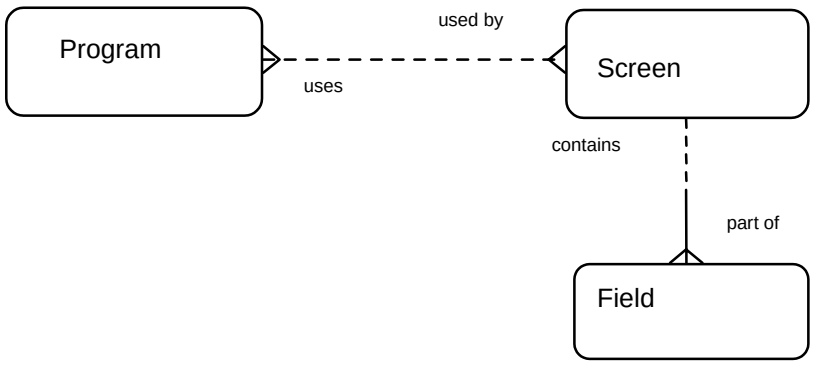

Figure 7: Business Data Model

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D.2.2 Implementation Requirement

This business requirement is designed as for implementation with the many to many relationship between Program and Screen resolved with a Usage intersection object class. The IRDS content module has the requirement to support the following data:

```
E1    Program
E2    Screen_Layout
E3    Field
E4    Usage_Of_Program_And_Screen

R1    Screen_Layout may have many Fields
R2    Program may have many Usage_Of_Program_And_Screen
R3    Screen_Layout may have many Usage_Of_Program_And_Screen
```

The data required to implement this representation can be identified as follows.

```
E1    Program
      A1    Program_Name
      A2    Screen_Count
E2    Screen_Layout
      A3    Screen_Name
      A4    Program_Count
      A5    Field_Count
E3    Field
      A6    Field_Name
      A7    Data_Type
      A8    Length
      A9    Line_Number
      A10   Column_Number
      A11   Screen_IRD_OBJ_KEY
      A12   Screen_IRD_WS_KEY
E4    Usage_Of_Screen_By_Program
      A13   Program_IRD_OBJ_KEY
      A14   Program_IRD_WS_KEY
      A15   Screen_IRD_OBJ_KEY
      A16   Screen_IRD_WS_KEY
```

--`,,```,,,,````-`-`,,`,,`,`,,`---

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A conventional entity-relationship diagram may be used to represent this data as follows.

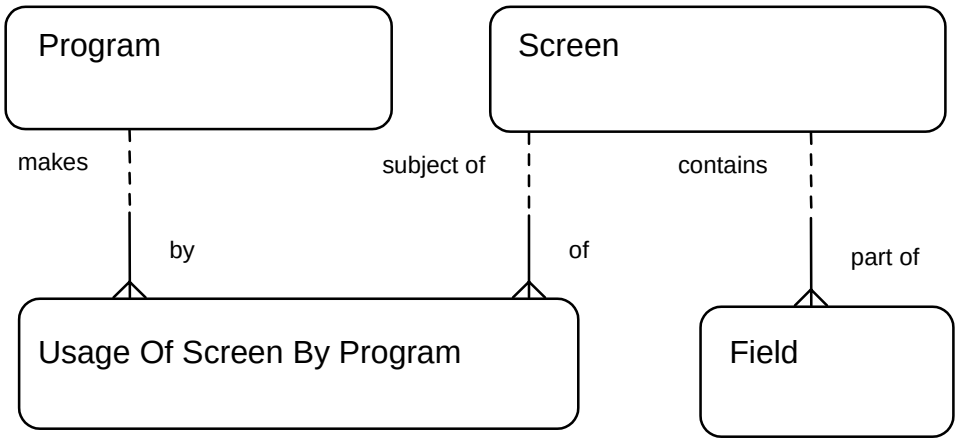

Figure 8: Implementation Data Model

This simple example represents the minimum data to illustrate the capabilities of this International Standard.

Planning includes the specification that the IRD content model will be contained in a single working set identified as “00020003” and that the sample system will be contained in a single working set identified as “00020004”. A third working set identified as "00020005" is used to define the domains referenced by the content module specification. A separate working set is used to illustrate how portions of a content module can be sub-divided in a manner that makes them candidates for separate content modules at a later date.

The following screen layout represents one of the images that needs to be recorded by the facility. It shows certain fields that may be named and their characteristics recorded.

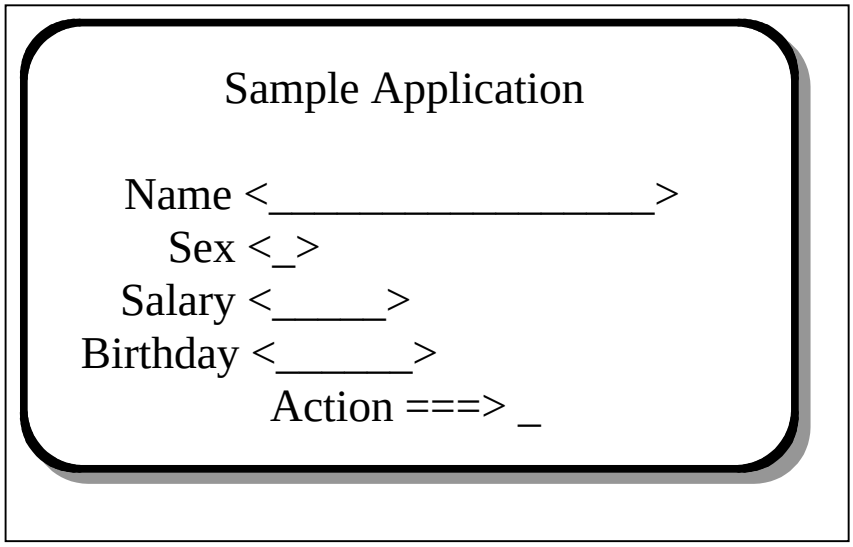

Figure 9: An example screen layout to be represented in the IRD

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D.3 Demonstration IRD Content Module

IRD content is created by the population of certain IRD tables with relevant data. The following representation illustrates each IRDS table with certain data that define the content module at the implementation design level. See ISO/IEC 10728, clause 6, Pages 27 onwards for further details. The general key style is to use an 8 digit identifier where the first digit represents the IRD level and the next three digits represent the table number. The final 4 digits are normally a row sequence within that table. Any key style may be used.

Rows in table IRD Object are ordered by IRD_OBJECT_KEY within IRD_MODULE_OBJ_KEY and IRD_MODULE_WS_KEY. Rows in all other tables are ordered by primary key, which for tables other than IRD Working Set and IRD Reference Path is the combination of OBJ_KEY and WS_KEY.

INTERNAL TABLE SET FOLLOWS

D.3.1 IRD_OBJECT

IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
00050001	null	null	00250001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null
00050002	null	null	00250001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null
00050003	null	null	00250001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null
00060001	null	null	00250001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null
00250001	null	null	00250001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null
00250002	null	null	00250002	00020002	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00260001	null	null	00250002	00020002	00050003	00020001	1997-06-01 00:00:00.0	null
00260002	null	null	00250002	00020002	00050003	00020001	1997-06-01 00:00:00.0	null
00260003	null	null	00250002	00020002	00050003	00020001	1997-06-01 00:00:00.0	null
00270001	null	null	00250002	00020002	00050003	00020001	1997-06-01 00:00:00.0	null
00070001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00080001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00090001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00100001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00130001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00130002	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00130003	null	null	00250003	00020003	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00130004	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150002	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150003	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150004	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150005	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150006	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150007	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150008	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150009	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150010	null	null	00250003	00020003	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00150011	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150012	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150013	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150014	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150015	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150016	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150017	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150018	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150019	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150020	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150021	null	null	00250003	00020003	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00150022	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150023	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150024	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00150025	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180002	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180003	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180004	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180005	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180006	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180007	null	null	00250003	00020003	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00180008	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180009	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00180010	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190002	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190003	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190004	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190005	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190006	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190007	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190008	null	null	00250003	00020003	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00190009	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190010	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190011	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190012	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190013	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190014	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190015	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190016	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190017	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190018	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190019	null	null	00250003	00020003	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00190020	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00190021	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00200001	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00200002	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00200003	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00250003	null	null	00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null
00250004	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10010001	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10020001	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10020002	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10030001	null	null	00250004	00020004	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
10030002	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10030003	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10030004	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10030005	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10040001	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
10040002	null	null	00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null
00090002	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00110001	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00110002	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00110003	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00110004	null	null	00250005	00020005	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAME	IRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
							00:00:00.0	
00110005	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00110006	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00120001	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00120002	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00120003	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00120004	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00120005	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00120006	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00210001	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00210002	null	null	00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null
00250005	null	null	00250005	00020005	00050003	00020001	1997-06-01	null

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IRD_ OBJECT_ KEY	IRDS_ NAMEIRD_ VAR_ NAME	IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD	PURPOSE
						00:00:00.0	

See ISO/IEC 10728, clause 6.1.7, item 3 states that corresponding rows in the object and object version tables shall also exist, conforming to the structure and constraints specified in ISO/IEC 10728, clause 6.1.4.

