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**Integrated Services Digital Network (ISDN);
File Transfer Access & Management (FTAM) over ISDN
based on simple file transfer profile**

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Foreword

This European Telecommunication Standard (ETS) was produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	31 May 1995
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1 Scope

This ETS specifies simple file transfer as a teleservice over the Integrated Services Digital Network (ISDN) using File Transfer Access and Management (FTAM - EN 30607 Parts 1 to 6 [5] (incorporating the corrigenda) and ISO/IEC 8571, Parts 1 to 5 [6]).

A basic ETS, fully compatible with the Simple File Transfer ETS as described in ISO/IEC ISP 10607 Parts 1 to 3 [1], [2], [3] & [4], the equivalent European Norm, EN 30607 [5], and in ISO TR 10000-2 is described. Conditional extensions which cover additional ETSI requirements are also specified. An implementation claiming full conformance to this teleservice is to support all of these conditional extensions. Basic and full implementations may interwork, as the extensions can be negotiated out in the initialization phase. The specification of the mapping between ISO Session Service and a Transport Service running over ISDN is based on ETS 300 080 [13].

This ETS is presented in a number of clauses. Clauses 6 to 9 specify the FTAM specific part of the ETS and is based on "Simple File Transfer", EN 30607, Part 3 [5]. It could become the first of a family of ETSS for the use of FTAM over ISDN, with additional, more powerful ETSS based on ISO/IEC ISP 10607, Parts 4 to 6.

Clause 10 gives the "Specification of the ACSE, Presentation and the Session protocols for the use by FTAM", and notes the additional constraints to EN 30607, Part 1 [5].

Clauses 11 and 12 give lower layer application rules for the Transport Service to be used based on ETS 300 080 [13]. Again it notes the additional constraints in this ETS for the support of the teleservice "File Transfer Access and Management (FTAM) over ISDN, based on simple file transfer".

The ETS also contains three annexes. Annex A (normative) is a delta ETS Implementation Conformance Statement Requirements List for FTAM, based on annex A of EN 30607-3 [5], the second (annex B (informative)) is a set of recommendations on parameter combinations through the lower four layers to achieve optimum throughput and the third (annex C (informative)), provides a bibliography of non-normative references given in this ETS.

The ETS is, therefore, structured as follows:

Clause(s)	Title
6 - 9	FTAM (this part plus the PICS);
10	ACSE, Presentation and Session;
11 - 12	Lower layers and Transport based on ETS 300 080 [13];
annexes A+B	ISPICS for the FTAM specific part and lower layer parameters.

The FTAM part of the ETS is based on (and conformant to) EN 30607-3 [5] which has additional European specific text preceding the ISO ISP text. It also, however, references ISO/IEC ISP 10607-3 [4] for international completeness. It is also aligned with the recommendations in the CEC European Procurement Handbook for Open Systems (EPHOS). For example, EPHOS defines that for a general purpose system for terminal-to-terminal or to host, all four possible roles (initiator and responder, sender and receiver) are implemented as is needed for a system claiming full conformance to the teleservice. Basic conformance to the teleservice can be claimed for specialized systems as identified in subclause 6.1.

Additional restrictions are defined for the specific ISDN environment and these are clearly identified in clause 9.

Some of the European Workshop for Open Systems (EWOS) conformance Abstract Test Suites (ATS) will be selected and can be applied to the teleservice FTAM Simple File Transfer over ISDN with a few changes and additions. This is used with ISDN specific additions for the Transport mapping.

2 Normative references

This ETS incorporates by dated or undated reference, provision from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revision of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] 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" (corrected and reprinted 1991-12-15).
- [2] ISO/IEC ISP 10607-2 (1990): "Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 2: Definition of document types, constraint sets and syntaxes" (corrected and reprinted 1991-12-15).
- [3] ISO/IEC ISP 10607-2(a), Amendment 1 (1991): "Amendment 1 to ISO/IEC ISP 10607-2:1990, Additional Definitions".
- [4] 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)" (corrected and reprinted 1991-12-15).
- [5] EN 30607, Parts 1 to 6 (1993): "Textually identical to ISO/IEC ISP 10607 with European specific character set foreword".
- [6] ISO/IEC 8571 (1988): "Information processing systems - Open Systems Interconnection - File Transfer, Access and Management -

Part 1 - General introduction,

Part 2 - Virtual Filestore definition,

Part 3 - File Service Definition,

Part 4 - File Protocol specification,

Part 5 - Protocol Implementation Conformance Statement Proforma".
- [7] ISO/IEC 8571, Parts 1 to 5 (1992): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management, Amendment 1 to Parts 1 to 5: Filestore Management".
- [8] Technical Corrigendum 1 to ISO/IEC 8571-1:1988 (1991): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 1: General introduction".
- [9] Technical Corrigendum 1 to ISO/IEC 8571-2:1988 (1991): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 2: Virtual Filestore Definition".
- [10] Technical Corrigendum 1 to ISO/IEC 8571-3:1988 (1991): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 3: File Service Definition".
- [11] Technical Corrigendum 1 to ISO/IEC 8571-4:1988 (1991): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 4: File Protocol specification".

