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Information technology — Information Resource Dictionary System (IRDS) Services Interface

AMENDMENT 1: C language binding

*Technologies de l'information — Interface de services du gestionnaire de
ressources du système d'informations (IRDS)*

AMENDEMENT 1: Liant de langage C



Reference number
ISO/IEC 10728:1993/Amd.1:1995(E)

Foreword

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Amendment 1 to International Standard ISO/IEC 10728:1993 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*.

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AMENDMENT 1: C language binding

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Contents

Add a new entry to the Table of Contents as follows:

"Annex C - C language binding"

Page 1

Clause 1

Add a new sentence in clause 1 paragraph 2, before the last sentence.

"A language binding for the C language is provided in annex C."

Page 5

Subclause 4.4

Add a new sentence in subclause 4.4.

"Data structures for use with the C language are defined in annex C."

Page 5

Subclause 4.5

Add a new sentence in subclause 4.5.

"C language bindings for the services are provided in annex C."

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Subclause 8.1

Amend the first sentence of the NOTE in subclause 8.1 to read:

"For the Pascal language binding specified in this clause and the C language binding specified in annex C, enumerated types are"

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Clause 9

Amend the first sentence of the second paragraph of Clause 9 to read:

"The service formats are specified in this clause using ISO standard Pascal. Alternative service formats for use with the C language are specified in annex C."

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Add a new annex C as follows:

Annex C

(normative)

C language binding

The IRDS Services Interface language bindings for the C language are presented in the form of a C .h file as set out in clause C.3 below.

C.1 Strategy for the Language Binding

In this binding the data names and data structures defined in clause 8 have been adhered to except where the C language does not provide an appropriate construct.

In this binding the procedure names and their parameters defined in clause 8 have been adhered to except where the C language does not provide an appropriate construct.

Macros have been used for various limits instead of const-qualified variables. Standard C requires that the length of an array be a compile-time constant integer expression and a const-qualified variable does not have this property.

Use of this language binding requires the use of a C implementation that conforms to ISO/IEC 9899:1990.

C.2 General Rules

1. Those data names in C.2 below that also appear in Clause 8 shall have the same meaning as is defined in Clause 8. The same rules for the use of separators as defined in Clause 8 shall apply.
2. The function and parameter names in C.2 below shall have the same meaning as is defined in Clause 9.
3. The Service Return Codes returned shall be those defined by Clause 9 and Annex A and they shall have the same meaning.
4. The following mappings from SQL data types to C data types have been used:

SQL DATA TYPE	C DATA TYPE	
CHARACTER	pIrdstText	/* See 8.2.1 */
CHARACTER VARYING	pIrdstText	/* See 8.2.1 */
NATIONAL CHARACTER	pIrdstText	/* See 8.2.1 */
NATIONAL CHARACTER VARYING	pIrdstText	/* See 8.2.1 */
REAL	float	
DOUBLE PRECISION	double	
FLOAT	float	
INTEGER	long	
SMALLINT	short	
NUMERIC	long	
DECIMAL	long	
DATE	IrdstDate	/* See 8.2.1 */
TIME	IrdstTime	/* See 8.2.1 */

TIMESTAMP	IrdTimestamp	/* See 8.2.1 */
INTERVAL	IrdInterval	/* See 8.2.1 */

5. Every function returns an int which is to be set to the value of the NumStates field of the RetCode returned by the function.

C.3 Notes for Implementors

1. To ensure uniqueness all externally visible names start with the characters Ird.
2. For readability and because of the above requirement, many names are not unique within the first six characters of the name. Those implementors whose implementations do not support long names are to add suitable #define statements to ensure that all names are distinguished by their implementation. For example,

```
#define IrdOpen I_O
#define IrdOpenCursor I_OC
```