D.3.2 IRD_WORKING_SET

IRD_ WORKING_ SET_ KEY	WORKING_ SET_ NAME	WORKING_ SET_ VERSION_ NAME	BASED_ ON_ WORKING_ SET_ KEY	IRD_ CONTENT_ STATUS_ OBJ_ KEY	IRD_ CONTENT_ STATUS_ WS_ KEY	VERSIONABLE	ADD_ BY_ OBJ_ KEY	ADD_ BY_ WS_ KEY	DATE_ TIME_ ADD
00020001	Environment	01	null	00260002	00020002	FALSE	00050001	00020001	1997-01-31 00:00:00.0
00020002	Common	01	null	00260002	00020002	FALSE	00050001	00020001	1997-01-31 00:00:00.0
00020003	Sample_Module_ IRD_Definition	01	null	00260002	00020002	TRUE	00050001	00020001	1997-01-31 00:00:00.0
00020004	Sample_Module_ IRD	01	null	00260002	00020002	TRUE	00050001	00020001	1997-01-31 00:00:00.0
00020005	Sample_Module_ Domains	01	null	00260002	00020002	FALSE	00050001	00020001	1997-01-31 00:00:00.0

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D.3.3 IRD_OBJECT_VERSION

IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00050001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00050002	00020001	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00050003	00020001	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00060001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00070001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00080001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00090001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00090002	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00100001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00110001	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00110002	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00110003	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00110004	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00110005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00110006	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00120001	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00120002	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00120003	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00120004	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00120005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00120006	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00130001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00130002	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00130003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00130004	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150002	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150004	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150005	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150006	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150007	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00150008	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150009	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150010	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150011	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150012	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150013	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150014	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150015	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150016	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150017	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150018	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00150019	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150020	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150021	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150022	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150023	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150024	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00150025	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180002	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180004	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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00180005	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180006	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180007	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180008	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180009	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00180010	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190002	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190004	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190005	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00190006	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190007	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190008	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190009	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190010	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190011	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190012	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190013	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190014	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190015	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190016	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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00190017	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190018	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190019	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190020	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00190021	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00200001	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00200002	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00200003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00210001	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00210002	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00250001	00020001	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
00250002	00020002	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00250003	00020003	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00250004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00250005	00020005	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00260001	00020002	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00260002	00020002	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00260003	00020002	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
00270001	00020002	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10010001	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10020001	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10020002	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

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IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	VERS_ ADD_ BY_ OBJ_ KEY	VERS_ ADD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ ADD	VERS_ MOD_ BY_ OBJ_ KEY	VERS_ MOD_ BY_ WS_ KEY	DATE_ TIME_ VERS_ MOD	TIMES_ MOD
10030001	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10030002	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10030003	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10030004	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10030005	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10040001	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0
10040002	00020004	00050003	00020001	1997-06-01 00:00:00.0	null	null	null	0

D.3.4 IRD_REFERENCE_PATH

REFTO_ WORKING_ SET_ KEY	REFFROM_ WORKING_ SET_ KEY
00020005	00020004

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D.3.5 IRDS_USER

IRDS_USER_OBJ_KEY	IRDS_USER_WS_KEY	IRDS_USER_NAME	IRDS_USER_ACTIVE	DEFAULT_WORKING_SET_KEY	IRDS_USER_MAY_CREATE_IRD	IRDS_USER_MAY_CREATE_WS	IRDS_USER_MAY_CREATE_REF_PATH	IRDS_USER_MAY_MODIFY_REF_PATH	IRDS_USER_MAY_DROP_REF_PATH
00050001	00020001	IRDS	TRUE	null	TRUE	TRUE	TRUE	TRUE	TRUE
00050002	00020001	Irds_Administrator	TRUE	null	TRUE	TRUE	TRUE	TRUE	TRUE
00050003	00020001	Eif_User	TRUE	null	TRUE	TRUE	TRUE	TRUE	TRUE

D.3.6 IMP_LIMITS

IMP_LIMITS_OBJ_KEY	IMP_LIMITS_WS_KEY	IMP_NAME_LIM	IMP_INT_LIM	IMP_TEXT_LIM	IMP_VAR_LIM	IMP_DIC_NAME_LEN
00060001	00020001	64	32767	72	64	72

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D.3.7 IRDS_DICTIONARY

IRDS_ DICTIONARY_OBJ_ KEY	IRDS_ DICTIONARY_WS_ KEY	DICTIONARY_ NAME	DICTIONARY_ ACTIVE	DEFINED_BY_ SCHEMA_GROUP_ OBJ_KEY	DEFINED_BY_ SCHEMA_GROUP_ WS_KEY
00070001	00020003	Eif_Content_Module	TRUE	00080001	00020003

IRD SPECIFIC TABLES

D.3.8 IRD_SCHEMA GROUP

IRD_ SCHEMA_ GROUP_ OBJ_ KEY	IRD_ SCHEMA_ GROUP_ WS_ KEY	IRD_ SCHEMA_ GROUP_ NAME
00080001	00020003	Eif_Schema_Group

D.3.9 IRD_SCHEMA

IRD_ SCHEMA_ OBJ_ KEY	IRD_ SCHEMA_ WS_ KEY	IRD_ SCHEMA_ NAME
00090001	00020003	Sample
00090002	00020005	Domains

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D.3.10 IRD_SCHEMA_REFERENCE

IRD_ SCHEMA_ REFERENCE_ OBJ_ KEY	IRD_ SCHEMA_ REFERENCE_ WS_ KEY	IRD_ REF_ SCHEMA_ GROUP_ OBJ_ KEY	IRD_ REF_ SCHEMA_ GROUP_ WS_ KEY	IRD_ REF_ SCHEMA_ OBJ_ KEY	IRD_ REF_ SCHEMA_ WS_ KEY
00100001	00020003	00080001	00020003	00090001	00020003

D.3.11 IRD_DATA_TYPE_DESCRIPTOR

IRD_ DATA_ TYPE_ OBJ_ KEY	IRD_ DATA_ TYPE_ WS_ KEY	IRD_ DOMAIN_ OBJ_ KEY	IRD_ DOMAIN_ WS_ KEY	IRD_ COLUMN_ OBJ_ KEY	IRD_ COLUMN_ WS_ KEY	DATA_ TYPE	CHAR_ MAX_ LENGTH	NUMERIC_ PRECISION	NUMERIC_ PREC_ RADIX	NUMERIC_ SCALE	DATETIME_ PRECISION
00110001	00020005	00120001	00020005	null	null	CHARACTER	256	null	null	null	null
00110002	00020005	00120002	00020005	null	null	INTEGER	null	12	10	0	null
00110003	00020005	00120003	00020005	null	null	DATE	null	null	null	null	12
00110004	00020005	00120004	00020005	null	null	CHARACTER	256	null	null	null	null
00110005	00020005	00120005	00020005	null	null	CHARACTER	128	null	null	null	null
00110006	00020005	00120006	00020005	null	null	CHARACTER	5	null	null	null	null

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D.3.12 IRD_DOMAIN

IRD_ DOMAIN_ OBJ_ KEY	IRD_ DOMAIN_ WS_ KEY	IRD_ DOMAIN_ NAME	IRD_ DOMAIN_ CONSTRAINT_ NAME	IRD_ DOMAIN_ SCHEMA_ OBJ_ KEY	IRD_ DOMAIN_ SCHEMA_ WS_ KEY	IRD_ DOMAIN_ DEFAULT	IRD_ DOMAIN_ CONSTRAINT_ OBJ_ KEY	IRD_ DOMAIN_ CONSTRAINT_ WS_ KEY
00120001	00020005	CHAR_DATA	CHAR_DATA_ VALUE_VALID	00090002	00020005	null	null	null
00120002	00020005	CARDINAL	CARDINAL_ DOMAIN_ VALUE_VALID	00090002	00020005	null	00210001	00020005
00120003	00020005	SQL_DATE	SQL_DATE_ VALUE_VALID	00090002	00020005	null	null	null
00120004	00020005	IRDS_KEY	IRDS_KEY_ VALUE_VALID	00090002	00020005	null	null	null
00120005	00020005	SQL_NAME	SQL_NAME_ VALUE_VALID	00090002	00020005	null	null	null
00120006	00020005	BOOLEAN	BOOLEAN_ DOMAIN_ VALUE_VALID	00090002	00020005	null	00210002	00020005

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D.3.13 IRD_TABLE

IRD_ TABLE_ OBJ_ KEY	IRD_ TABLE_ WS_ KEY	IRD_ TABLE_ NAME	IRD_ TABLE_ SCHEMA_ OBJ_ KEY	IRD_ TABLE_ SCHEMA_ WS_ KEY	SUPER TABLE_ OBJ_ KEY	SUPER TABLE_ WS_ KEY	MAX_ NAME_ LEN	MIN_ NAME_ LEN	IRD_ TABLE_ TYPE	VERSIONABLE
00130001	00020003	Program	00090001	00020003	null	null	128	5	BASE TABLE	TRUE
00130002	00020003	Screen_Layout	00090001	00020003	null	null	128	5	BASE TABLE	TRUE
00130003	00020003	Field	00090001	00020003	null	null	128	5	BASE TABLE	TRUE
00130004	00020003	Usage_Of_Screen_By_Program	00090001	00020003	null	null	128	5	BASE TABLE	TRUE

D.3.14 IRD_VIEW

No Rows.

