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Information technology — International Standardized Profiles AFTnn — File Transfer, Access and Management —

Part 2:
Definition of document types, constraint sets and syntaxes

Technologies de l'information — Profil normalisé international AFTnn — Transfert, accès et gestion de fichier —

Partie 2: Définition de types de documents, jeux de contraintes et syntaxes

Reference number
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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. In addition to developing International Standards, ISO/IEC JTC 1 has created a Special Group on Functional Standardization for the elaboration of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

Draft International Standardized Profiles are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75 % of the national bodies casting a vote.

International Standardized Profile ISO/IEC ISP 10607-2 was prepared with the collaboration of

— Asia-Oceania Workshop (AOW);

— European Workshop for Open Systems (EWOS);

— NIST OSI Implementors Workshop (~~NIST~~ OIW).

ISO/IEC ISP 10607 consists of the following parts, under the general title *Information technology — International Standardized Profiles AFTnn — File Transfer, Access and Management*:

— *Part 1: Specification of ACSE, Presentation and Session Protocols for the use by FTAM*

— *Part 2: Definition of document types, constraint sets and syntaxes*

— *Part 3: AFT11 — Simple File Transfer Service (unstructured)*

— *Part 4: AFT12 — Positional File Transfer Service (flat)*

— *Part 5: AFT22 — Positional File Access Service (flat)*

— *Part 6: AFT3 — File Management Service*

Annex A forms an integral part of this part of ISO/IEC ISP 10607.

Introduction

This International Standardized Profile (ISP) is defined within the context of Functional Standardization, in accordance with the principles specified by ISO/IEC TR 10000, "Framework and Taxonomy of International Standardized Profiles". The context of Functional Standardization is one part of the overall field of Information Technology (IT) standardization activities, covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that collectively perform a specific well-defined IT function. Profiles standardize the use of options and other variations in the base standards, and provide a basis for the development of uniform, internationally recognized system tests.

One of the most important roles for an ISP is to serve as the basis for the development (by organizations other than ISO and IEC) of internationally recognized tests and test centres. ISPs are produced not simply to "legitimize" a particular choice of base standards and options, but to promote real system interoperability. The development and widespread acceptance of tests based on this and other ISPs is crucial to the successful realization of this goal.

The text for this ISP was developed in close co-operation among the FTAM Expert Groups of the three International OSI Workshops NIST Workshop for Implementors of OSI (NIST OIW), the European Workshop for Open Systems (EWOS) and the OSI Asia-Oceania Workshop (AOW). This ISP is harmonized among these three Workshops and it was finally ratified by the Workshops' plenary assemblies.

Information technology — International Standardized Profiles AFTnn — File Transfer, Access and Management —

Part 2:
Definition of document types, constraint sets and syntaxes

1 Scope

1.1 General

This part of ISO/IEC ISP 10607 contains the basic definitions of document types, constraint sets, abstract syntaxes, and transfer syntaxes as used and referenced in the FTAM application ISO/IEC ISP 10607-3 (AFT11), ISO/IEC ISP 10607-4 (AFT12), ISO/IEC ISP 10607-5 (AFT22) and ISO/IEC ISP 10607-6 (AFT3). Additional document types, constraint sets and syntaxes may be defined and added to this part of ISO/IEC ISP 10607 to be referenced by either the existing parts of ISO/IEC ISP 10607 or by further parts yet to be defined.

1.2 Position within the taxonomy

This part of ISO/IEC ISP 10607 is the second part, as common text, of a multi-part ISP identified in ISO/IEC TR 10000-2 as "AFT, File Transfer, Access and Management " (see also ISO/IEC TR 10000-1, 8.2 for the definition of multipart ISPs).

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC ISP 10607. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this part of ISO/IEC ISP 10607 are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents, is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and CCITT maintains published editions of its current Recommendations.

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[1] To be published.

Amendments and corrigenda to the base standards referenced : See annex A for a complete list of these documents which are used in this part of ISO/IEC ISP 10607.

ISO 6523:1984, Data interchange - Structure for the identification of organizations.

ISO 8571-1:1988, *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management - Part 1 : General introduction.*

ISO 8571-2:1988, *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management - Part 2 : Virtual Filestore Definition.*

ISO 8571-3:1988, *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management - Part 3 : File Service Definition.*

ISO 8571-4:1988, *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management - Part 4 : File Protocol Specification.*

ISO 8571-5:---[1], *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management - Part 5 : Protocol Implementation Conformance Statement Proforma.*

ISO 8824:1987, *Information processing systems - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO/IEC TR 10000-1:1990, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1 : Framework .*

ISO/IEC TR 10000-2:1990, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2 : Taxonomy of Profiles.*

ISO/IEC ISP 10607-1:1990, *Information technology - International Standardized Profiles AFTnn - File Transfer,*

Access and Management - Part 1 : Specification of ACSE, Presentation and Session Protocols for the use by FTAM.