- [12] Technical Corrigendum 1 to ISO/IEC 8571-5:1988 (1991): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 5: Protocol Implementation Conformance Statement Proforma".
- [13] ETS 300 080 (1992): "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".
- [14] ISO 8327 (X.225) (1987): "Information processing systems - Open Systems Interconnection - Basic connection oriented session protocol specification (and Addendum 2)".
- [15] ISO/IEC 8073 (X.224) (1992): "Information processing systems - Open Systems Interconnection - Protocol for providing the connection - mode transport service".
- [16] ISO/IEC 8208: "Information technology- Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".
- [17] CCITT Recommendation X.223 (1988): "Use of X.25 to provide the OSI connection-mode network service for CCITT applications".
- [18] ENV 41112 (T/1112): "Provision of OSI Connection-Mode Transport Service over the OSI Connection-mode Network Service by using an ISDN Circuit-mode 64 Kbits Unrestricted Bearer Service: Demand Case".
- [19] ISO 7776 (1986): "Information processing systems - Data communications - High level procedures - Description of the X.25 LAPB - compatible DTE data link procedures".
- [20] CCITT Recommendation X.75 (1984): "Packet switched signalling system between public networks providing data transmission services".
- [21] CCITT Recommendation T.90 (1988): "Characteristics and protocols for terminals for telematic services in ISDN".
- [22] prETS 300 410: "Integrated Services Digital Network (ISDN); File Transfer and Access Management (FTAM) teleservice, Service description".
- [23] ITU-T Recommendation I.333 (1992): "Terminal selection in ISDN".
- [24] prETS 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) - User-network interface layer 3 specification for basic call control - Part 1: Protocol specification - [ITU-T Recommendation Q.931 (1993), modified]".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the terms used in EN 30607-3 [5], ISO 8571 [6] and ISO 7498 are used with the same meaning. The abbreviations used in the Profile Implementation Conformance Statement Requirements List are duplicated for convenience.

3.2 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ACSE	Association Control Service Element
AFT	Application File Transfer profile
ATS	Abstract Test Suite
DISP	Draft International Standardized Profile
CEC	Commission of the European Communities
EN	European Norm
EPHOS	European Procurement Handbook for Open Systems
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
EWOS	European Workshop for Open Systems
FTAM	File Transfer Access and Management
HLC	Higher Layer Compatibility information element
IEC	International Electrotechnical Committee
ISDN	Integrated Services Digital Network
ISO	International Organisation for Standardization
ISP	International Standardized Profile
ISPICS	ISP Implementation Conformance Statement
MLS	Maximum Level of Security or Multi Level Security system
NSAP	Network Service Access Point
ODA	Office Document Architecture
ODIF	Office Document Interchange Format
PICS	Protocol Implementation Conformance Statement
PDU	Protocol Data Unit
PSPDN	Packet Switched Public Data Network
SABM	Set Asynchronous Balanced Mode
SNPA	Sub-Network Point of Attachment
SPDU	Session Protocol Data Unit
TSAP	Transport Service Access Point
TSAP-Id	TSAP Identifier
VT	Virtual Terminal

Support level for protocol features

m	supported (mandatory)
o	optionally supported
c	conditionally supported
x	excluded
i	outside the scope
-	not applicable

Support level for attributes

f	full
p	partial

4 General

For the purposes of this ETS, the following terminology shall apply:

Support level: for Protocol Data Units (PDUs), parameters and other features:

- 'm' = Supported. Mandatory support as defined in EN 30607-3 [5].
- 'o' = Optionally supported, as defined in EN 30607-3 [5].
- 'c' = Conditionally supported (optional for a basic implementation but mandatory for an implementation claiming full conformance).
- 'x' = eXcluded as defined in EN 30607-3 [5].

'i' = outside the scope as defined in EN 30607-3 [5], and ignored for conformance testing.

'-' = not applicable as defined in EN 30607-3 [5].

For attributes:

'f' = full support of the attribute is required, as defined in ISO/IEC 8571-2 [6].

'p' = partial support of the attribute is permitted, as defined in ISO/IEC 8571-2 [6].

5 Conformance

This ETS states requirements upon implementations to achieve FTAM simple file transfer teleservice terminal interworking. A claim of conformance to this ETS requires that all requirements in the relevant base standards are satisfied, and that all the requirements in the following clauses are satisfied. Clauses 9 to 12 state the relationship between these requirements and those of the base standards.

5.1 Conformance statement

For each implementation claiming conformance to this ETS, an appropriate set of PICS shall be made available stating support or non-support of each option identified in this ETS. In addition, for an implementation claiming basic conformance, the status of each conditional option which has not been implemented shall be explained. An implementation claiming full conformance shall support all conditional options.

6 FTAM Services

6.1 Classes of service

The most widely implemented Service class is the File Transfer and Management class (no file access). This is the preferred class (as restricted in Simple File Transfer, EN 30607-3 [5]) and is the basis for the rest of the detailed recommendations. The File Transfer Class shall also be implemented with the Limited File Management functional unit as mandatory. All future references are to EN 30607-3 [5] which is textually identical to ISO/IEC ISP 10607-3 [4] with the addition of a European foreword.

EN 30607 [5] allows optionality in the roles of initiator and responder, and in the ability to send or receive files. The main requirement is for symmetric PC-to-PC and this also requires all four roles to be available. Specialised systems, for example, file or print servers need only ever act as a Responder. Conversely, specialised simple terminals accessing a server or a host need only ever act as an Initiator. These basic styles of usage are common and considerably simplify implementation. In support of such usage this ETS distinguishes between the full conformance of general purpose systems and basic conformance of specialised systems being capable of interworking with general purpose systems.

6.2 Functional units

For the full requirements of terminal access, the Limited File Management functional unit (the ability to read attributes such as file size, Create files and Delete files) shall be mandatory.

The Enhanced File Management functional unit (the ability to change attributes) is optional in the basic service but mandatory in the full service. It allows the user to modify attributes of selected files such as rename a file. This is required for an implementation claiming full conformance. However, it can also allow the ability to change the Access control security attributes. This is not considered to be safe. Therefore, the Security Group of Attributes should not be negotiated in conjunction with this functional unit.

FTAM allows automatic Recovery from a network failure, or even an end system or terminal system failure. The Restart (warm recovery) and Recover (cold recover) functional units are, therefore, highly desirable for general purpose systems and Recovery shall be mandatory for full automatic mode.

6.3 Document types (or file types) supported

The support of the Document types FTAM-1 (unstructured text file) and FTAM-3 (unstructured binary) shall be mandatory as specified in EN 30607-3 [5].