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D.3.15 IRD_COLUMN

IRD_ COLUMN_ OBJ_ KEY	IRD_ COLUMN_ WS_ KEY	IRD_ TABLE_ OBJ_ KEY	IRD_ TABLE_ WS_ KEY	IRD_ COLUMN_ NAME	IRD_ COLUMN_ POSITION	MANDATORY	SYSTEM_ MAINTAINED	IRD_ DOMAIN_ OBJ_ KEY	IRD_ DOMAIN_ WS_ KEY	IRD_ COLUMN_ DEFAULT
00150001	00020003	00130001	00020003	IRD_OBJECT_KEY	1	TRUE	TRUE	00120004	00020005	null
00150002	00020003	00130001	00020003	IRD_WORKING_ SET_KEY	2	TRUE	TRUE	00120004	00020005	null
00150003	00020003	00130001	00020003	Program_Name	3	TRUE	FALSE	00120001	00020005	null
00150004	00020003	00130001	00020003	Description	4	TRUE	FALSE	00120001	00020005	null
00150005	00020003	00130001	00020003	Screen_Count	5	TRUE	FALSE	00120002	00020005	null
00150006	00020003	00130002	00020003	IRD_OBJECT_KEY	1	TRUE	TRUE	00120004	00020005	null
00150007	00020003	00130002	00020003	IRD_WORKING_ SET_KEY	2	TRUE	TRUE	00120004	00020005	null
00150008	00020003	00130002	00020003	Screen_Name	3	TRUE	FALSE	00120001	00020005	null
00150009	00020003	00130002	00020003	Program_Count	4	TRUE	FALSE	00120002	00020005	null
00150010	00020003	00130002	00020003	Field_Count	5	TRUE	FALSE	00120002	00020005	null
00150011	00020003	00130003	00020003	IRD_OBJECT_KEY	1	TRUE	TRUE	00120004	00020005	null
00150012	00020003	00130003	00020003	IRD_WORKING_ SET_KEY	2	TRUE	TRUE	00120004	00020005	null
00150013	00020003	00130003	00020003	Screen_Ird_Obj_Key	3	TRUE	FALSE	00120004	00020005	null
00150014	00020003	00130003	00020003	Screen_Ird_Ws_Key	4	TRUE	FALSE	00120004	00020005	null

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IRD_ COLUMN_ OBJ_ KEY	IRD_ COLUMN_ WS_ KEY	IRD_ TABLE_ OBJ_ KEY	IRD_ TABLE_ WS_ KEY	IRD_ COLUMN_ NAME	IRD_ COLUMN_ POSITION	MANDATORY	SYSTEM_ MAINTAINED	IRD_ DOMAIN_ OBJ_ KEY	IRD_ DOMAIN_ WS_ KEY	IRD_ COLUMN_ DEFAULT
00150015	00020003	00130003	00020003	Field_Name	5	TRUE	FALSE	00120001	00020005	null
00150016	00020003	00130003	00020003	Length	6	TRUE	FALSE	00120002	00020005	null
00150017	00020003	00130003	00020003	Data_Type	7	TRUE	FALSE	00120001	00020005	null
00150018	00020003	00130003	00020003	Line_Number	8	TRUE	FALSE	00120002	00020005	null
00150019	00020003	00130003	00020003	Column_Number	9	TRUE	FALSE	00120002	00020005	null
00150020	00020003	00130004	00020003	IRD_OBJECT_KEY	1	TRUE	TRUE	00120004	00020005	null
00150021	00020003	00130004	00020003	IRD_WORKING_ SET_KEY	2	TRUE	TRUE	00120004	00020005	null
00150022	00020003	00130004	00020003	Screen_Ird_Obj_Key	3	TRUE	FALSE	00120004	00020005	null
00150023	00020003	00130004	00020003	Screen_Ird_Ws_Key	4	TRUE	FALSE	00120004	00020005	null
00150024	00020003	00130004	00020003	Program_Ird_Obj_ Key	5	TRUE	FALSE	00120004	00020005	null
00150025	00020003	00130004	00020003	Program_Ird_Ws_ Key	6	TRUE	FALSE	00120004	00020005	null

D.3.16 IRD_VIEW_TABLE_USAGE

No Rows.

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D.3.17 IRD_VIEW_COLUMN_USAGE

No Rows.

D.3.17 IRD_TABLE_CONSTRAINT

IRD_ TABLE_ CONSTRAINT_ OBJ_ KEY	IRD_ TABLE_ CONSTRAINT_ WS_ KEY	IRD_ CONSTRAINT_ NAME	IRD_ CONSTRAINT_ TYPE	IRD_ TABLE_ OBJ_ KEY	IRD_ TABLE_ WS_ KEY
00180001	00020003	Program_Unique	PRIMARY KEY	00130001	00020003
00180002	00020003	Screen_Layout_Unique	PRIMARY KEY	00130002	00020003
00180003	00020003	Field_Unique	PRIMARY KEY	00130003	00020003
00180004	00020003	Usage_of_Prog_By_Scr_Unique	PRIMARY KEY	00130004	00020003
00180005	00020003	Program_Name_Unique_in_WS	UNIQUE	00130001	00020003
00180006	00020003	Screen_Layout_Name_Unique	UNIQUE	00130002	00020003
00180007	00020003	Field_Name_Unique_In_Screen	UNIQUE	00130003	00020003
00180008	00020003	Field_References_Screen	FOREIGN KEY	00130003	00020003
00180009	00020003	Usage_Of_Screen_Refs_Screen	FOREIGN KEY	00130004	00020003
00180010	00020003	Usage_Of_Screen_Refs_Program	FOREIGN KEY	00130004	00020003

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D.3.18 IRD_KEY_COLUMN_USAGE

IRD_ KEY_ COLUMN_ USAGE_ OBJ_ KEY	IRD_ KEY_ COLUMN_ USAGE_ WS_ KEY	IRD_ TABLE_ CONSTRAINT_ OBJ_ KEY	IRD_ TABLE_ CONSTRAINT_ WS_ KEY	IRD_ COLUMN_ OBJ_ KEY	IRD_ COLUMN_ WS_ KEY	IRD_ COLUMN_ POSITION
00190001	00020003	00180001	00020003	00150001	00020003	1
00190002	00020003	00180001	00020003	00150002	00020003	2
00190003	00020003	00180002	00020003	00150006	00020003	1
00190004	00020003	00180002	00020003	00150007	00020003	2
00190005	00020003	00180003	00020003	00150011	00020003	1
00190006	00020003	00180003	00020003	00150012	00020003	2
00190007	00020003	00180004	00020003	00150020	00020003	1
00190008	00020003	00180004	00020003	00150021	00020003	2
00190009	00020003	00180005	00020003	00150002	00020003	1
00190010	00020003	00180005	00020003	00150003	00020003	2
00190011	00020003	00180006	00020003	00150007	00020003	1
00190012	00020003	00180006	00020003	00150008	00020003	2
00190013	00020003	00180007	00020003	00150013	00020003	1
00190014	00020003	00180007	00020003	00150014	00020003	2
00190015	00020003	00180007	00020003	00150015	00020003	3

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IRD_ KEY_ COLUMN_ USAGE_ OBJ_ KEY	IRD_ KEY_ COLUMN_ USAGE_ WS_ KEY	IRD_ TABLE_ CONSTRAINT_ OBJ_ KEY	IRD_ TABLE_ CONSTRAINT_ WS_ KEY	IRD_ COLUMN_ OBJ_ KEY	IRD_ COLUMN_ WS_ KEY	IRD_ COLUMN_ POSITION
00190016	00020003	00180008	00020003	00150013	00020003	1
00190017	00020003	00180008	00020003	00150014	00020003	2
00190018	00020003	00180009	00020003	00150022	00020003	1
00190019	00020003	00180009	00020003	00150023	00020003	2
00190020	00020003	00180010	00020003	00150024	00020003	1
00190021	00020003	00180010	00020003	00150025	00020003	2

D.3.19 IRD_REF_CONSTRAINT

IRD_ REF_ CONSTRAINT_ OBJ_ KEY	IRD_ REF_ CONSTRAINT_ WS_ KEY	IRD_ CONSTRAINT_ NAME	IRD_ TABLE_ CONSTRAINT_ OBJ_ KEY	IRD_ TABLE_ CONSTRAINT_ WS_ KEY	UNIQUE_ CONSTRAINT_ OBJ_ KEY	UNIQUE_ CONSTRAINT_ WS_ KEY	MATCH_ OPTION	UPDATE_ RULE	DELETE_ RULE
00200001	00020003	IRD_ CONSTRAINT_N AME **Not Used**	00180008	00020003	00180002	00020003	null	null	CASCADE
00200002	00020003	IRD_ CONSTRAINT_N AME **Not Used**	00180009	00020003	00180002	00020003	null	null	CASCADE
00200003	00020003	IRD_ CONSTRAINT_N AME **Not Used**	00180010	00020003	00180003	00020003	null	null	CASCADE

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D.3.20 IRD_CHECK_CONSTRAINT

IRD_ CHECK_ CONSTRAINT_ OBJ_ KEY	IRD_ CHECK_ CONSTRAINT_ WS_ KEY	IRD_ CHECK_ CLAUSE	IRD_ TABLE_ CONSTRAINT_ OBJ_ KEY	IRD_ TABLE_ CONSTRAINT_ WS_ KEY	IRD_ ASSERTION_ OBJ_ KEY	IRD_ ASSERTION_ WS_ KEY	IRD_ DOMAIN_ OBJ_ KEY	IRD_ DOMAIN_ WS_ KEY
00210001	00020005	VALUE = 0	null	null	null	null	00120002	00020005
00210002	00020005	VALUE IN ('TRUE', 'FALSE')	null	null	null	null	00120006	00020005

D.3.21 IRD_CHECK_TABLE_USAGE

No Rows.

