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Information technology — Text and office systems — Document Filing and Retrieval (DFR) —

Part 2:
Protocol specification

Technologies de l'information — Bureautique — Classement et récupération de documents —

Partie 2: Spécification du protocole

Reference number
ISO/IEC 10166-2:1991(E)

Table of Contents

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 10166-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 10166 consists of the following parts, under the general title *Information technology — Text and office systems — Document Filing and Retrieval (DFR)*:

— *Part 1: Abstract service definition and procedures*

— *Part 2: Protocol specification*

Annex A forms an integral part of this part of ISO/IEC 10166.

Introduction

The Document Filing and Retrieval (DFR) application provides the capability for large capacity non-volatile document storage to multiple users in a distributed office system. This facility is particularly useful in an environment where a large population of desktop workstations that have limited storage capacity require access to large expensive storage devices.

Documents have associated attributes, to facilitate and control retrieval. Use of these attributes according to given algorithms will enable documents in the document storage to be browsed, retrieved, managed and deleted in a variety of ways. Access control protects documents from unauthorized operations. Documents can be stored in nested groups. References to documents and groups can be created and also stored in nested groups. With specific attributes a document can be designated a version of another document. Single documents, references or groups can be moved from one group into another group. Enumeration of groups, identification by other attributes besides names, identification by conditions over attributes, search for documents meeting search criteria, concurrent access to the same document, reference or group of documents are further functions provided by this standard for the user requirements in an office environment.

The Document Filing and Retrieval application is one of a series of International Standards defining applications needed in the area of office automation, as described in the Distributed-office-application model [ISO/IEC 10031-1]. This part of ISO/IEC 10166 provides the functionality of document filing and retrieval which directly supports the user in an office environment. Thus Document Filing and Retrieval is not a general standardization of all types of filestores as they may exist in computing systems. Rather it concentrates on the filing and retrieval of documents, as related to the task of office work. Document Filing and Retrieval aims only at standardizing the model of such document stores and the associated services and protocols defining the principles of how clients can access such document store servers, where clients and servers reside on different nodes of a distributed office system.

The Document Filing and Retrieval application is a distributed application located in the Application Layer of the Reference Model for Open Systems Interconnection (see ISO 7498).

It should be noted that a Document Filing and Retrieval application will provide storage for an open-ended set of document types. The content of the documents stored is transparent to the Document Filing and Retrieval server.

NOTES

1 This part of ISO/IEC 10166 deals with individual Document Filing and Retrieval servers, it defines the Document Filing and Retrieval (DFR-) protocol. This part of ISO/IEC 10166 governs the interactions of a Document Filing and Retrieval client and a single Document Filing and Retrieval server. Future standardization will consider the facilities of a Distributed Filing and Retrieval server system and the need for inter-server protocols and a DFR administration protocol. It is intended that the results of the initial standardization work be extensible and support this future work.

2 This part of ISO/IEC 10166 does not presently include administration aspects of the Document Filing and Retrieval abstract-service. For the time being these aspects are left to local implementation, although they are candidates for future standardization.

Information technology — Text and office systems — Document Filing and Retrieval (DFR) — Part 2: Protocol specification

Section 1: General

1 Scope

This part of ISO/IEC 10166 specifies the Document Filing and Retrieval access protocol.

It

- specifies the Abstract Syntax of the Document Filing and Retrieval access protocol;
- specifies how the Document Filing and Retrieval access protocol supports the Document Filing and Retrieval Abstract Service as defined in ISO/IEC 10166-1;
- specifies the mapping of the Document Filing and Retrieval access protocol onto the services used;
- specifies the requirements for conformance with the Document Filing and Retrieval access protocol;

Except for the specification of the conformance requirements, this specification uses the principles established by the Abstract Service Definition Conventions [ISO/IEC 10021-3].

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 10166. 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 10166 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 9072-1:1989, *Information processing systems - Text communication - Remote Operations Part 1: Model, notation and service definition.*

ISO/IEC 10166-1:1991, *Information technology - Text and office systems - Document Filing and Retrieval (DFR) - Part 1: Abstract service definition and procedures.*

3 Definitions

The terminology used in this part of ISO/IEC 10166 is defined in ISO/IEC 10166-1.

4 Abbreviations

The abbreviations used in this part of ISO/IEC 10166 are defined in ISO/IEC 10166-1.

Section 2 : DFR Access Protocol Specification

5 Overview of the Protocol

5.1 DFR Access Protocol Model

ISO/IEC 10166-1 describes an abstract model of the Document Filing and Retrieval Application, and the DFR Abstract Service which is provided to the DFR-User.

This clause describes how the DFR Abstract Service is supported by instances of OSI communication when an abstract-service user and an abstract-service provider are realized as application-processes located in different open systems.

In the OSI environment, communication between application-processes is represented in terms of communication between a pair of application-entities (AEs) using the presentation-service. The functionality of an application-entity is factored into a set of one or more application-service-elements (ASEs). The interaction between AEs is described in terms of their use of the services provided by the ASEs.