ISO/IEC ISP 10607-3:1990, *Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 3 : AFT11 - Simple File Transfer Service (unstructured).*

ISO/IEC ISP 10607-4:---[1)], *Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 4 : AFT12 - Positional File Transfer Service (flat).*

ISO/IEC ISP 10607-5:---[1)], *Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 5 : AFT22 - Positional File Access Service (flat).*

ISO/IEC ISP 10607-6:---[1)], *Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 6 : AFT3 - File Management Service.*

3 Definitions

The terms used in this part of ISO/IEC ISP 10607 are defined in the referenced base standards.

4 Abbreviations

This clause lists only abbreviations as used in clauses 1 to 5.

AFT	Profile sub-class : File Transfer, Access and Management
ASN.1	Abstract Syntax Notation One
FTAM	File Transfer, Access and Management
ISP	International Standardized Profile
OSI	Open Systems Interconnection

5 Conformance

No conformance requirements are specified in this part of ISO/IEC ISP 10607.

NOTE - This part of ISO/IEC ISP 10607 is a register of document types, constraint sets, abstract syntaxes, and transfer syntaxes. Conformance requirements are specified in the parts of ISO/IEC ISP 10607 which reference these objects.

[1)] To be published.

6 Document type definitions

6.1 NBS-9 File Directory File

6.1.1 Entry number : NBS-9

6.1.2 Information objects

Table 1 - Information objects in NBS-9

document type name :	{ iso identified-organization oiw(14) ftamsig(5) document-type(5) file-directory(9) } "NBS-9 FTAM file-directory file "
abstract syntax names : name for asname1	{ iso identified-organization oiw(14) ftamsig(5) abstract-syntax(2) nbs-as2(2) } "NBS file directory entry abstract syntax"
transfer syntax names :	{ joint-iso-ccitt asn1(1) basic-encoding(1) } "Basic Encoding of a single ASN.1 type"

parameter syntax :

```
PARAMETERS : := [0]  IMPLICIT BIT STRING {
                -- Kernel group
                   read-filename (0),              read-permitted-actions (1),
                   read-contents-type (2),
                -- Storage group
                   read-storage-account (3),       read-date-and-time-of-creation (4),
                   read-date-and-time-of-last-modification (5),read-date-and-time-of-last-read-access (6),
                   read-date-and-time-of-last-attribute-modification (7),read-identity-of-creator (8),
                   read-identity-of-last-modifier (9),read-identity-of-last-reader (10),
                   read-identity-of-last-attribute-modifier (11),read-file-availability (12),
                   read-filesize (13),             read-future-filesize (14),
                -- Security group
                   read-access-control (15),       read-legal-qualifications (16),
                -- Private group
                   read-private-use (17)            }
```

file model :	{ iso standard 8571 file-model(3) hierarchical(1) } "FTAM hierarchical file model"

Table 1 (concluded)

constraint set :	{ iso standard 8571 constraint-set(4) unstructured(1) } "FTAM unstructured constraint set"
file contents : Datatype1 ::= FileDirectoryEntry -- as defined by NBS-AS2 in 8.1	

6.1.3 Scope and field of application

This document defines the contents of a file for transfer (not for storage) using FTAM.

6.1.4 References

ISO 8571, *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management.*

6.1.5 Definitions

This definition makes use of the terms data element, data unit and file access data unit as defined in ISO 8571-1.

6.1.6 Abbreviations

FTAM File Transfer, Access and Management.
NBS National Bureau of Standards, USA

6.1.7 Document semantics

The document consists of one file access data unit, which consists only of zero, one or more data elements of type "FileDirectoryEntry" (defined in NBS-AS2).

The document structure takes any of the forms allowed by the FTAM hierarchical file model as constrained by the unstructured constraint set. These definitions appear in ISO 8571-2.

The parameter of the document type is used on "F-OPEN request" to specify the desired attributes of each of the files in the Filestore, when reading the document.

6.1.8 Abstract syntactic structure

The abstract syntactic structure of the document is a series of file directory entries, each of which is defined by the "FileDirectoryEntry" definition in NBS-AS2.

Additional constraints are defined for this document type: file access actions are restricted to Read. File-directory files may not be Written or Modified (except as a side effect of actions performed on individual files contained within a file directory).