D.3.22 IRD_CHECK_COLUMN_USAGE

No Rows.

D.3.23 IRD_ASSERTION

No Rows.

COMMON TABLE SET

D.3.25 IRD_MODULE

IRD_ MODULE_ OBJ_ KEY	IRD_ MODULE_ WS_ KEY	STANDARD_ MODE

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00250001	00020001	TRUE
00250002	00020002	TRUE
00250003	00020003	TRUE
00250004	00020004	TRUE
00250005	00020005	TRUE

D.3.26 IRD_CONTENT_STATUS

IRD_ CONTENT_ STATUS_ OBJ_ KEY	IRD_ CONTENT_ STATUS_ WS_ KEY	CONSTRAINT_ ENFORCED	IRD_ CONTENT_ STATUS_ CLASS
00260001	00020002	FALSE	UNCONTROLLED
00260002	00020002	TRUE	CONTROLLED
00260003	00020002	TRUE	ARCHIVED

D.3.27 INSTALLATION_DEFAULT

INSTALLATION_ DEFAULT_ OBJ_ KEY	INSTALLATION_ DEFAULT_ WS_ KEY	INST_ NAME_ MAX	INST_ NAME_ MIN
00270001	00020002	64	64

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D.4 Design Of Sample Application

The above IRD definition is a representation of the following application level tables. These tables can be populated with the real data values that are to be part of the Transfer File contents.

This IRD is contained within the single working set identified as "00020004".

The columns of these tables are based on the implementation requirement in clause C.2.

D.4.1 Program

IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	PROGRAM_ NAME	DESCRIPTION	SCREEN_ COUNT
10010001	00020004	Maintain_Order	null	2

D.4.2 Screen_Layout

IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	SCREEN_ NAME	PROGRAM_ COUNT	FIELD_ COUNT
10020001	00020004	Order_Menu	1	1
10020002	00020004	Order_Enquiry	1	4

D.4.3 Field

IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	SCREEN_ IRD_ OBJ_ KEY	SCREEN_ IRD_ WS_ KEY	FIELD_ NAMELENGTH	DATA_ TYPE	LINE_ NUMBER	COLUMN_ NUMBER

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10030001	00020004	10020001	00020004	Action	1	CHAR	20	40
10030002	00020004	10020002	00020004	Name	60	CHAR	5	36
10030003	00020004	10020002	00020004	Sex	1	INTEGER	14	35
10030004	00020004	10020002	00020004	Salary	6	DECIMAL	16	30
10030005	00020004	10020002	00020004	Birthday	10	DATE	18	32

D.4.4 Usage_Of_Screen_By_Program

IRD_ OBJECT_ KEY	IRD_ WORKING_ SET_ KEY	SCREEN_ IRD_ OBJ_ KEY	SCREEN_ IRD_ WS_ KEY	PROGRAM_ IRD_ OBJ_ KEY	PROGRAM_ IRD_ WS_ KEY
10040001	00020004	10020001	00020004	10010001	00020002
10040002	00020004	10020002	00020004	10010001	00020002

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D.5 IRDS Definition in BNF

D.5.1 Overview

Data may be represented with white space and indentation for readability reasons. The implementor and exporter are free to support any representation within the context of the BNF syntax.

> Note: This example is shown with extensive tutorial comments which may, but would not normally, be included in an export file. For tutorial purposes, the file is shown with the tags 'FULL'. More compact versions of the file would be generated by using the other tag options.

D.5.2 Header Structure

The first part is a relatively fixed format file signature that identifies the file to the importer and provides certain management data.

```
{                                                    -- Start File Header
   {                                                 -- Start File Attributes
   DMEI-IRDS,
      TITLE                    "ISO/IEC 13238-3:1998 IRDS TRANSFER FILE",
      SYNTAX                   BNF,
      ENCODING                 CLEAR,
      TAGS                     FULL,
      CODESET                  "ISO/IEC 10646-1 level 1 UCS-2",
      TIMESTAMP                "19980801153012"
   }                                                 -- End File Attributes
   {                                                 -- Start Source Attributes
      SOURCE_NAME              "David JL Gradwell",
      SOURCE_SYSTEM_NAME       "Test IRDS",
      SOURCE_FILE_VERSION      "1.0",
      SOURCE_ENVIRONMENT       "Apple Macintosh",
      SOURCE_PROGRAM_NAME      "DDSL IRDS TOOL",
      SOURCE_PROGRAM_VERSION   "1.0",
      SOURCE_PROGRAM_VENDOR    "DDSL"
   }                                                 -- End Source Attributes
,
      USER_PARAMETERS          "Demonstration User Parmameters"
}                                                    -- End File Header
```


--`,,```,,,,````-`-`,,`,,`,`,,`---
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D.5.3 Definition Structure

The next part consists of one or more IRD Definition Level Working Sets. Each Working set has a row for the working set followed by the rows for each table with rows in that working set. Default and null values are not recorded, so only relevant tables, rows and columns form part of the exported definition.

```
{                                                   -- Start of tfIrdDefinition
                                                    -- Start of tfIrdDefinitionHeader
    COMPONENT_TYPE            DMEI-IRDS-DEFINITION,
    COMPONENT_TITLE "ISO/IEC 10728:1993 IRDS SERVICES INTERFACE IRD DEFINITION",
    COMPONENT_NAME            "13238_3 IRD DEFINITION",
                                                    -- End of tfIrdDefinitionHeader
                                                    -- Start of IrdDefinition W/S
  {                                                 -- Start of irdDefWSExport
  {                                                 -- Start of workingSetTableRow
    TABLE_NAME IRD_WORKING_SET,
  {                                                 -- begin row
    "IRD_WORKING_SET_KEY"      "00020001",          -- end column (not last in row)
    "WORKING_SET_NAME"         "Environment",       -- end column (not last in row)
    "WORKING_SET_VERSION_NAME" "01"                 -- end column (last in row)
  }
  }                                                 -- End of workingSetTableRow
  {  TABLE_NAME "IRD_OBJECT",                       -- begin table
  {                                                 -- begin row
    "IRD_OBJECT_KEY"           "00250001",          -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"       "00250001",          -- end column (not last in row)
    "IRD_MODULE_WS_KEY"        "00020001",          -- end column (not last in row)
    "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
    "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
    "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                -- end row (not last in table)
  {                                                 -- begin row
    "IRD_OBJECT_KEY"           "00050001",          -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"       "00250001",          -- end column (not last in row)
    "IRD_MODULE_WS_KEY"        "00020001",          -- end column (not last in row)
    "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
    "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
    "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                -- end row (not last in table)
  {                                                 -- begin row
    "IRD_OBJECT_KEY"           "00050002",          -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"       "00250001",          -- end column (not last in row)
    "IRD_MODULE_WS_KEY"        "00020001",          -- end column (not last in row)
    "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
    "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
    "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                -- end row (not last in table)
  {                                                 -- begin row
    "IRD_OBJECT_KEY"           "00050003",          -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"       "00250001",          -- end column (not last in row)
    "IRD_MODULE_WS_KEY"        "00020001",          -- end column (not last in row)
    "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
    "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
    "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                -- end row (not last in table)
```