Access to the DFR abstract service is supported by the DFR Service Element (DFRSE), supporting a port paired between a DFR-User and the DFR-Server in the abstract model. The DFR Service Element is an asymmetric ASE, that is, the DFR-User acts as the consumer, and the DFR-Server acts as the supplier, of the DFR abstract service.

The DFRSE is in turn supported by other application-service-elements.

The Remote Operations Service Element (ROSE) supports the request/reply paradigm of the abstract operations that occur at the DFR port in the abstract model. The DFRSE provides the mapping function of the abstract-syntax notation of this abstract-service onto the services provided by the ROSE.

Optionally, the Reliable Transfer Service Element (RTSE) can be used to reliably transfer the application-protocol-data-units (APDUs) that contain the parameters of the operations between AEs.

The Association Control Service Element (ACSE) supports the establishment and release of an application-association between a pair of AEs. Associations between a DFR-User and the DFR-Server shall be established only by the DFR-User, and only the initiator of an established association can release it.

The combination of the DFRSE together with the supporting ASEs, defines the application-context of an application-association. Note that a single application-association can be used to support one or more port types paired between two objects in the abstract model.

Figure 1 models an application-context between a DFR-User and a DFR-Server. The consumer role of the DFR-User ASE and the supplier role of the DFR-Server ASE, is indicated by the subscript "c" or "s".

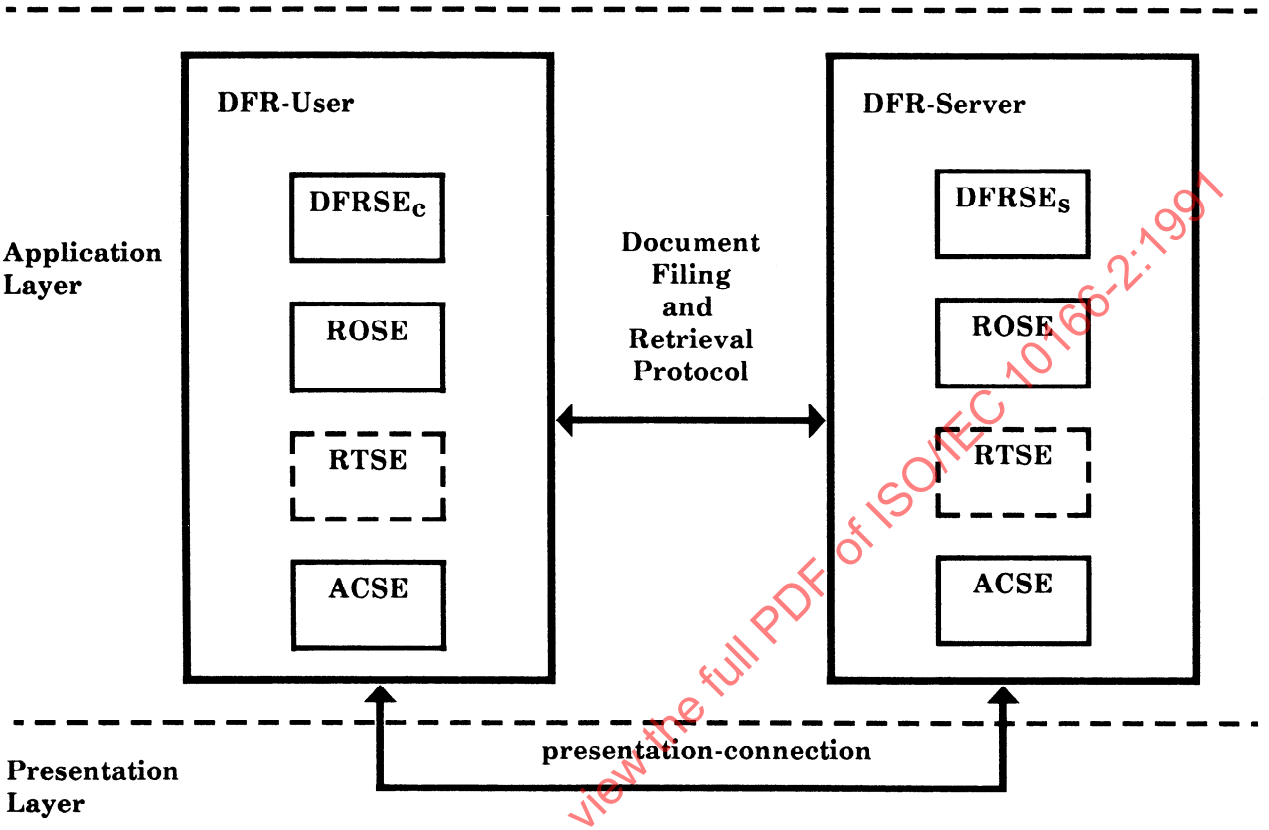

Figure 1 - The DFR Model

5.2 Services Provided by the DFR Access Protocol

The DFR access protocol comprises the following operations which provide the services defined in ISO/IEC 10166-1.