The Document type (file type) NBS-9, which is the definition of a Directory file, shall be mandatory in this ETS for implementations claiming full conformance. This is to allow the ability to List Directory. The use of this is defined in EN 30607-3 [5], clause 6.

The FTAM 2 document type (sequential or record oriented text) is optional but should be used (strongly recommended) as it is useful for word processing and other common applications and widely implemented. FTAM 4 (sequential binary) is outside the scope of this ETS.

INTAP-1, the Japanese document type for very large binary record files (image processing for example), is optional in EN 30607-3 [5]. It is not useful in a terminal-to-terminal environment and is, therefore, outside the scope of this ETS. Presentation abstract syntax for INTAP Document Type is, therefore, also outside the scope of this ETS.

In this environment, only a simple Presentation service shall be required. The ability to perform context management (P-Alter-Context) shall not be necessary. All required file/document types to be used on this session shall be negotiated at connection time. This is sufficient for normal terminal use. This is reflected in the Presentation Service requirements.

6.4 Attributes

The Storage group of attributes is still optional for the basic service but strongly recommended. In addition to the requirements of EN 30607-3 [5], it shall be mandatory for implementations claiming full conformance.

The security group of attributes are optional for the Responder. Given the problems with the ability to change security attributes described earlier. This group should not be used in conjunction with the Enhanced File Management functional unit.

NOTE: Improvement to this is the subject of a work item in ISO. In the interim, the Security Attribute Group should not be selected in secure environments.

FTAM defines an access control attribute which allows authentication and access control security checking on the basis of a Password, the user Identity and his location (Application Entity Title).

6.5 Protocol

For reasons of efficiency, implementations should optionally make use of the draft prEN 11188-3 "Common upper layer requirements - Minimal OSI upper layers requirements".

6.5.1 Capability to parse, as a minimum, application data records of 7K octets

For complex structures, EN 30607 [5] specifies the minimum amount of incoming data which a system shall be capable of buffering and decoding. It does not specify the maximum. This requirement is in line with the recommended defaults for the lower layers.

6.5.2 Out of scope settings

Some of the current "out of scope" settings in EN 30607-3 [5], should in fact be forbidden or "excluded" (e.g. Activity Management). This is under discussion within EWOS but does not effect the current ETS as it would mean changes in EN 30607-3 [5], which are not specific to ETSI file transfer. These are, in any case, features which are not conformance tested or implemented. Nevertheless, other optional or out of scope facilities may be negotiated by implementations of this teleservice, they are not subject to conformance to this ETS.

6.6 Details of FTAM internal service

Support for the following document types shall be mandatory:

Title	Name	Object Identifier
FTAM-1	Unstructured text file	1,0,8571,5,1;
FTAM-3	Unstructured binary file	1,0,8571,5,3.

Support for this document type is conditional on a claim for full conformance:

Title	Name	Object Identifier
NBS-9	File Directory Support	1,3,14,5,5,9.

Support for the following document type is optional (but strongly recommended):

Title	Name	Object Identifier
FTAM-2	Sequential text file	1,0,8571,5,2.

Support for the **File Transfer** class shall be mandatory.

The **File Transfer** class only allows a single complete transfer of a complete file within each Selection. It also forces concatenation (or grouping) of requests whenever possible to reduce protocol overheads.

Support for the **File Transfer and Management** class shall be mandatory in a full service.

The **File Transfer and Management** class is a combination of the File Transfer and File Management classes.

The actions which can be performed on a complete file are as follows:

File -	Select/Deselect Create/Delete (delete is optional) Open/Close
Attributes -	Read/Change (including change filename = rename)
Contents -	Read Write Append Replace
Navigate -	Change Filename prefix.

NOTE: Navigate is available with the FileStore Management Amendment 1 to ISO/IEC 8571 [7]. Profiles will be completed for this within 6 months.

6.6.1 File transparency

The transparency of user data is assured by the use of Presentation context. FTAM adds no overhead and user file data is passed directly to the presentation layer.

7 Use of directory including the X.500 Directory

The EWOS work for the use of the Directory based on CCITT Recommendations X.500 to X.521 by FTAM has been harmonized with the other Regional Workshops (OIW and AOW), and is currently registered within EWOS as ISO/IEC DISP 11190 "The use of the directory by FTAM". This defines the initial use of CCITT Recommendation X.500 by the ETSI Simple FTAM Profile.

FTAM can use a directory (local or remote, or CCITT Recommendation X.500) to convert Application Entity Titles into a combination of a Presentation Address (including Presentation, Session and Transport selectors as well as the Network Address) and the information necessary to set-up the ISDN call. This latter information being used to transparently drive the ISDN Control Plane.

There are a number of pieces of addressing information, each of which has a different purpose and format.

From the user view, he inputs the Application Entity Title or a more user friendly alias. This shall be translated by a built-in list, local directory, or remote directory (CCITT Recommendation X.500) into two pieces of information which are related. These are the Presentation Address, which includes the Network Address, and, optionally, the Sub-Network Point of Attachment (SNPA) (if it is not derivable from the network address).

The SNPA is, in general, the physical address of the connection point of the terminal on its relevant sub-network. In this ETS, it is the ISDN address information. This shall be passed transparently to the ISDN Control Plane.

The Presentation Address contains the Transport Service Access Point Identifier (TSAP-Id) and a series of Selectors for the upper layers to allow multiple instances of the same protocol and multiple types of application to be differentiated. Thus allowing a server to allow many terminals to connect simultaneously and to allow a terminal to run interactive editing (VT) in parallel with file transfer (FTAM). The selectors are not significant (see clause 12). The Presentation Address also contains the Network Service Access Point (NSAP) which allows an ISDN terminal to traverse multiple sub-networks other than ISDN or link into ISDN through Packet Switched Public Data Network (PSPDN).