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```
{                                                   -- begin row
   "IRD_OBJECT_KEY"           "00060001",           -- end column (not last in row)
   "IRD_MODULE_OBJ_KEY"       "00250001",           -- end column (not last in row)
   "IRD_MODULE_WS_KEY"        "00020001",           -- end column (not last in row)
   "ADD_BY_OBJ_KEY"           "00050003",           -- end column (not last in row)
   "ADD_BY_WS_KEY"            "00020001",           -- end column (not last in row)
   "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
}                                                   -- end row (last in table)
},                                                  -- end table (not last table)
{  TABLE_NAME "IRD_OBJECT_VERSION",                 -- begin table
{                                                   -- begin row
   "IRD_OBJECT_KEY"           "00250001",           -- end column (not last in row)
   "IRD_WORKING_SET_KEY"      "00020001",           -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"      "00050003",           -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"       "00020001",           -- end column (not last in row)
   "DATE_TIME_VERS_ADD"       "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"                "0"                   -- end column (last in row)
},                                                  -- end row (not last in table)
{                                                   -- begin row
   "IRD_OBJECT_KEY"           "00050001",           -- end column (not last in row)
   "IRD_WORKING_SET_KEY"      "00020001",           -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"      "00050003",           -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"       "00020001",           -- end column (not last in row)
   "DATE_TIME_VERS_ADD"       "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"                "0"                   -- end column (last in row)
},                                                  -- end row (not last in table)
{                                                   -- begin row
   "IRD_OBJECT_KEY"           "00050002",           -- end column (not last in row)
   "IRD_WORKING_SET_KEY"      "00020001",           -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"      "00050003",           -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"       "00020001",           -- end column (not last in row)
   "DATE_TIME_VERS_ADD"       "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"                "0"                   -- end column (last in row)
},                                                  -- end row (not last in table)
{                                                   -- begin row
   "IRD_OBJECT_KEY"           "00050003",           -- end column (not last in row)
   "IRD_WORKING_SET_KEY"      "00020001",           -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"      "00050003",           -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"       "00020001",           -- end column (not last in row)
   "DATE_TIME_VERS_ADD"       "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"                "0"                   -- end column (last in row)
},                                                  -- end row (not last in table)
{                                                   -- begin row
   "IRD_OBJECT_KEY"           "00060001",           -- end column (not last in row)
   "IRD_WORKING_SET_KEY"      "00020001",           -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"      "00050003",           -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"       "00020001",           -- end column (not last in row)
   "DATE_TIME_VERS_ADD"       "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"                "0"                   -- end column (last in row)
}                                                   -- end row (last in table)
},                                                  -- end table (not last table)
{  TABLE_NAME "IRDS_USER",                          -- begin table
{                                                   -- begin row
   "IRDS_USER_OBJ_KEY"        "00050001",           -- end column (not last in row)
   "IRDS_USER_WS_KEY"         "00020001",           -- end column (not last in row)
   "IRDS_USER_NAME"           "IRDS",               -- end column (not last in row)
   "IRDS_USER_ACTIVE"         "TRUE",               -- end column (not last in row)
```


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```
      "IRDS_USER_MAY_CREATE_IRD" "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_WS"  "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_REF_PATH" "TRUE",           -- end column (not last in row)
      "IRDS_USER_MAY_MODIFY_REF_PATH" "TRUE",           -- end column (not last in row)
      "IRDS_USER_MAY_DROP_REF_PATH" "TRUE"              -- end column (last in row)
   },                                                   -- end row (not last in table)
   {                                                    -- begin row
      "IRDS_USER_OBJ_KEY"        "00050002",            -- end column (not last in row)
      "IRDS_USER_WS_KEY"         "00020001",            -- end column (not last in row)
      "IRDS_USER_NAME"           "Irds_Administrator",  -- end column (not last in row)
      "IRDS_USER_ACTIVE"         "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_IRD" "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_WS"  "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_REF_PATH" "TRUE",           -- end column (not last in row)
      "IRDS_USER_MAY_MODIFY_REF_PATH" "TRUE",           -- end column (not last in row)
      "IRDS_USER_MAY_DROP_REF_PATH" "TRUE"              -- end column (last in row)
   },                                                   -- end row (not last in table)
   {                                                    -- begin row
      "IRDS_USER_OBJ_KEY"        "00050003",            -- end column (not last in row)
      "IRDS_USER_WS_KEY"         "00020001",            -- end column (not last in row)
      "IRDS_USER_NAME"           "Eif_User",            -- end column (not last in row)
      "IRDS_USER_ACTIVE"         "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_IRD" "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_WS"  "TRUE",                -- end column (not last in row)
      "IRDS_USER_MAY_CREATE_REF_PATH" "TRUE",           -- end column (not last in row)
      "IRDS_USER_MAY_MODIFY_REF_PATH" "TRUE",           -- end column (not last in row)
      "IRDS_USER_MAY_DROP_REF_PATH" "TRUE"              -- end column (last in row)
   }                                                    -- end row (last in table)
   },                                                   -- end table (not last table)
   {  TABLE_NAME "IMP_LIMITS",                          -- begin table
   {                                                    -- begin row
      "IMP_LIMITS_OBJ_KEY"       "00060001",            -- end column (not last in row)
      "IMP_LIMITS_WS_KEY"        "00020001",            -- end column (not last in row)
      "IMP_NAME_LIM"             "64",                  -- end column (not last in row)
      "IMP_INT_LIM"              "32767",               -- end column (not last in row)
      "IMP_TEXT_LIM"             "72",                  -- end column (not last in row)
      "IMP_VAR_LIM"              "64",                  -- end column (not last in row)
      "IMP_DIC_NAME_LEN"         "72"                   -- end column (last in row)
   }                                                    -- end row (last in table)
   },                                                   -- end table (not last table)
   {  TABLE_NAME "IRD_MODULE",                          -- begin table
   {                                                    -- begin row
      "IRD_MODULE_OBJ_KEY"       "00250001",            -- end column (not last in row)
      "IRD_MODULE_WS_KEY"        "00020001",            -- end column (not last in row)
      "STANDARD_MODE"            "TRUE"                 -- end column (last in row)
   }                                                    -- end row (last in table)
   }                                                    -- end table (last table)
   }                                                    -- End of irdDefWSExport
,
   {                                                    -- Start of irdDefWSExport
   {                                                    -- Start of workingSetTableRow
      TABLE_NAME IRD_WORKING_SET,
   {                                                    -- begin row
      "IRD_WORKING_SET_KEY"      "00020002",            -- end column (not last in row)
      "WORKING_SET_NAME"         "Common",              -- end column (not last in row)
      "WORKING_SET_VERSION_NAME" "01"                   -- end column (last in row)
   }
```

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```
  }                                                  -- End of workingSetTableRow
  {  TABLE_NAME "IRD_OBJECT",                        -- begin table
  {                                                  -- begin row
     "IRD_OBJECT_KEY"           "00250002",          -- end column (not last in row)
     "IRD_MODULE_OBJ_KEY"       "00250002",          -- end column (not last in row)
     "IRD_MODULE_WS_KEY"        "00020002",          -- end column (not last in row)
     "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
     "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
     "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
     "IRD_OBJECT_KEY"           "00260001",          -- end column (not last in row)
     "IRD_MODULE_OBJ_KEY"       "00250002",          -- end column (not last in row)
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      "IRD_DOMAIN_OBJ_KEY"       "00120004",           -- end column (not last in row)
      "IRD_DOMAIN_WS_KEY"        "00020005",           -- end column (not last in row)
      "IRD_DOMAIN_NAME"          "IRDS_KEY",           -- end column (not last in row)
      "IRD_DOMAIN_CONSTRAINT_NAME" "IRDS_KEY_VALUE_VALID",-- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_OBJ_KEY" "00090002",          -- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_WS_KEY" "00020005"            -- end column (last in row)
   },                                                  -- end row (not last in table)
   {                                                   -- begin row
      "IRD_DOMAIN_OBJ_KEY"       "00120005",           -- end column (not last in row)
      "IRD_DOMAIN_WS_KEY"        "00020005",           -- end column (not last in row)
      "IRD_DOMAIN_NAME"          "SQL_NAME",           -- end column (not last in row)
```

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```
      "IRD_DOMAIN_CONSTRAINT_NAME" "SQL_NAME_VALUE_VALID",-- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_OBJ_KEY" "00090002",            -- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_WS_KEY" "00020005"              -- end column (last in row)
   },                                                    -- end row (not last in table)
   {                                                     -- begin row
      "IRD_DOMAIN_OBJ_KEY"       "00120006",            -- end column (not last in row)
      "IRD_DOMAIN_WS_KEY"        "00020005",            -- end column (not last in row)
      "IRD_DOMAIN_NAME"          "BOOLEAN",             -- end column (not last in row)
      "IRD_DOMAIN_CONSTRAINT_NAME" "BOOLEAN_DOMAIN_VALUE_VALID",-- end column (not last in
row)
      "IRD_DOMAIN_SCHEMA_OBJ_KEY" "00090002",            -- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_WS_KEY" "00020005",             -- end column (not last in row)
      "IRD_DOMAIN_CONSTRAINT_OBJ_KEY" "00210002",        -- end column (not last in row)
      "IRD_DOMAIN_CONSTRAINT_WS_KEY" "00020005"          -- end column (last in row)
   },                                                    -- end row (not last in table)
   {                                                     -- begin row
      "IRD_DOMAIN_OBJ_KEY"       "00120001",            -- end column (not last in row)
      "IRD_DOMAIN_WS_KEY"        "00020005",            -- end column (not last in row)
      "IRD_DOMAIN_NAME"          "CHAR_DATA",           -- end column (not last in row)
      "IRD_DOMAIN_CONSTRAINT_NAME" "CHAR_DATA_VALUE_VALID",-- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_OBJ_KEY" "00090002",            -- end column (not last in row)
      "IRD_DOMAIN_SCHEMA_WS_KEY" "00020005"              -- end column (last in row)
   }                                                     -- end row (last in table)
   },                                                    -- end table (not last table)
   {  TABLE_NAME "IRD_CHECK_CONSTRAINT",                 -- begin table
   {                                                     -- begin row
      "IRD_CHECK_CONSTRAINT_OBJ_KEY" "00210002",         -- end column (not last in row)
      "IRD_CHECK_CONSTRAINT_WS_KEY" "00020005",          -- end column (not last in row)
      "IRD_CHECK_CLAUSE"         "VALUE IN ('TRUE', 'FALSE')",-- end column (not last in row)
      "IRD_DOMAIN_OBJ_KEY"       "00120006",            -- end column (not last in row)
      "IRD_DOMAIN_WS_KEY"        "00020005"             -- end column (last in row)
   },                                                    -- end row (not last in table)
   {                                                     -- begin row
      "IRD_CHECK_CONSTRAINT_OBJ_KEY" "00210001",         -- end column (not last in row)
      "IRD_CHECK_CONSTRAINT_WS_KEY" "00020005",          -- end column (not last in row)
      "IRD_CHECK_CLAUSE"         "VALUE >= 0",          -- end column (not last in row)
      "IRD_DOMAIN_OBJ_KEY"       "00120002",            -- end column (not last in row)
      "IRD_DOMAIN_WS_KEY"        "00020005"             -- end column (last in row)
   }                                                     -- end row (last in table)
   },                                                    -- end table (not last table)
   {  TABLE_NAME "IRD_MODULE",                           -- begin table
   {                                                     -- begin row
      "IRD_MODULE_OBJ_KEY"       "00250005",            -- end column (not last in row)
      "IRD_MODULE_WS_KEY"        "00020005",            -- end column (not last in row)
      "STANDARD_MODE"            "TRUE"                 -- end column (last in row)
   }                                                     -- end row (last in table)
   }                                                     -- end table (last table)
   }                                                     -- End of irdDefWSExport
}                                                        -- End of tfIrdDefinition
,
```