DFR-bind and DFR-unbind

- DFR-bind
- DFR-unbind

DFR Service Element (DFRSE)

- Create
- Delete
- Copy
- Move
- Read
- Modify
- List
- Search
- Reserve
- Abandon

5.3 Use of Underlying Services

The DFR access protocol makes use of underlying services as defined in ISO/IEC 9072-1.

6 DFR Access Protocol Abstract Syntax Definition

The abstract-syntax of the DFR access protocol is defined using the abstract syntax notation (ASN.1) defined in ISO 8824, and the remote operations notation defined in ISO/IEC 9072-1.

```
DFRAccessProtocol {  iso standard 10166 part-2 (2) modules (0) access-protocol(1)}
DEFINITIONS IMPLICIT TAGS :: =
BEGIN

-- PROLOGUE --

EXPORTS

    -- DFR ASE --
    dFRSE;

IMPORTS


    -- Application Service Elements and Application Contexts --
    APPLICATION-SERVICE-ELEMENT, APPLICATION-CONTEXT, aCSE, rOSE
        FROM Remote-Operations-Notation-extension { joint-iso-ccitt
            remote-operations(4) notation-extension(2)}

    rTSE
        FROM Reliable-Transfer-APDUs { joint-iso-ccitt reliable-transfer(3) apdus(0) };

    -- DFR Abstract Service Parameters --
    DfrBind, DfrUnbind, Create, Delete, Copy, Move, Read, Modify, List, Search, Reserve, Abandon, AttributeError,
    NameError, AccessError, UpdateError, ReferentAccessError, InterServerAccessError, ReservationError,
    VersionManagementError, SecurityError, ServiceError, AbandonFailed , Abandoned
        FROM DFRAbstractService { iso standard 10166 part-1 (1) modules (0) abstract-service (1) }


    -- Object Identifiers --
    id-ac-dfr-access, id-ac-dfr-reliable-access, id-as-acse, id-as-dfrse, id-as-dfr-ext-attr, id-ase-dfrse
        FROM DFRProtocolObjectIdentifiers{  iso standard 10166 part-2(2) modules (0) object-identifiers(0) };
```

```
-- Application Context without RTSE --
dfr-access APPLICATION-CONTEXT
        APPLICATION SERVICE ELEMENTS { aCSE }
        BIND DfrBind
        UNBIND DfrUnbind
        REMOTE OPERATIONS  { rOSE }
        INITIATOR CONSUMER OF        {dFRSE}
        ABSTRACT SYNTAXES {
                id-as-acse,          -- of ACSE --
                id-as-dfrse,         -- of DFRSE, including ROSE and the DFR-Basic-Attribute-Set --
                id-as-dfr-ext-attr } -- optional for the DFR-Extension-Attribute-Set. Other abstract --
        ::= id-ac-dfr-access         -- syntax names for other attribute sets can be negotiated --

-- Application Context including RTSE --
dfr-reliable-access APPLICATION-CONTEXT
        APPLICATION SERVICE ELEMENTS { aCSE, rTSE }
        BIND DfrBind
        UNBIND DfrUnbind
        REMOTE OPERATIONS  { rOSE }
        INITIATOR CONSUMER OF        {dFRSE}
        ABSTRACT SYNTAXES {
                id-as-acse,          -- of ACSE --
                id-as-dfrse,         -- of DFRSE, including ROSE and the DFR-Basic-Attribute-Set --
                id-as-dfr-ext-attr } -- optional for the DFR-Extension-Attribute-Set. Other abstract --
        ::= id-ac-dfr-reliable-access -- syntax names for other attribute sets can be negotiated --

id-as-acse ::= aCSE-as

aCSE-as OBJECT IDENTIFIER ::= {
        joint-iso-ccitt association-control (2) abstractSyntax (1) apdus (0) version1 (1)} -- as defined in ISO 8650

-- DFR Service Element --
dFRSE APPLICATION-SERVICE-ELEMENT
        CONSUMER INVOKES {
            create,
            delete,
            copy,
            move,
            read,
            modify,
            list,
            search,
            reserve,
            abandon      }
        SUPPLIER INVOKES { }
        ::= id-ase-dfrse
```

```
-- Remote Operations --

create                  Create                  ::= 01

delete                  Delete                  ::= 02

copy                    Copy                    ::= 03

move                    Move                    ::= 04

read                    Read                    ::= 05

modify                  Modify                  ::= 06

list                    List                    ::= 07

search                  Search                  ::= 08

reserve                 Reserve                 ::= 09

abandon                 Abandon                 ::= 10


-- Remote Errors --

attribute-error         AttributeError          ::= 01

name-error              NameError               ::= 02

access-error            AccessError             ::= 03

update-error            UpdateError             ::= 04

referent-access-error   ReferentAccessError     ::= 05

inter-server-access-error  InterServerAccessError  ::= 06

reservation-error       ReservationError        ::= 07

version-management-error  VersionManagementError  ::= 08

security-error          SecurityError           ::= 09

service-error           ServiceError            ::= 10

abandon-failed          AbandonFailed           ::= 11

abandoned               Abandoned               ::= 12


END     -- of DFRAccessProtocol --
```