6.1.9 Definition of transfer

6.1.9.1 Datatype definition

The file consists of zero or more values of Datatype1 defined in table 1.

6.1.9.2 Presentation data values

The document is transferred as a series of presentation data values. Each presentation data value shall consist of one value of the ASN.1 data type "Datatype1", carrying one of the file directory entries from the document.

All values are transmitted in the same (but any) presentation context established to support the abstract syntax name "asname1" declared in table 1.

6.1.9.3 Sequence of presentation data values

The sequence of presentation data values is the same as the sequence of file directory entries within the data unit in the file.

6.1.10 Transfer syntax

An implementation supporting this document type shall support the transfer syntax generation rules named in table 1 for all presentation data values transferred. Implementations may optionally support other named transfer syntaxes.

6.1.11 ASE specific specifications for FTAM

Relaxation is allowed to any bitstring combination of the document type parameter.

6.2 INTAP-1 Record File

6.2.1 Entry number : INTAP-1

6.2.2 Information objects

Table 2 - Information objects in INTAP-1

document type name :	{ iso member-body 392 ftam(10) document-type(2) intap-record-file(1) } "INTAP record file "
abstract syntax names : name for asname1	{ iso member-body 392 ftam(10) abstract-syntax(3) intap-as1(1) } "INTAP abstract syntax AS1"
transfer syntax names :	{ iso member-body 392 ftam(10) transfer-syntax(4) intap-ts1(1) } "INTAP transfer syntax TS1" { joint-iso-ccitt asn1(1) basic-encoding(1) } "Basic Encoding of a single ASN.1 type"
parameter syntax : PARAMETERS : := SEQUENCE { maximum-record-length [1] IMPLICIT INTEGER OPTIONAL, record-significance [2] IMPLICIT INTEGER {variable (0), fixed (1) } OPTIONAL }	
file model :	{ iso standard 8571 file-model(3) hierarchical(1) } "FTAM hierarchical file model"
constraint set :	{ iso standard 8571 constraint-set(4) unstructured(1) } "FTAM unstructured constraint set"
file contents : Datatype1 ::= Record-Element -- as defined in 8.2	

6.2.3 Scope and field of application

The document type defines the contents of a file for storage, for transfer and access by FTAM.

6.2.4 References

ISO 8571, *Information processing systems - Open Systems Interconnection - File Transfer, Access and Management.*

6.2.5 Definitions

This definition makes use of the terms data element, data unit and file access data unit as defined in ISO 8571-1.

6.2.5.1 record : an ordered series of one or more record-elements. Data units of this document type consist of one or more records (see figure 1).

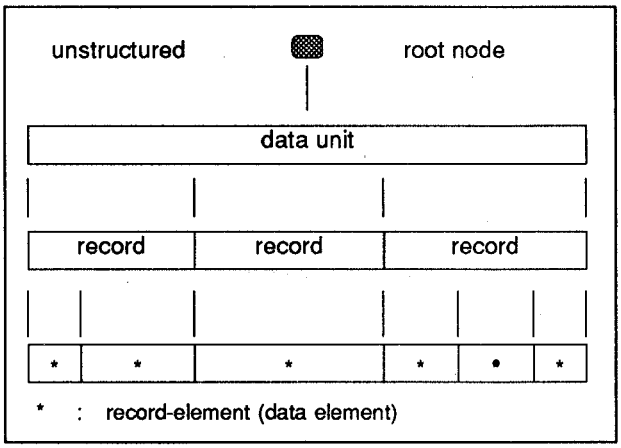


Figure 1 - INTAP-1 document type structure

6.2.6 Abbreviations

FADU	File Access Data Unit
FTAM	File Transfer, Access and Management
INTAP	Interoperability Technology Association for Information Processing, Japan

6.2.7 Document semantics

The document consists of one file access data unit, which consists only of zero, one or more records. The order of each of these records is significant.

The document structure takes the form allowed by the FTAM hierarchical file model as constrained by the unstructured constraint set (see table 2). These definitions appear in ISO 8571-2.

Each record consists of octets of any value from 0 to 255. The meaning attached to these values is not constrained by the document type.

There are no size or length limitations imposed by this definition, except those specified here. Each record is of a length determined by the number of octets given by the "maximum-record-length" parameter. If this parameter is not present, the default is that the length of records is unbounded. If the value of the "record-significance" parameter is "variable", or if the parameter is not present, the length of each record is less than or equal to the length given in the "maximum-record-length" parameter. If the value is "fixed", the length of each record is exactly equal to the length given.