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D.5.4 Content Structure

The third and final part consists of one or more IRD Level Working Sets. Each Working set has a row for the working set followed by the rows for each table with rows in that working set. The structure of the data corresponds to that defined by the rows in the IRD definition level tables shown above.

```
{                                                    -- Start of tfIrdContents
                                                     -- Start of tfIrdContentsHeader
     COMPONENT_TYPE            DMEI-IRDS-CONTENT,
     COMPONENT_TITLE "ISO/IEC 10728:1993 IRDS SERVICES INTERFACE IRD CONTENT",
     COMPONENT_NAME            "13238_3 IRD",
     COMPONENT_DEFINITION_NAME "13238_3 IRD DEFINITION",
     COMPONENT_SCHEMA_GROUP_NAME "Eif_Schema_Group",
                                                     -- End of tfIrdContentsHeader
                                                     -- Start of Ird Level WS
   {                                                 -- Start of irdWorkingSetExport
   {                                                 -- Start of workingSetTableRow
     TABLE_NAME IRD_WORKING_SET,
   {                                                 -- begin row
     "IRD_WORKING_SET_KEY"      "00020004",          -- end column (not last in row)
     "WORKING_SET_NAME"         "Sample_Module_IRD", -- end column (not last in row)
     "WORKING_SET_VERSION_NAME" "01"                 -- end column (last in row)
   }
   }                                                 -- End of workingSetTableRow
   {  TABLE_NAME "IRD_OBJECT",                       -- begin table
   {                                                 -- begin row
     "IRD_OBJECT_KEY"           "10020001",          -- end column (not last in row)
     "IRD_MODULE_OBJ_KEY"       "00250004",          -- end column (not last in row)
     "IRD_MODULE_WS_KEY"        "00020004",          -- end column (not last in row)
     "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
     "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
     "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
   },                                                -- end row (not last in table)
   {                                                 -- begin row
     "IRD_OBJECT_KEY"           "10020002",          -- end column (not last in row)
     "IRD_MODULE_OBJ_KEY"       "00250004",          -- end column (not last in row)
     "IRD_MODULE_WS_KEY"        "00020004",          -- end column (not last in row)
     "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
     "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
     "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
   },                                                -- end row (not last in table)
   {                                                 -- begin row
     "IRD_OBJECT_KEY"           "10030001",          -- end column (not last in row)
     "IRD_MODULE_OBJ_KEY"       "00250004",          -- end column (not last in row)
     "IRD_MODULE_WS_KEY"        "00020004",          -- end column (not last in row)
     "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
     "ADD_BY_WS_KEY"            "00020001",          -- end column (not last in row)
     "DATE_TIME_ADD"            "1997-06-01 00:00:00.0" -- end column (last in row)
   },                                                -- end row (not last in table)
   {                                                 -- begin row
     "IRD_OBJECT_KEY"           "10030002",          -- end column (not last in row)
     "IRD_MODULE_OBJ_KEY"       "00250004",          -- end column (not last in row)
     "IRD_MODULE_WS_KEY"        "00020004",          -- end column (not last in row)
     "ADD_BY_OBJ_KEY"           "00050003",          -- end column (not last in row)
```

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```
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "10030003",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "10030004",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "10030005",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "10040001",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "10040002",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "00250004",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
    "DATE_TIME_ADD"          "1997-06-01 00:00:00.0" -- end column (last in row)
  },                                                 -- end row (not last in table)
  {                                                  -- begin row
    "IRD_OBJECT_KEY"         "10010001",             -- end column (not last in row)
    "IRD_MODULE_OBJ_KEY"     "00250004",             -- end column (not last in row)
    "IRD_MODULE_WS_KEY"      "00020004",             -- end column (not last in row)
    "ADD_BY_OBJ_KEY"         "00050003",             -- end column (not last in row)
    "ADD_BY_WS_KEY"          "00020001",             -- end column (not last in row)
```

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```
   "DATE_TIME_ADD"           "1997-06-01 00:00:00.0" -- end column (last in row)
}                                                    -- end row (last in table)
},                                                   -- end table (not last table)
{  TABLE_NAME "IRD_OBJECT_VERSION",                  -- begin table
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10020001",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10020002",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10030001",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10030002",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10030003",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10030004",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10030005",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
```

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```
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10040001",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10040002",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "00250004",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10010001",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "VERS_ADD_BY_OBJ_KEY"     "00050003",             -- end column (not last in row)
   "VERS_ADD_BY_WS_KEY"      "00020001",             -- end column (not last in row)
   "DATE_TIME_VERS_ADD"      "1997-06-01 00:00:00.0",-- end column (not last in row)
   "TIMES_MOD"               "0"                     -- end column (last in row)
}                                                    -- end row (last in table)
},                                                   -- end table (not last table)
{  TABLE_NAME "PROGRAM",                             -- begin table
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10010001",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "PROGRAM_NAME"            "Maintain_Order",       -- end column (not last in row)
   "SCREEN_COUNT"            "2"                     -- end column (last in row)
}                                                    -- end row (last in table)
},                                                   -- end table (not last table)
{  TABLE_NAME "SCREEN_LAYOUT",                       -- begin table
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10020001",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "SCREEN_NAME"             "Order_Menu",           -- end column (not last in row)
   "PROGRAM_COUNT"           "1",                    -- end column (not last in row)
   "FIELD_COUNT"             "1"                     -- end column (last in row)
},                                                   -- end row (not last in table)
{                                                    -- begin row
   "IRD_OBJECT_KEY"          "10020002",             -- end column (not last in row)
   "IRD_WORKING_SET_KEY"     "00020004",             -- end column (not last in row)
   "SCREEN_NAME"             "Order_Enquiry",        -- end column (not last in row)
   "PROGRAM_COUNT"           "1",                    -- end column (not last in row)
```


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```
   "FIELD_COUNT"            "4"                  -- end column (last in row)
}                                                -- end row (last in table)
},                                               -- end table (not last table)
{  TABLE_NAME "FIELD",                           -- begin table
{                                                -- begin row
   "IRD_OBJECT_KEY"         "10030001",          -- end column (not last in row)
   "IRD_WORKING_SET_KEY"    "00020004",          -- end column (not last in row)
   "SCREEN_IRD_OBJ_KEY"     "10020001",          -- end column (not last in row)
   "SCREEN_IRD_WS_KEY"      "00020004",          -- end column (not last in row)
   "FIELD_NAME"             "Action",            -- end column (not last in row)
   "LENGTH"                 "1",                 -- end column (not last in row)
   "DATA_TYPE"              "CHAR",              -- end column (not last in row)
   "LINE_NUMBER"            "20",                -- end column (not last in row)
   "COLUMN_NUMBER"          "40"                 -- end column (last in row)
},                                               -- end row (not last in table)
{                                                -- begin row
   "IRD_OBJECT_KEY"         "10030002",          -- end column (not last in row)
   "IRD_WORKING_SET_KEY"    "00020004",          -- end column (not last in row)
   "SCREEN_IRD_OBJ_KEY"     "10020002",          -- end column (not last in row)
   "SCREEN_IRD_WS_KEY"      "00020004",          -- end column (not last in row)
   "FIELD_NAME"             "Name",              -- end column (not last in row)
   "LENGTH"                 "60",                -- end column (not last in row)
   "DATA_TYPE"              "CHAR",              -- end column (not last in row)
   "LINE_NUMBER"            "5",                 -- end column (not last in row)
   "COLUMN_NUMBER"          "36"                 -- end column (last in row)
},                                               -- end row (not last in table)
{                                                -- begin row
   "IRD_OBJECT_KEY"         "10030003",          -- end column (not last in row)
   "IRD_WORKING_SET_KEY"    "00020004",          -- end column (not last in row)
   "SCREEN_IRD_OBJ_KEY"     "10020002",          -- end column (not last in row)
   "SCREEN_IRD_WS_KEY"      "00020004",          -- end column (not last in row)
   "FIELD_NAME"             "Sex",               -- end column (not last in row)
   "LENGTH"                 "1",                 -- end column (not last in row)
   "DATA_TYPE"              "INTEGER",           -- end column (not last in row)
   "LINE_NUMBER"            "14",                -- end column (not last in row)
   "COLUMN_NUMBER"          "35"                 -- end column (last in row)
},                                               -- end row (not last in table)
{                                                -- begin row
   "IRD_OBJECT_KEY"         "10030004",          -- end column (not last in row)
   "IRD_WORKING_SET_KEY"    "00020004",          -- end column (not last in row)
   "SCREEN_IRD_OBJ_KEY"     "10020002",          -- end column (not last in row)
   "SCREEN_IRD_WS_KEY"      "00020004",          -- end column (not last in row)
   "FIELD_NAME"             "Salary",            -- end column (not last in row)
   "LENGTH"                 "6",                 -- end column (not last in row)
   "DATA_TYPE"              "DECIMAL",           -- end column (not last in row)
   "LINE_NUMBER"            "16",                -- end column (not last in row)
   "COLUMN_NUMBER"          "30"                 -- end column (last in row)
},                                               -- end row (not last in table)
{                                                -- begin row
   "IRD_OBJECT_KEY"         "10030005",          -- end column (not last in row)
   "IRD_WORKING_SET_KEY"    "00020004",          -- end column (not last in row)
   "SCREEN_IRD_OBJ_KEY"     "10020002",          -- end column (not last in row)
   "SCREEN_IRD_WS_KEY"      "00020004",          -- end column (not last in row)
   "FIELD_NAME"             "Birthday",          -- end column (not last in row)
   "LENGTH"                 "10",                -- end column (not last in row)
   "DATA_TYPE"              "DATE",              -- end column (not last in row)
   "LINE_NUMBER"            "18",                -- end column (not last in row)
```