C.4 C language .h file

```
/* This file is called irds.h
 *
 * This version of this header conforms to:
 *     ISO/IEC 10728:1993 (E)
 *     IRDS Services Interface
 *
 * © Copyright ISO 1995
 */

/* Protect against multiple inclusion of the header file */
#ifndef IRDS_H
#define IRDS_H

/* Allow use by C++ Compilers */

#ifdef __cplusplus
extern "C" {
#endif

#include <stddef.h>
/* to ensure that NULL is defined */

/* Implementor defined length limits */

/* Clause 8.1.1 */

#define IrdNameLim    t1    /* t1 is to be replaced by an
                             implementor defined
                             value */
```

```
/* IrdsNameLim is used in 8.2.2 below */

#define IrdsVarLim      t2      /*      t2 is to be replaced by an
                                   implementor defined
                                   value */
/* IrdsVarLim is used in 8.2.2 below */

/* Clause 8.1.2 */

#define IrdsTextLim     t3      /*      t3 is to be replaced by an
                                   implementor defined
                                   value */

/*      Note that although no use is made of IrdsTextLim in this
language
binding, it is included so that a program may refer to the
value
to test the length of a string. */

/* Clause 8.1.3 - these definitions are used in 8.2.3 below */

/*      The numeric values n1, n2, n3, n4 in this clause are to be
replaced by implementor defined values. */

#define IrdsSessIdLim    n1
/* IrdsSessIdLim used in 8.2.3 below */
#define IrdsCurIdLim    n2
/* IrdsCurIdLim used in 8.2.3 below */
#define IrdsImpDicNameLen n3
/* IrdsImpDicNameLen used in 8.2.3 below */

#define IrdsKeyLen       n4
/* IrdsKeyLen used in 8.2.1 below */
```

/* Clause 8.1.4 Data Types */

```
typedef enum
{
    IrdsDataTypeChar,          /* SQL CHARACTER */
    IrdsDataTypeCharVar,      /* SQL CHARACTER VARYING */
    IrdsDataTypeNatChar,      /* SQL NATIONAL CHARACTER */
    IrdsDataTypeNatCharVar,   /* SQL NATIONAL CHARACTER VARYING */
    IrdsDataTypeReal,         /* SQL REAL */
    IrdsDataTypeDouble,       /* SQL DOUBLE PRECISION */
    IrdsDataTypeFloat,        /* SQL FLOAT */
    IrdsDataTypeInteger,      /* SQL INTEGER */
    IrdsDataTypeSmallint,     /* SQL SMALLINT */
    IrdsDataTypeNumeric,      /* SQL NUMERIC */
    IrdsDataTypeDecimal,      /* SQL DECIMAL */
    IrdsDataTypeDate,         /* SQL DATE */
    IrdsDataTypeTime,         /* SQL TIME */
    IrdsDataTypeTimestamp,    /* SQL TIMESTAMP */
    IrdsDataTypeInterval,     /* SQL INTERVAL */
    IrdsDataTypeIrdsKey       /* SQL IRDS KEY */
} IrdsDataType;
```

/* Clause 8.1.5 IRD Content Status Classes */

```
typedef enum
{
    IrdsDcsClsUcntl,          /* Uncontrolled */
    IrdsDcsClsCntl,          /* Controlled */
    IrdsDcsClsArch           /* Archived */
} IrdsDcsCls;
```

```

/*      Clause 8.1.6 Close Type parameter */

typedef enum
{
    RequestIrdsCommit,          /* COMMIT      */
    RequestIrdsRollback        /* ROLLBACK   */
} IrdsCloseType;

/*      Clause 8.2.1 Column data types */

typedef char * pIrdsText;
/*      Note that in this language binding a pointer to a text
    string is used instead of an array of char as specified
    in the Pascal binding in Clause 8. This removes the
    length limit on text.
*/

typedef struct
{
    char Year[4];
    char Sep1;
    char Month[2];
    char Sep2;
    char Day[2];
} IrdsDate;

typedef struct
{
    char Hour[2];
    char Sep1;
    char Minute[2];
    char Sep2;
    char Second[2];
    char Sep3;
    char Fraction[3];
} IrdsTime;

typedef struct
{
    IrdsDate    Date;
    char        SepT;
    IrdsTime    Time;
} IrdsTimestamp;