8 Logging

In addition to the normal logging of communication events, FTAM defines a series of eighteen Attributes. At least, the following eight, if values are available, should be logged as tracing information:

- Date and time of Creation;
- Date and time of last modification;
- Date and time of last read access;
- Date and time of last attribute modification;
- Identity of creator;
- Identity of last modifier;
- Identity of last reader;
- Identity of last attribute modifier.

The use of the Storage Group of Attributes and full support for at least the above group of attributes is, therefore, conditional on a claim to full conformance in order to allow these remote attributes to be read and retained in a local log file. For basic conformance these are not required, but are strongly recommended.

In addition, local functions shall be provided to register and clearly indicate to the user the result of each communication event. This indication should be provided by a log which contains the information in chronological order. The log should include a trace of any communication event or any communication incident. The log-examine function should always be able to access the log, whatever the status of the call may be and the operation mode. The log-examine function should be able to access, at least, the latest communication events.

9 Delta to the ISPICS from EN 30607, Part 3

The following specifies the changes from the EN 30607-3 [5], annex A, the ISPICS Requirements List which are felt necessary for the ISDN terminal-to-terminal environment. They are additional constraints and are conformant with EN 30607-3 [5], annex A. Their rationale is described in earlier clauses. The ISO/IEC 8571-5 [6], clause A.x.x references are to the relevant subclause in EN 30607-3 [5], annex A and ISO/IEC 8571-5 [6] (FTAM PICS, annex A).

EN 30607-3 [5] or ISO/IEC 8571-5 [6], clause A.5

Addition of the published technical corrigenda.

EN 30607-3 [5] or ISO/IEC 8571-5 [6], clause A.7

All four roles shall be mandatory for an implementation claiming full conformance, this allows symmetric terminal-to-terminal operation. A note is added to explain how a basic conformant implementation (e.g. a simpler terminal or server), conformant to EN 30607-3 [5], but not to this ETS, could interwork with an ETS conformant system (see subclause 6.1).

EN 30607-3 [5] or ISO/IEC 8571-5 [6], clause A.9

The INTAP AS1 abstract syntax is not included as there is no clear requirement for very large (Gigabit) binary file transfers between terminals. FTAM-3 is adequate. INTAP AS1 is conditional on INTAP-1 document Type which is optional in EN 30607-3 [5]. This is, therefore, not a technical change, but one of emphasis.

EN 30607-3 [5] or ISO/IEC 8571-5 [6], subclause A.10.2.1

The Storage Group of Attributes shall be mandatory for fully conformant implementations as they are widely implemented and highly desirable for reliable logging.

For Maximum Level Security (or Multi Level Secure systems (MLS)) it has been noted that the combination of Change Attribute and the Security Group of Attributes is not safe as it allows the Access Control Vector to be modified. It is optional in EN 30607-3 [5].

EN 30607-3 [5] or ISO/IEC 8571-5 [6], subclause A.10.2.2

For logging purposes in an MLS situation, a fully conformant implementation of the Storage Group of Attributes shall be fully supported.

EN 30607-3 [5] or ISO/IEC 8571-5 [6], subclause A.11.11

Change Attributes is outside the scope of ISP 30607-3 [5] and for basic implementations. It is, however, mandatory in this ETS for implementations claiming full conformance, as it is necessary for the renaming of a file.

EN 30607-3 [5] or ISO/IEC 8571-5 [6], subclause A.12.4

The support of the Transfer and Management class shall be mandatory for full conformance of this ETS. (This function is not mandatory in AFT11).

EN 30607-3 [5] or ISO/IEC 8571-5 [6], subclause A.12.5

Following on from subclause A.12.4 of EN 30607-3 [5] or ISO/IEC 8571-5 [6], the support of the Limited File Management functional unit shall be mandatory in Transfer class and the support of the Enhanced File Management Functional unit is optional for a basic implementation conforming to AFT11 but strongly recommended. It shall be mandatory for an implementation claiming full conformance with this ETS but not in combination with the Security group of attributes.

EN 30607-3 [5] or ISO/IEC 8571-5 [6], clause A.13

The INTAP-1 Document Type is not included in the list. It is optional in EN 30607-3 [5]. See also annex A, clause A.9. Conversely, in order to be able to list a directory, NBS-9 shall become conditional.

NBS-9 is optional but strongly recommended for a basic implementation conforming to AFT11 and shall be mandatory for implementations claiming full conformance with this ETS in order to be able to list files.

10 ACSE, Presentation and Session Profile for FTAM over ISDN

10.1 Association Control Service Element (ACSE)

The rules of EN 30607-1 [5] shall apply. In particular, the requirements of clause 6 shall be supported. No additional constraints shall be imposed.

10.2 Presentation layer and Transfer syntax

10.2.1 General

The rules of EN 30607-1 [5] shall apply. In particular, the requirements of clauses 7 and 8 shall be supported.

10.2.2 Context management

The use of P-Alter context is outside the scope of this ETS as it is not considered necessary in a simple terminal environment with a limited number of Document Types and, hence, a small number of Presentation Contexts.

10.2.3 Context restoration

This is not required by FTAM.

10.2.4 Document translation

The Presentation layer only allows for simple character translation or different encoding of other information. Each system should be able to deal with simple ASCII text (mandatory function in FTAM-1), see ISO/IEC 8571-5 [6], and optionally (strongly recommended) with the Office Document Interchange Format (ODIF), see ISO 8613-5. Local mappings between these two standard formats and the local WP format can then be made.

The use of PC formats such as Word-RTF format sent in FTAM-1 (unstructured text) can also be used as a suitable exchange mechanism, especially between different manufacturers equipment.

10.3 Session Layer

10.3.1 Session version 2 - unlimited user data

Session version 2 for the use of unlimited user data, as specified in ISO 8327 [14], addendum 2, shall be used.