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```
      "COLUMN_NUMBER"           "32"                  -- end column (last in row)
   }                                                  -- end row (last in table)
   },                                                 -- end table (not last table)
   {  TABLE_NAME "USAGE_OF_SCREEN_BY_PROGRAM",        -- begin table
   {                                                  -- begin row
      "IRD_OBJECT_KEY"          "10040001",           -- end column (not last in row)
      "IRD_WORKING_SET_KEY"     "00020004",           -- end column (not last in row)
      "SCREEN_IRD_OBJ_KEY"      "10020001",           -- end column (not last in row)
      "SCREEN_IRD_WS_KEY"       "00020004",           -- end column (not last in row)
      "PROGRAM_IRD_OBJ_KEY"     "10010001",           -- end column (not last in row)
      "PROGRAM_IRD_WS_KEY"      "00020002"            -- end column (last in row)
   },                                                 -- end row (not last in table)
   {                                                  -- begin row
      "IRD_OBJECT_KEY"          "10040002",           -- end column (not last in row)
      "IRD_WORKING_SET_KEY"     "00020004",           -- end column (not last in row)
      "SCREEN_IRD_OBJ_KEY"      "10020002",           -- end column (not last in row)
      "SCREEN_IRD_WS_KEY"       "00020004",           -- end column (not last in row)
      "PROGRAM_IRD_OBJ_KEY"     "10010001",           -- end column (not last in row)
      "PROGRAM_IRD_WS_KEY"      "00020002"            -- end column (last in row)
   }                                                  -- end row (last in table)
   }                                                  -- end table (last table)
   }                                                  -- End of irdWorkingSetExport
}                                                     -- End of IRD Contents
                                                      -- End of IRDS Export/Import File
```


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Annex E
(informative)

Informative illustrations of the file structure

The File Structure can be inferred from the following indented list:

```
01   irdsTransfer File
     02  tfIrdHeader
          03    BeginDelimiter        {                    !! begin header
          03    tfFileAttributes
                04  BeginDelimiter    {
                04  tfSignature       DMEI-IRDS,
                04  tfTitle           "ISO/IEC 13238-3:1998 IRDS Transfer File",
                04  tfSyntax          BNF,
                04  tfEncoding        CLEAR,
                04  tfTableRowTags    FULL,                !! one of four possibilities
                04  tfCodeSet         "ISO/IEC 10646-1 level 1 UCS-2"
                04  tfTimeStamp       "yyyymmddhhmmss000000"
                04  EndDelimiter      }                    !!end of file attributes
          03  tfSourceAttributes
                04  BeginDelimiter    {
                04  PublisherName     "David JL Gradwell"   !! User defined
                04  PublisherSystemName "Test IRDS"         !! User defined
                04  PublisherVersion  "1.0"                !! User defined
                04  ExporterToolPlatform "Apple Macintosh"  !! Implementor defined
                04  ExporterToolName  "DDSL IRDS Tool"      !! Implementor defined
                04  ExporterToolVersion "1.0"               !! Implementor defined
                04  ExporterToolVendor "DDSL"               !! Implementor defined
                04  EndDelimiter      }                    !!end of source attributes
          03  tfUserParameters                             !! (optional)
                04  BeginDelimiter    {
                04  EndDelimiter                           }!!end of user parameters
          03  EndDelimiter           },                    !!end header
     02  tfIrdDefinition                                   !! (optional)
          03  BeginDelimiter         {                     !! begin IRDdefinition Component
                04  tfComponentType   DMEI-IRDS-DEFINITION,
                04 tfIrdDefTitle "ISO/IEC 10278:1993 IRDS SERVICES INTERFACE IRD DEFINITION"
                04 irdDefName         "IRD DEF1",
          03  IrdDefWorkingSetExport                       !! many
                04  BeginDelimiter    {                    !! begin Ird Def WS Export
                04  workingSetTableRow
                      05  BeginDelimiter {                 !! begin Def WS Table Row
                      05  WSTableName  "IRD_WORKING_SET"
                      05  WSTableRow                       !! the row that
                                                          !! identifies the WS
                            06  BeginDelimiter {          !! begin row column list
                            06  WSTableColumn             !! (many)
                                      07  WSTabColName  "IRD_WORKING_SET_KEY"
                                      07  WSTabColValue "00020003"
                                                          !! Repeated for each column
                                                          !! in the WS Row
                            06  EndDelimiter },           !! end row column list
                      05  EndDelimiter },                  !! end Def WS Table Row
                04  tfTable                               !! (many)
                      05  BeginDelimiter {                 !! begin table
                      05  tfTableName  "IRD_ASSERTION"
                      05  tfTableRowTags FULL,
                      05  TableRows                        !! (many)
                            06  BeginDelimiter {          !! begin row
                            06  TableColumn               !! (many)
                                      07  tfColumnName "COUNT"
                                      07  Separator        !! space
                                      07  tfColumnValue "234"
                                      ,                   !! if more columns
                            06  EndDelimiter }           !!end row
                                      ,                   !! if more rows
                      05  EndDelimiter }                   !!end table
                                      ,                   !! if more tables
                04  EndDelimiter      }                    !! end Def Ws Export
                                      ,                   !! repeat for more WS

          03  EndDelimiter           },                    !!end IRD definition
```

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```
02  tfIrdContents                                       !! (optional)
     03  BeginDelimiter          {                      !! begin contents
     03  tfIrdContentsHeader                            !! begin contents header
          04  tfComponentType    DMEI-IRDS-CONTENT,
          04  tfIrdTitle "ISO/IEC 10728:1993 IRDS SERVICES INTERFACE IRD CONTENT",
          04  irdDicName         "IRD1",
          04  irdDefName         "IRD DEF1",
          04  irdSchGrpName      "SCHGRP1"

     03  irdWorkingSetExport                            !! many
          04  BeginDelimiter     {                      !! begin Ird WS Export
          04  workingSetTableRow
               05  BeginDelimiter {                     !! begin WS Table Row
               05  WSTableName  "IRD_WORKING_SET"
               05  WSTableRow                           !! the row that identifies the
WS
                    06  BeginDelimiter {                !! begin row column list
                    06  WSTableColumn                   !! (many)
                              07  WSTabColName "IRD_WORKING_SET_KEY"
                              07  WSTabColValue "00020004"
                                                        !! Repeated for each column
                                                        !! in the WS Row
                    06  EndDelimiter },                 !! end row column list
               05  EndDelimiter },                      !! end WS Table Row

          04  tfTable                                   !! (many)
               05  BeginDelimiter {                     !! begin table
               05  tfTableName  "PROGRAM",
               05  tfTableRowTags FULL,
               05  TableRows                            !! (many)
                    06  BeginDelimiter {                !! begin row
                    06  TableColumn                     !! (many)
                              07  tfColumnName  "PROGRAM_NAME"
                              07  Separator         !! space
                              07  tfColumnValue "TR1234"
                              ,                         !! if more columns

                    06  EndDelimiter }                 !! end row
                              ,                         !! if more rows

               05  EndDelimiter }                       !! end table
                              ,                         !! if more tables

          04  EndDelimiter       }                     !! end Ws Export
                                                        !! repeat for more WS

     03  EndDelimiter           }                      !!end tfComponents

                                 ,                      !! if more <tfComponents>

02  EndDelimiter                }                      !! end file
02  OptionalComment                                    !! comment
```

Figure 10: File Structure as an Indented List

The file structure has been decomposed into three structure charts. The first shows how the file structure consists of three parts, within delimiters.

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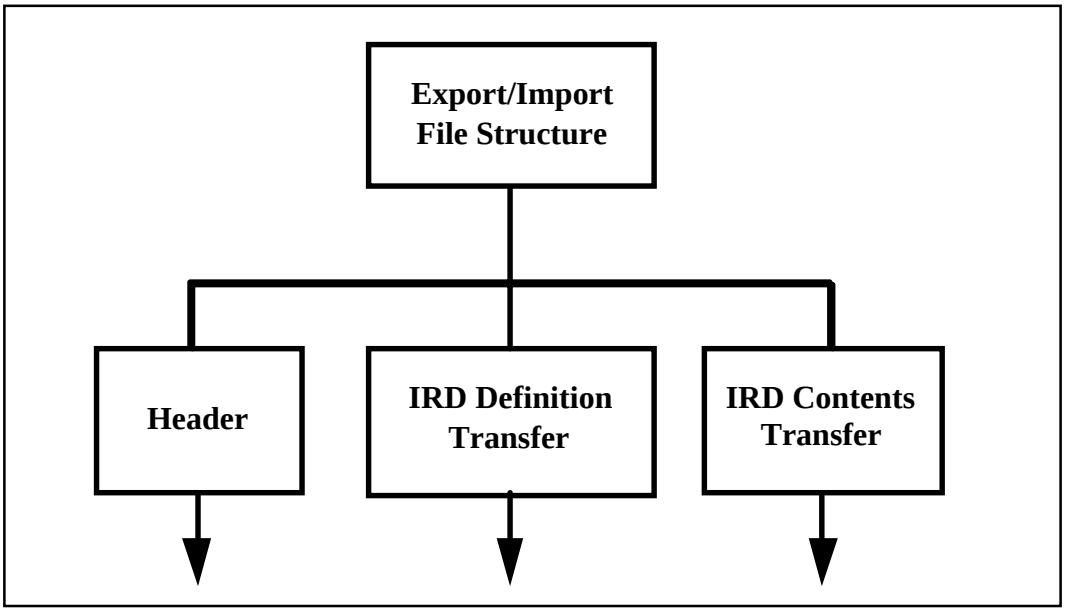

Figure 11: Overall File Structure Diagram

The header is shown as a sequence of positional values, within delimiters.