6.2.8 Abstract syntactic structure

The abstract syntactic structure of the document is a series of octet strings (record elements). The grouping of record elements into records is indicated by the context-specific-number field of each record-element as specified in 8.2.

6.2.9 Definition of transfer

6.2.9.1 Datatype definition

The file consists of zero or more values of Datatype1 (see table 2 for the definition).

6.2.9.2 Presentation data values

The document is transferred as a series of presentation data values. Each presentation data value shall consist of one value of ASN.1 data type "Datatype1", carrying one of the record-elements from the document. All values are transmitted in the same (but any) presentation context defined to support the abstract syntax name "asname1".

NOTE - Specific carrier standards may impose additional constraints on the presentation context to be used, where the above permits a choice.

Boundaries between presentation data values in the same presentation context, and boundaries between P-DATA primitives, are chosen locally by the sending entity at the time of transmission, and carry no semantics of the document type. Receivers which support this document type shall accept a document with any of the permitted transfer options.

6.2.9.3 Sequence of presentation data values

The sequence of presentation data values is the same as the sequence of record-elements within the data unit in the file.

6.2.10 Transfer syntax

For transferred presentation data values there are two types of transfer syntax names for INTAP-1 specified in table 2. They are "INTAP transfer syntax TS1" and "Basic Encoding of a single ASN.1 type". The former is used for compression of data, and the latter is used for basic encoding (non-compression) of data. Implementations supporting this document type shall support the syntax for the basic encoding and may optionally support the syntax for compression of data. Implementations may optionally support other named transfer syntaxes.

6.2.11 ASE specific specifications

6.2.11.1 Simplification and relaxation

String length relaxation loses explicit information in the document type identification. A document of type "INTAP-1" may be relaxed to another document of type "INTAP-1" with a larger "maximum-record-length" parameter, or no "maximum-record-length" parameter.

6.2.11.2 The EXTEND operation

When the EXTEND operation is applied to a data unit of an "INTAP-1" document, the transferred data shall be an "INTAP-1" document with parameters equal to those of the original "INTAP-1" document. The resulting document consists of the record-elements of the original "INTAP-1" document, followed by the record-elements of the new "INTAP-1" document. The boundary of the original and new record-elements is not visible in the new document.

6.2.11.3 The REPLACE operation

When the REPLACE operation is applied to the root FADU of an "INTAP-1" document, the transferred material shall be any "INTAP-1" document with the same parameter values.

7 Constraint sets

Reserved for future extensions to this part of ISO/IEC ISP 10607.

8 Abstract syntaxes

8.1 Abstract syntax NBS-AS2

Abstract syntax name:

{ iso identified-organization oiw(14) ftamsig(5) abstract-syntax(2) nbs-as2(2) }

"NBS file directory entry abstract syntax"

This is an abstract syntax for the set of presentation data values, each of which is a value of the ASN.1 type NBS-AS2.FileDirectoryEntry (see figure 2).

```
NBS-AS2 DEFINITIONS ::=
 BEGIN
 FileDirectoryEntry   ::= [PRIVATE 2] Read-Attributes
 Read-Attributes      ::= ISO8571-FTAM.Read-Attributes
 END
```

Figure 2 - NBS-AS2 definition

For this abstract syntax the following transfer syntax will be used

{ joint-iso-ccitt asn1(1) basic-encoding(1) }

"Basic Encoding of a single ASN.1 type"

8.2 Abstract syntax INTAP-AS1

Abstract syntax name:

{ iso member-body 392 ftam(10) abstract-syntax(3) intap-as1(1) }

"INTAP abstract syntax AS1"

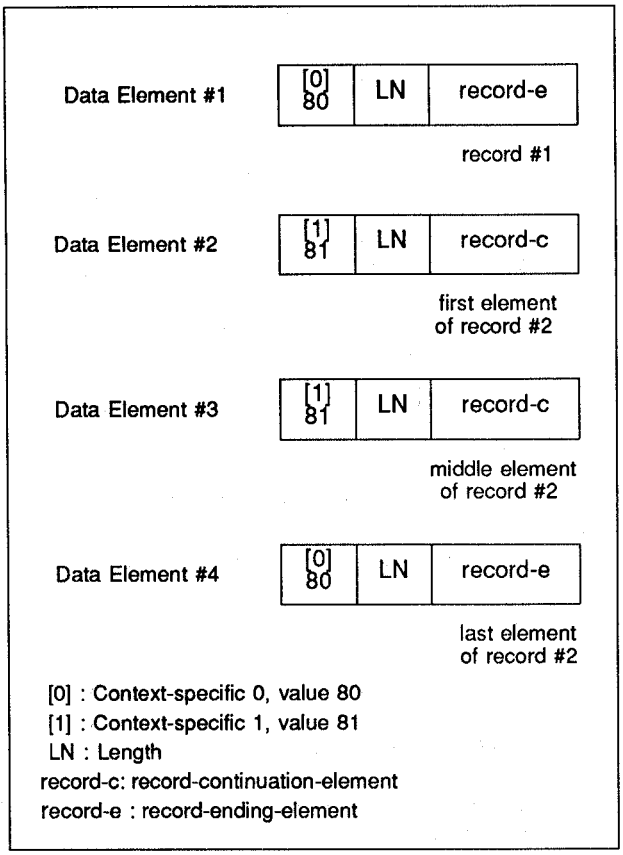
This is an abstract syntax which defines the file contents data elements as an ASN.1 type INTAP-1-DOCUMENT-TYPE. INTAP-1-Record-Element (see figure 3).