NOTE: EN 30607-3 [5] and all existing implementations of FTAM make use of version 2 of the session service which specifies "unlimited" user data. This allows Application protocols to correctly report cancel and abort problems and to recover from them. The Restart and Recovery mechanisms of FTAM are the prime examples of this requirement.

10.3.2 Extended concatenation

Extended concatenation shall not be required.

10.3.3 Session segmenting

Session segmenting shall not be required. It can be refused using the negotiation mechanisms of the session protocol.

10.3.4 Minor Synchronise

Minor Synchronise shall be mandatory in full automatic mode and shall, therefore, be specified as conditional.

10.3.5 Resynchronise

Resynchronise shall be mandatory in full automatic mode.

11 Lower layers application rules

11.1 General

This clause defines the delta changes necessary to run FTAM simple file transfer over ETS 300 080 [13] for the lower layers. It adds specific application rules to ETS 300 080 [13] in order to run FTAM efficiently and reliably over the ISDN. All references shown in *italic* in the following subclauses are direct references to ETS 300 080 [13].

11.2 Application rules for lower layer protocols based on ETS 300 080 for "FTAM simple file transfer over ISDN"

For each of the following subclauses, the relevant subclause of ETS 300 080 [13] is indicated in *italic*.

11.2.1 Scope (*clause 1*)

Add to the "telematic services considered" a new entry for:

- "FTAM over ISDN".

11.2.2 Model description (*clause 4*)

Details given for each subclause.

11.2.2.1 Protocol pillars (*subclause 4.1*)

Subclause 4.1 of ETS 300 080 [13] shall apply for "FTAM over ISDN" with the following modification of the last but one paragraph.

"For the application of "FTAM over ISDN", transport connections are provided by ISO/IEC 8073 [15] (with Application rules imposed as indicated in clause 8)."

11.2.2.2 Co-ordination between B-Channel and D-Channel (*subclause 4.2*)

Subclause 4.2 shall apply without any additional rule.

11.2.2.3 Mapping of ETS 300 102-1 causes to OSI CONS reasons (*subclause 4.3*)

Subclause 4.3 shall apply without any additional rule.

11.2.3 Layer 1 protocols (*clause 5*)

Clause 5 shall apply without any additional rule (see note 1).

11.2.4 D-channel layer 2 (*clause 6*)

Clause 6 shall apply without any additional rule.

11.2.5 D-channel layer 3 (*clause 7*)

Details given for each subclause.

11.2.5.1 The access protocol (*subclause 7.1*)

Subclause 7.1 shall apply without any additional rule.

11.2.5.2 Terminal selection and compatibility checking (*subclause 7.2*)

Subclause 7.2 of ETS 300 080 [13] shall apply for "FTAM over ISDN" with the following extension of table 4 of *subclause 7.2.1.3* ("High Layer Compatibility"). The ITU-T Recommendation I.333 [23] shall apply.

"The HLC codepoint(s) for the FTAM simple file transfer over ISDN is/are called "FTAM over ISDN". The definition of the codepoint(s) is given in prETS 300 410 [22] by taking into account the aspects of the general purpose and specialized systems as outlined in *subclause 6.1* and shall be included for octet 4. Pending publication of ETS 300 410 [22], no HLC shall be sent.

NOTE: In case ETSI decides not to publish ETS 300 403-1 [24] but an enhanced version of ETS 300 102-1, the above text will be updated accordingly.

11.2.5.3 Service specific use of supplementary services (*subclause 7.3*)

Subclause 7.3 shall apply without any additional rule.

11.2.6 B-channel protocols (*clause 8*)

Details given for each subclause.

11.2.6.1 B-channel layer 2 (*subclause 8.1*)

Details given for each subclause.

11.2.6.1.1 Base protocols (*subclause 8.1.1*)

Subclause 8.1.1 shall apply without any additional rule (also see note 2).

11.2.6.1.2 General rules for base protocol CCITT Recommendation X.75 (*subclause 8.1.2*)

Subclause 8.1.2 shall apply without any additional rule (see note 2).

11.2.6.1.3 Specific rules for base protocol CCITT Recommendation X.75 (*subclause 8.1.3*)

Subclause 8.1.3 of ETS 300 080 [13] shall apply for "FTAM over ISDN" with the following additions.

p) Timer/Parameter T1 (CCITT Recommendation X.75 [20], § 2.4.8.1)

For T1 the value indicated in table B.1 is suggested for efficiency.

q) Parameter T2 (CCITT Recommendation X.75 [20], § 2.4.8.2)

The implementation of a T2 timer as indicated in table B.1 is suggested for efficiency.

r) Transmission Counter N2 (CCITT Recommendation X.75 [20], § 2.4.8.4)

A value of 10 is the default for N2.

s) Maximum frame length N1 (CCITT Recommendation X.75 [20], § 2.4.8.5)

Maximum frame sizes of at least 1 031 octets should be implemented assuming that basic mode is used.

11.2.6.1.4 Application rules for base protocol ISO 7776 (*subclause 8.1.4*)

Subclause 8.1.4 of ETS 300 080 [13] shall apply for "FTAM over ISDN" with the following additions.

c) Timer T1

In spite of the 5 second value recommended in *subclause 8.1.4* for T1, the value indicated in table B.1 is suggested for efficiency.

d) Parameter T2

The implementation of a T2 timer as indicated in table B.1 should be carried out for efficiency.

f) Maximum frame length N1

Maximum frame sizes of at least 1 031 octets should be implemented assuming that basic mode is used.

In addition a value of 10 is the default for N2.

11.2.6.1.5 Synchronization (*subclause 8.1.5*)

Subclause 8.1.5 shall apply without any additional rule (see note).

11.2.6.2 B-channel layer 3 (*subclause 8.2*)

Subclause 8.2 of ETS 300 080 [13] shall apply for "FTAM over ISDN" with the following additions.

11.2.6.2.1 Logical channels to be used (*subclause 8.2.2*)

Channel 1 should be available as default.