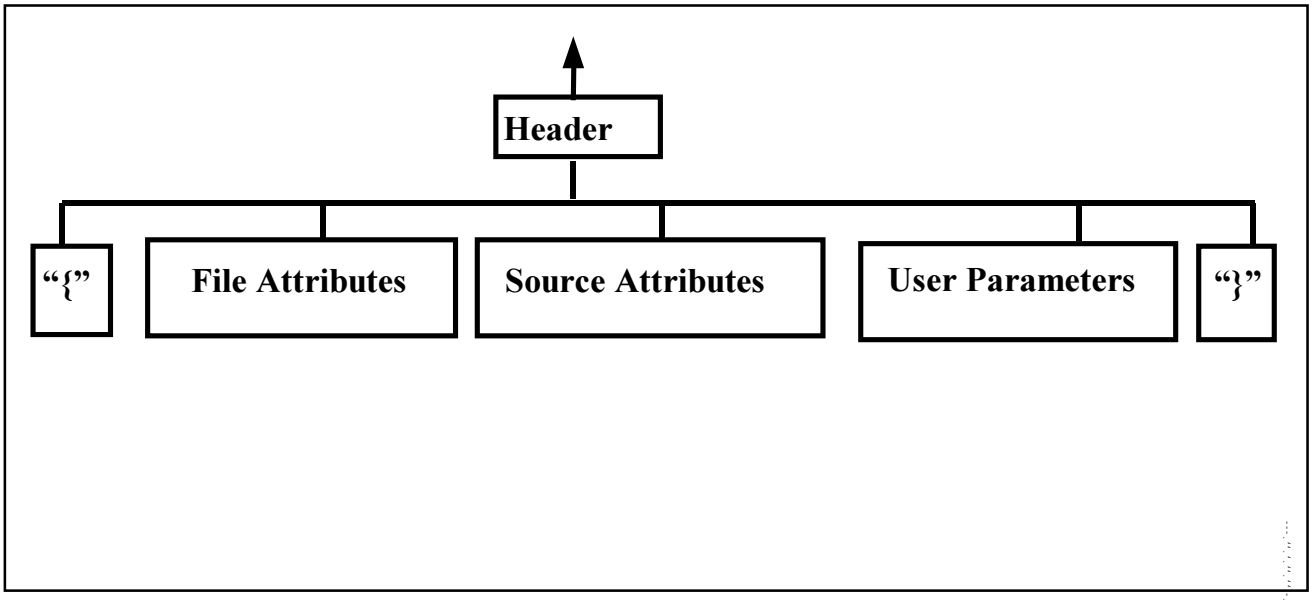

Figure 12: Header File Structure Diagram

Both the IRD definition and IRD contents are shown as a common transfer structure of tables, rows and columns.

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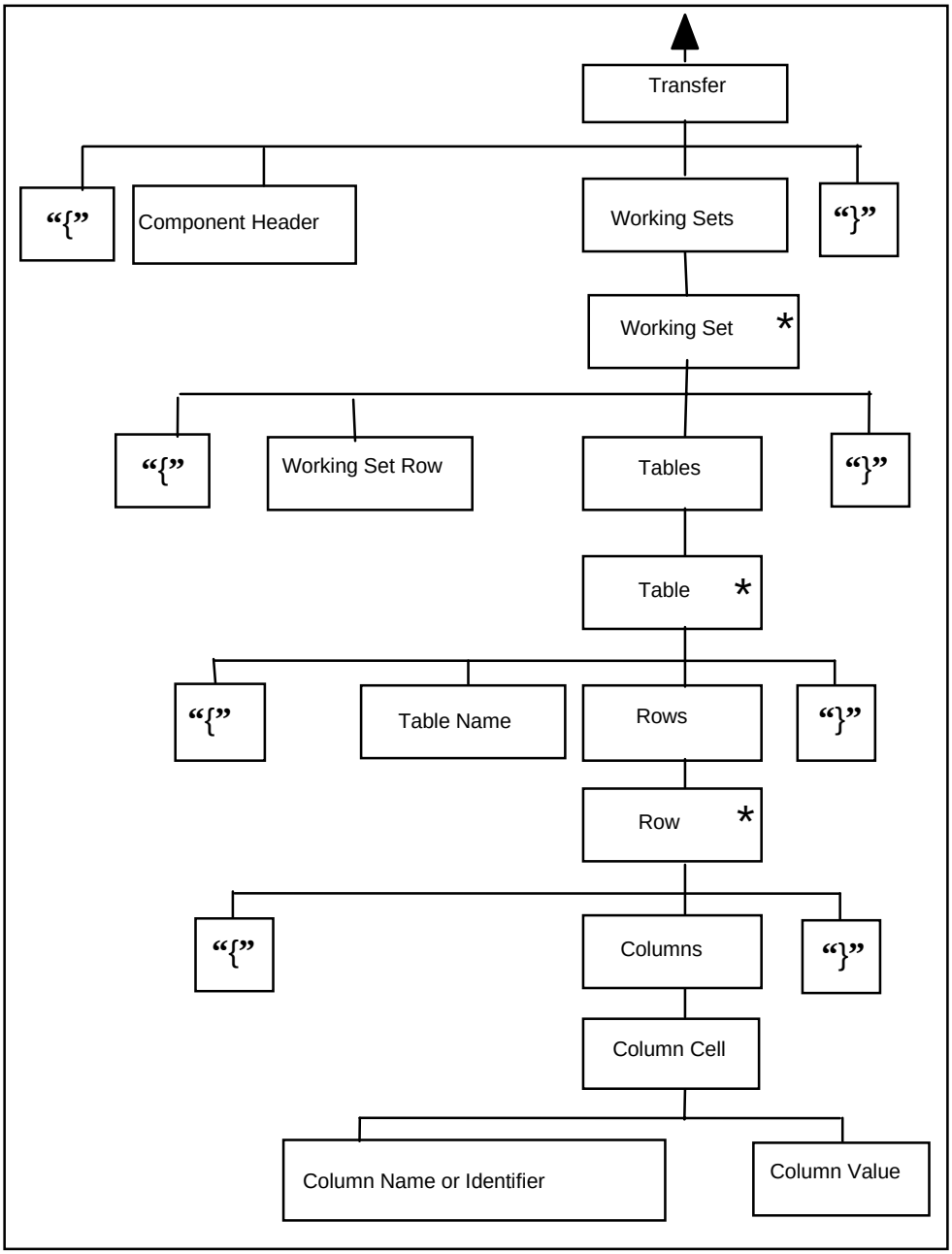

Figure 13: Definition and Content File Structure Diagram

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<any character except double quote and newline> 8
<any character except newline> 9
<carriage return> 8
<character string literal element> 9
<character string literal> 9; 10; 19
<column name> 9; 19
<comment> 10
<double quote in character string literal> 9
<double quote> 8; 10
<endSeq> 10; 12; 13; 15; 18; 19
<exclamation> 8
<exporterToolName> 13; 14; 27
<exporterToolPlatform> 13; 14
<exporterToolVendor> 13; 14
<exporterToolVersion> 13; 14; 27
<File Syntax> 11
<FULL> 12; 18; 19
<irdDefName> 15; 17; 32
<irdDefWorkingSetExport> 15; 32; 33; 39; 42; 45
<irdDicName> 17; 32
<irdSchemaGroupName> 17
<irdsTransferFile> 11
<irdWorkingSetExport> 17; 18; 32; 33; 39; 42; 45
<left brace> 9
<line feed> 8
<minus sign> 9
<newline> 9
<NUMBER> 12; 18; 19
<publisherName> 12; 13; 14; 26; 27
<publisherSystemName> 12; 13; 14; 26
<publisherVersion> 13; 14; 26
<quoted SQL language identifier> 10; 15; 17
<right brace> 9
<search condition> 9; 29
<separator> 10; 19
<SHORT> 12; 18; 19
<space> 8
<SQL language identifier> 9; 10; 19
<startComment> 9
<startSeq> 10; 12; 15; 17; 18; 19
<tab> 8
<table name> 9
<tfAttributes> 12
<tfCodeset> 12; 13
<tfColumn> 19; 20
<tfColumnId> 19; 20
<tfColumnName> 19; 20
<tfColumnNumber> 19; 20
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<tfIrdContentsHeader> 17
<tfIrdDefinition> 11; 15; 33
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<tfIrdHeader> 8; 11; 12; 21; 26; 27; 36; 43
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<tfTableRowTags> 12; 18; 19; 26
<tfTimestamp> 12; 14; 27
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<UNLABELLED> 12; 18; 19
<unsigned integer> 9; 19
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