Figure 4 gives an example of INTAP-1 records.

```
ISO8571-CONTENTS.File-Contents-Data-Element ::= INTAP-1-DOCUMENT-TYPE.INTAP-1-Record-Element

INTAP-1-DOCUMENT-TYPE DEFINITIONS ::=
                                BEGIN
                                    INTAP-1-Record-Element::= CHOICE {
                                    record-ending-element [0] IMPLICIT OCTET STRING,
                                    record-continuation-element [1] IMPLICIT OCTET STRING }
                            -- The last INTAP-1-Record-Element in the bulk data
                            -- transfer must be of format  record-ending-element.
                            --
                            -- <Record of INTAP-1>  ::=
                            --       <record-ending-element>   |
                            --       <record-continuation-elements><record-ending-element>
                            -- <record-continuation-elements>   ::=
                            --       <record-continuation-element>   |
                            --       <record-continuation-element><record-continuation-elements>
                                    END
```

Figure 3 - INTAP-AS1 definition



NOTE - This example uses the primitive type encoding of a record-element. When the encoding of a record-element is of constructed type, the encoding for 0 and 1 is A0 and A1, respectively.

Figure 4 - Example of INTAP-1 records

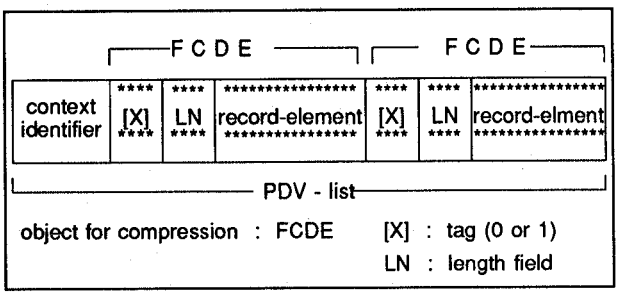
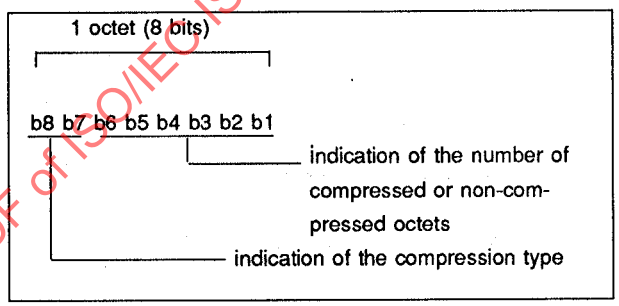


Figure 5 - INTAP-TS1 compression method

When the record-element in FCDE is encoded as a constructed type, the object of compression includes "id", "LN" of the constructed type.

With this method the repetition of octets is compressed, using 1-octet compression control characters to indicate type and length of the compression (figure 6).



bit assignment		description
b8 b7	b6 b5 b4 b3 b2 b1	
00	number of octets not compressed (1-63)	No compression of the following octets.
11	number of the compressed octets (1-63)	Compression of octets. In this case, one of the compressed octets follows the compression control character.

Figure 6 - Compression control character

The first octet of a File-Contents-Data-Element is always a compression control character (see also figure 7).

9 Transfer syntaxes

9.1 Transfer syntax INTAP-TS1

Transfer syntax name:

{ iso member-body 392 ftam(10) transfer-syntax(4) intap-ts1(1)}

"INTAP transfer syntax TS1"

9.1.1 Basic encoding

A File-Contents-Data-Element is encoded using the ASN.1 Basic Encoding Rules, and then the following compression method is applied.

9.1.2 Compression method

The objects for compression are individual File-Contents-Data-Elements (see figure 5 for an example of INTAP-1).