Further study is required to evaluate the use of either the "Registration Procedure" or the "Logical Channel Identifier negotiation" based on the "Reference Number" optional user facility as proposed in ISO/IEC 8208 [16].

11.2.6.2.2 Packet sizes (*subclause 8.2.3*) & Default packet level window size (*subclause 8.2.4*)

These two subclauses shall apply to "FTAM over ISDN" applications with the following addition.

"To optimise the efficiency of an FTAM application over ISDN use of the negotiation mechanism for packet window size and packet size (together with the support of packet size of at least 1 024 octets) shall be mandatory. Such negotiation should aim to other values than default packet size = 128 and default packet level window size = 2. The recommended combinations of packet size and packet level window size are given in table B.1."

11.2.6.2.3 Protocol Identifier (*subclause 8.2.8*)

An additional clause with the protocol identifier to be used for "FTAM over ISDN" may be included in ETS 300 080 [13] (see ENV 41112 [18]).

This subject is currently not agreed within ISO and the ITU-TS concerning the value 2, see:

- ISO/IEC 8208 [16] where it is defined as the ISO number in a joint agreement;
- CCITT Recommendation T.90 [21] where it is used for teletex and Group 4 facsimile;
- ENV 41112 [18], subclause 6.1.1.2;
- ETS 300 080 [13], subclauses 8.2.8 and 9.1.5;
- CCITT Recommendation X.29, figure 1/X.29;

- CCITT Recommendation X.224 ISO/IEC 8073 [15], annex B.

In the interim, the temporary value of 3 should be used for FTAM over OSI Transport over ISDN. This should be configurable as the value of 3 is not currently recognised by ETS 300 080 [13].

11.2.6.2.4 Interrupt packet (*subclause 8.2.9*)

For "FTAM over ISDN" the S-Prepare service is optional (but strongly recommended). When used and in order to support that, the expedited data facility shall be requested, if available, to support for "FTAM over ISDN".

11.2.6.2.5 Encoding of Network Service Access Point (NSAP) addresses (*subclause 8.2.11*)

As specified in ETS 300 080 [13].

11.2.6.2.6 Optional user facilities and CCITT specified DTE facilities (*subclause 8.2.12*)

Subclause 8.2.12, as a whole, applies to the case of "FTAM over ISDN" (with the amendment that no facilities shall be mandatory for the support of "FTAM over ISDN") except those required to support the mechanism defined in *subclauses 8.2.4, 8.2.9 and 8.2.11* which shall be **fully** implemented.

NOTE 1: As indicated in annex C, subclause C.4.2 of ETS 300 080 [13], the interworking between a terminal implementing a CCITT Recommendation X.75 [20] based level 2 protocol modified by the application rules defined in CCITT Recommendation T.90 [21] and terminal implementing a level 2 protocol based on ISO 7776 [19] is possible, however, the communication may be inefficient in some situations.

If an efficient interworking with ENV 41112 [18] based implementations is a major concern, the use of a level 2 protocol based on ISO 7776 [19] with the additional rules defined in ETS 300 080 [13] subclause 8.1.4, is preferable. If global interoperability with the terminal providing telematic services is the major concern, then the CCITT Recommendation X.75 [20] based level 2 protocol (CCITT Recommendation T.90 [21] compatible and globally recognised as level 2 protocol for telematic terminals) should be preferred.

NOTE 2: If possible, the calling side should send at least 64 concatenated flags so that two adjacent "0"s occur between each string of "1"s before initialising the link with a Set Asynchronous Balanced Mode (SABM). The called side should start the transmission of flag as soon as possible in order to send at least 64 concatenated flags before receiving a SABM from the calling side.

12 Transport profile based on ETS 300 080

12.1 Addressing

Although not strictly necessary in a closed ISDN network, the Network Service Access Point (NSAP) is required for more global interworking with, for example, PSPDN X.25. This requires the use of the Address Extension field in CCITT Recommendation X.25. The specification of this mapping is defined in CCITT Recommendation X.223 [17], with examples in annex II of this Recommendation.

The use of significant service access point and selectors at each of Transport, Session and Presentation layers is considered excessive. Only the Transport Service Access Point Identifier (TSAP-Id) is optional but should be used (strongly recommended) to select the required service. Multiplexing is not allowed in the Session and Presentation layers in any case, and these selectors are non-mandatory (optional) and largely redundant. The Responder should attach no significance to their value and prefers them to be absent. However, the Initiator shall remain capable of transmitting whatever values are required.

12.2 Quality of Service

ISDN networks are considered to be of Type A (Network connection with acceptable residual error rate and acceptable rate of signalled errors) as defined in ISO/IEC 8073 (X.224) [15], Transport Service Definition. Thus the error recovery and detection Transport protocol classes are not necessary.

12.3 Transport protocol Classes

Support for Transport Class 0 shall be mandatory. However, support for Class 2 should also be strongly recommended as it can be used to multiplex other Application Associations or connections alongside FTAM. Thus, for example, it would be possible for a terminal to share a Transport connection between an automatic mode file transfer and a Virtual Terminal (VT) editing session. This in line with EN 41112 [18], subclause 6.1.2.

12.4 Re-use of Transport connection

Re-use of Transport connection shall not be required. However, as described above, it may be useful to multiplex FTAM and VT on a single Transport connection but on parallel Session Connections using Class 2.

12.5 Guideline for ISDN call set-up

When an FTAM call is being initialised, it is necessary to first set up the network connection. Thus it will be necessary to hold the ISDN call set up information to allow call set-up on the Control Plane. This operation should be done independently of the FTAM use of the User Plane. It will thus be necessary to implement some form of management function capable of directly accessing the ISDN Control Plane. The details are implementation dependant and outside the scope of this ETS.