```

```
typedef struct
{
    char      Days[7];
    char      SepI;
    IrdsTime  Time;
} IrdsInterval;

typedef char IrdsKey[IrdsKeyLen];
/* IrdsKeyLen is defined in 8.1.3 above */

/* Clause 8.2.2 Object Names */

typedef char IrdsSQLName[128];
/* 128 is set by ISO/IEC 9075:1992 database
   Language SQL */

typedef char IrdsName[IrdsNameLim];
/* IrdsNameLim is defined in 8.1.1 above */

typedef char IrdsVarName[IrdsVarLim];
/* IrdsVarLim is defined in 8.1.1 above */

typedef char UserId[IrdsNameLim];
/* IrdsNameLim is defined in 8.1.1 above */

/* Clause 8.2.3 Control Identifiers */

typedef char IrdsSessId[IrdsSessIdLim];
/* IrdsSessIdLim is defined in 8.1.3 above */

typedef char IrdsCurId[IrdsCurIdLim];
/* IrdsCurIdLim is defined in 8.1.3 above */

typedef char IrdsImpDicName[IrdsImpDicNameLen];
/* IrdsImpDicNameLen is defined in 8.1.3 above */

/* Clause 8.2.4 Diagnostics Area */

typedef struct
{
    char  StateClass[2];
    char  StateSubClass[3];
} IrdsState;
/* IrdsState is used in 8.2.5 below */
```

```

typedef struct
{
    int          IrdStateSeq;
    IrdState     IrdReturnedState;
    IrdSQLName   IrdConstraintSchema;
    IrdSQLName   IrdConstraintName;
    IrdSQLName   IrdSchemaName;
    IrdSQLName   IrdTableName;
    int          IrdColumnNameNumber;
    IrdSQLName   IrdColumnName;
} IrdStateRec;

/* IrdStateRec is used in the
   Get Diagnostics Service in
   9.1.8 below */

/* Clause 8.2.5 Service Return Code */

typedef struct
{
    int          NumStates;
    IrdState     State;
} IrdRetCode;

/* Clause 8.2.6 Column List parameters */

/* In the C binding the column list actually is a list.
   In the Pascal binding the list was actually an array.
   In IrdColList the FirstColumn points to the first
   IrdSingleColSpec.
   In each IrdSingleColSpec, NextColumn points to the following
   IrdSingleColSpec and so on.

   The definition of a boolean data type is not included
   in the C language definition, but many environments
   defines one automatically. To be secure, an IrdBoolean
   is defined.
*/

typedef enum {Ird_False = 0, Ird_True = 1} Ird_Boolean;

```

```

typedef union
{
    pIrdsText          ColValText;
                        /* Note that this is a
                        pointer to text */
    double              ColValReal;
    short               ColValShortInteger;
    long                ColValLongInteger;
    IrdsDate            ColValDate;
    IrdsTime            ColValTime;
    IrdsTimestamp       ColValTimestamp;
    IrdsInterval        ColValInterval;
} IrdsDataTypeUnion;

struct IrdsSingleColSpec
{
    IrdsSQLName          ColName;
    Irds_Boolean         ColNull;
    IrdsDataType         ColType;
    IrdsDataTypeUnion    IrdsColVal;
    struct IrdsSingleColSpec* NextColumn;
};

typedef struct IrdsSingleColSpec* pIrdsSingleColSpec;

/* Note that unlike Pascal, C offers no enforcement of
the interpretation of the data type of IrdsColVal
according to the value of ColType. It is therefore
the responsibility of the client to interpret data
returned by the IRDS according to the value of ColType.
*/

typedef struct
{
    int                  NumCols;
    char                 StateSubClass[3];
    pIrdsSingleColSpec  FirstColumn;
} IrdsColList;

typedef IrdsColList* pIrdsColList;