12.6 Transport expedited

S-Re-synchronise and S-Abort both use the S-Prepare Session Protocol Data Unit (SPDU), thus Transport expedited is optional but strongly recommended. EN 30607-1 [5] states "Note - This feature should be requested and used". This requires the use of 32 byte interrupt capability if available. If it is not available FTAM can map Cancel onto S-DATA. Although the interrupt will not overtake data in a point-to-point network, it is still useful in the case of end system queuing problems. This is not in line with ETS 300 080 [13] or EN 41112 [18].

12.7 Security

In addition to the Access Control and Authorisation features at the Application layer, the Remote User Identifier, if available should be used for an authorisation check against the user identifier.

12.8 Detailed Application rules for ETS 300 080, clause 9

For each of the following subclauses, the relevant ETS 300 080 [13] subclause is indicated in *italic*.

12.8.1 Additional application rules for the transport protocol in ITU-T Recommendation T.70 (layer 4) (*subclause 9.1*)

Subclause 9.1 shall not apply for "FTAM over ISDN".

12.8.2 Specification of the additional application rules for the transport protocol in ISO/IEC 8073 and ITU-T Recommendation X.224 (layer 4) (*subclause 9.2*)

Subclause 9.2 of ETS 300 080 [13] shall apply for "FTAM over ISDN" with the following amendment of subclause 9.2.1 "Protocol classes".

"The end system should not be limited to support class 0 but should, optionally, also support class 2".

Annex A (normative): ETSI - FTAM Profile Implementation Conformance Statement Requirements List

This annex describes additions to EN 30607-3 [5], which is derived from ISO/IEC 8571-5 [6] and the Technical corrigendum to ISO/IEC 8571-5 [12] to act as the ETSI simple file transfer profile PICS Proforma for OSI-FTAM over the ISDN with the modifications given below. Clause 9 of this ETS describes the additional constraints which are felt necessary for the ISDN terminal-to-terminal environment.

1) **Clause A.5 - insert the published technical corrigenda to the table as shown below.**

A.5 Defect report numbers and amendments implemented

The numbers of any approved defect reports or amendments which have been implemented shall be stated below:

1	ISO 8571-1	-	Technical Corrigendum 1 to 8571-1 [8]
2	ISO 8571-2	-	Technical Corrigendum 1 to 8571-2 [9]
3	ISO 8571-3	-	Technical Corrigendum 1 to 8571-3 [10]
4	ISO 8571-4	-	Amendment 4 to 8571-4 and Technical Corrigendum 1 [11]
5	ISO 8571-5	-	Technical Corrigendum 1 to 8571-5 [12]

2) **Insert the following note at the end of clause A.7 (Initiator/Responder capability):**

"NOTE: May interwork with simpler FTAM AFT11 conformant systems which do not claim full "conformance to this ETS and do not implement all four roles".

3) **Subclause A.10.2.1 (Attribute values). Amend the text in the final column of the table to read:**

	ATTRIBUTE GROUP NAME	D	I	R	
1	Kernel	m	m	m	
2	Storage	o	o	o	Full support is c for logging
3	Security	o	o	o	see note
4	Private	o	l	l	

and insert the following note below the table:

"NOTE: May interwork with simpler FTAM AFT11 conformant systems which do not claim full conformance to this ETS and do not implement all four roles."

- 4) Subclause A.10.2.2 (Attribute values). Amend the text in the final column of the Storage Group (Responder), Security Group (initiator) and Security Group (Responder). Also insert a note beneath the last-mentioned table as shown below:

	STORAGE GROUP (RESPONDER)	D	R full	R partial	RANGE OF VALUES
10	Storage account	p	c	o	Full support is c for logging
11	Date and time of creation	p	c	o	Full support is c for logging
12	Date and time of last modification	p	c	o	Full support is c for logging
13	Date and time of last read access	p	c	o	Full support is c for logging
14	Date and time of last attribute modification	p	c	o	Full support is c for logging
15	Identity of creator	p	c	o	Full support is c for logging
16	Identity of last modifier	p	c	o	Full support is c for logging
17	Identity of last reader	p	c	o	Full support is c for logging
18	Identity of last attribute modifier	p	c	o	Full support is c for logging
19	File availability	p	m	x	
20	Filesize	p	m	x	
21	Future filesize	p	o	o	

	SECURITY GROUP (INITIATOR)	D	I full		RANGE OF VALUES
22	Access control	f	m		see A.12.2 and note
23	Legal qualifications	f	m		

	SECURITY GROUP (RESPONDER)	D	R full	R partial	RANGE OF VALUES
24	Access control	f	m	x	see A.12.2 and note
25	Legal qualifications	f	o	o	

NOTE: Propagation of Access Control by Change Attribute is a security risk.

- 5) **Subclause A.10.3.1 (constraint sets). Insert the following text for the second element in the "DEPTH" column of the second line entitled "Sequential Flat":**

"NOT APPLICABLE, see note 2".

Add a note 2 beneath the table as follows:

"NOTE 2: Conditional upon the use of FTAM-2".

- 6) **Subclause A.11.2 (FTAM regime establishment). Insert the following text in the "RANGE OF VALUES OR REFERENCE" column for line 15 "Filestore password":**

"see A.12.11"

- 7) **Subclause A.11.11 (Change attributes). Insert the following note at the end of the subclause:**

"NOTE: If security facilities are requested, then the Enhanced File Management shall not be used for changing security attributes."

- 8) **Subclause A.11.12 (File open). Delete the current note 3 and replace with:**

"NOTE 3: Not applicable for this ETS".

- 9) **Subclause A.12.5 (Functional unit field details). Insert note 3 and note 4 beneath the table:**

"NOTE 3: For full automatic mode of operation the Recovery mechanism shall be mandatory.

"NOTE 4: Enhanced File Management is optional but strongly recommended and mandatory for basic implementation claiming full conformance, in order to allow file renaming. But it is not recommended in conjunction with the security group of attributes".

Insert note 3 and note 4 in the following table.

A.12.5 Functional unit field detail

State the functional units implemented in each service class.

	FUNCTIONAL UNITS	SERVICE CLASSES														
		Transfer			Access			Management			Transfer and Management			Un-constrained		
		D	I	R	D	I	R	D	I	R	D	I	R	D	I	R
1	Kernel	m	m	m	m	-	-	m	-	-	m	m	m	m	-	-
2	Read (see note 2)	c	o	o	m	-	-	-	-	-	c	o	o	m	-	-
3	Write (see note 2)	c	o	o	m	-	-	-	-	-	c	o	o	o	-	-
4	File Access	-	-	-	m	-	-	-	-	-	-	-	-	o	-	-
5	Limited File Management	o	o	o	o	-	-	m	-	-	m	m	m	o	-	-
6	Enhanced File Management	o see note 4			o - -			o - -			o see note 4			o - -		
7	Grouping	m	m	m	o	-	-	m	-	-	m	m	m	o	-	-
8	FADU Locking	-	-	-	o	-	-	-	-	-	-	-	-	o	-	-
9	Recovery	o see note 3			o - -			o - -			o see note 3			o - -		
10	Restart	o	-	-	o	-	-	o	-	-	o	-	-	o	-	-

- 10) **Clause A.13 (Document types). Insert a reference to note 3 in the final column of the second table of this clause, the line entitled "Object descriptor". Add the following note 3 at the end of the clause.**

"NOTE 3: Support for document type FTAM-2 is optional but strongly recommended in this ETS".

Annex B (informative): Recommended combinations of parameter values to ensure optimum throughput

One 64 kbit/s channel is assumed.

When many protocol layers are used within a single end-to-end transport mechanism the choice of specific values for the parameters of each level is not conditioned by their availability within intermediate systems or networks. It is then possible (and recommended) to select appropriate combinations of values at different levels to ensure the operation at the maximum achievable throughput.

Table B.1 includes some cases selected as meaningful examples of possible implementations for systems with different requirements of capacity (from small to large). The table is intended as a guidance for the optimum parameter combination. Selection of actual values for a specific implementation and the target throughput of such an implementation is matter of evaluation for the implementation engineer.

Table B.1

(draft)	Case small 1	Case usual 2	Case average 3	Case large 4
File Block Size	2 k	8 k	16 k	64 k
Transport TPDU size (octets)	2 k	4 k	16 k	64 k
Transport W Size (octets)	1	2	2	2
Packet Level Size	1 024	1 024	2 048	2 048
Packet Window Size (octets)	2	7	7	7
Frame Size	1 031	1 031	2 055	2 055
k (octets)	7	7	7	7
Timer T1	1 600 ms	1 600 ms	3 300 ms	3 300 ms
Timer T2	150 ms	150 ms	300 ms	300 ms

Annex C (informative): Bibliography

These are either non normative references, for information, or are referenced indirectly through EN 30607 [5] or ETS 300 080 [13]:

- 1) EN 11188-3: "Common upper layer requirements - Minimal OSI upper layers requirements".
- 2) EN 30607-4 (1991): "Information Processing Systems - Open Systems Interconnection - Positional File Transfer Service(Flat)".
- 3) EN 30607-5 (1991): "Information Processing Systems - Open Systems Interconnection - 'Positional File Access Service Flat)".
- 4) EN 30607-6 (1991): "Information Processing Systems - Open Systems Interconnection - File Management Service".
- 5) ISO/IEC 8649 (X.217): "Information processing systems - Open Systems Interconnection - Service definition for the Association Control Service Element".
- 6) ISO/IEC 8649 (X.227): "Information processing systems - Open Systems Interconnection - Protocol specification for the Association Control Service Element".
- 7) ISO/IEC 8822 (X.216): "Information processing systems - Open Systems Interconnection - Connection oriented presentation service definition".
- 8) ISO/IEC 8823 (X.226): "Information processing systems - Open Systems Interconnection - Connection oriented presentation protocol specification".
- 9) ISO/IEC 8824 (X.208) (1988): "Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)".
- 10) ISO/IEC 8825 (X.209) (1988): "Information technology - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)".
- 11) ISO/IEC 8326 (X.215): "Information processing systems - Open Systems Interconnection - Basic connection oriented session service definition".
- 12) ISO/IEC 8072 (X.214): "Information processing systems - Open Systems Interconnection - Transport service definition".
- 13) CCITT Recommendation T.70 (1988): "Network-Independent basic transport service for the telematic services".
- 14) ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User network interface layer 3, Specification for basic call control".
- 15) ISO/IEC TR 10000 - 2: "Information technology - Framework and taxonomy of International Standardized Profiles - Part 2: Taxonomy of OSI Profiles".
- 16) ITU-T Recommendation I.333 (1994): " Terminal selection in ISDN".
- 17) CCITT Recommendations X.500 to X.521 (1988): "Data Communication Networks - Directory. Volume VIII, Fascicle VIII.8".
- 18) European Procurement Handbook for Open Systems - 1992 - Report EUR 14021 EN.

- 19) ISO 8613-5 (T.400) (1989): "Information processing, Text and office systems - Office Document Architecture (ODA) and interchange format - Part 5: Office Document Interchange Format (ODIF)".
- 20) ISO 7498 (X.200) (1984): "Information processing systems - Open Systems Interconnection - Basic Reference Model".
- 21) ISO/IEC ISP 10607, Parts 4 to 6 (1991): "Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 4: AFT 12 - Positional File Transfer Service (Flat), Part 5: AFT 22 - Positional File Access Service (Flat), Part 6: AFT3 - File Management Service".
- 22) CCITT Recommendation X.25 (1988): "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- 23) ISO/IEC PDISP 11190: "Information technology - International Standardized Profiles FDI3 - Directory data definition - FTAM - Use of the Directory".

History

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