```

```
/* IRDS C function prototypes */

/* All functions return an int which is the value of the
   NumStates field of the RetCode returned by the function.
   See clause 8.2.5 */

/* Clause 9.1.1 Create IRD Definition Service */

int IrdsCreateIRDDefinition
(
    const UserId          IrdsUser,
    const IrdsImpDicName  IrdDefName,
    IrdsSessId            CurrSessId,
    IrdsRetCode*          RetCode
);

/* Clause 9.1.2 Drop IRD Definition Service */

int IrdsDropIRDDefinition
(
    const UserId          IrdsUser,
    const IrdsImpDicName  IrdDefName,
    IrdsRetCode*          RetCode
);

/* Clause 9.1.3 Open IRDS Service */

int IrdsOpen
(
    const UserId          IrdsUser,
    const IrdsImpDicName  IrdDefName,
    const IrdsName        IrdDicName,
    const Irds_Boolean     WillUpdate,
    IrdsSessId            CurrSessId,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.1.4    Prepare Service */

int IrdsPrepare
(
    const IrdsSessId      CurrSessId,
    IrdsRetCode*          RetCode
);

/* Clause 9.1.5    Commit Service */

int IrdsCommit
(
    const IrdsSessId      CurrSessId,
    IrdsRetCode*          RetCode
);

/* Clause 9.1.6    Rollback Service */

int IrdsRollback
(
    const IrdsSessId      CurrSessId,
    IrdsRetCode*          RetCode
);

/* Clause 9.1.7    Close IRDS Service */

int IrdsClose
(
    const IrdsSessId      CurrSessId,
    const IrdsCloseType   CloseType,
    IrdsRetCode*          RetCode
);

/* Clause 9.1.8    GetDiagnostics Service */

int IrdsGetDiagnostics
(
    const IrdsSessId      CurrSessId,
    const int             StateNum,
    IrdsStateRec*         StateRec,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.1 Set Context Service */
```

```
int IrdsSetContext
(
    const IrdsSessId      CurrSessId,
    const IrdsName        SessWkgSetName,
    const IrdsName        SessWkgSetVerId,
    const Irds_Boolean    WillUpdate,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.2 Add Object Service */
```

```
int IrdsAddObject
(
    const IrdsSessId      CurrSessId,
    const IrdsName        ObjType,
    const IrdsCollList*   NewCols,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.3 Open Cursor Service */
```

```
int IrdsOpenCursor
(
    const IrdsSessId      CurrSessId,
    const Irds_Boolean    UseContext,
    const pIrdsText       ObjSelExpr,
    const IrdsName        WkgSetName,
    const IrdsName        WkgSetVerId,
    const Irds_Boolean    FullContext,
    const Irds_Boolean    WillUpdate,
    IrdsCurId*           ObjCurId,
    IrdsRetCode*          RetCode
);
```

/* Clause 9.2.4 Retrieve Object Service */

```
int IrdsRetrieveObject
(
    const IrdsSessId      CurrSessId,
    const IrdsCurId      ObjCurId,
    IrdsColList*          RequestedCols,
    IrdsRetCode*          RetCode
);
```

/* Clause 9.2.5 Modify Object Service */

```
int IrdsModifyObject
(
    const IrdsSessId      CurrSessId,
    const IrdsCurId      ObjCurId,
    const IrdsColList*    ModifiedCols,
    IrdsRetCode*          RetCode
);
```

/* Clause 9.2.6 Delete Object Service */

```
int IrdsDeleteObject
(
    const IrdsSessId      CurrSessId,
    const IrdsCurId      ObjCurId,
    IrdsRetCode*          RetCode
);
```

/* Clause 9.2.7 IrdsDeclassifyObject Object Service */

```
int IrdsDeclassifyObject
(
    const IrdsSessId      CurrSessId,
    const IrdsCurId      ObjCurId,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.8  IrdsReclassifyObject Object Service */
```

```
int IrdsReclassifyObject
(
    const IrdsSessId      CurrSessId,
    const IrdsCurId      ObjCurId,
    const IrdsName        NewObjType,
    const IrdsCollList*   NewCols,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.9  Close Cursor Service */
```

```
int IrdsCloseCursor
(
    const IrdsSessId      CurrSessId,
    const IrdsCurId      ObjCurId,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.10 Create Working Set Service */
```

```
int IrdsCreateWorkingSet
(
    const IrdsSessId      CurrSessId,
    const IrdsName        NewWkgSetName,
    const IrdsName        NewWkgSetVerId,
    const IrdsName        NewDcs,
    const IrdsName        BasisWkgSetName,
    const IrdsName        BasisWkgSetVerId,
    const Irds_Boolean     Versionable,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.11 Drop Working Set Service */
```

```
int IrdsDropWorkingSet
(
    const IrdsSessId      CurrSessId,
    const IrdsName        WkgSetName,
    const IrdsName        WkgSetVerId,
    IrdsRetCode*          RetCode
);
```

```
/* Clause 9.2.12 Modify Content Status Service */
```