TECHNICAL REPORT

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Information technology — Framework and taxonomy of International Standardized Profiles —

Part 2:
Principles and Taxonomy for OSI Profiles

Technologies de l'information — Cadre et taxinomie des profils normalisés internationaux —

Partie 2: Principes et taxinomie pour profils OSI

Reference number
ISO/IEC TR 10000-2:1998(E)

Contents

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Foreword

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

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/IEC TR 10000-2, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This fifth edition cancels and replaces the fourth edition (ISO/IEC TR 10000-2:1995), which has been technically revised.

ISO/IEC TR 10000 consists of the following parts, under the general title *Information technology - Framework and taxonomy of International Standardized Profiles*:

— *Part 1: General principles and documentation framework*
— *Part 2: Principles and Taxonomy for OSI Profiles*
— *Part 3: Principles and Taxonomy for Open System Environment Profiles*

Other parts to be defined as necessary.

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Introduction

The context of Functional Standardization is one part of the overall field of Information Technology standardization activities covering

- Base standards, which define fundamentals and generalized procedures. They provide an infrastructure that can be used by a variety of applications, each of which can make its own selection from the options offered by them.

- Profiles, which define conforming subsets or combinations of base standards used to provide specific functions. Profiles identify the use of particular options available in the base standards, and provide a basis for the development of uniform, internationally recognized, conformance tests.

- Registration mechanisms, which provide the means to specify detailed parameterization within the framework of the base standards or profiles.

Within ISO/IEC JTC 1, the process of Functional Standardization is concerned with the methodology of defining profiles, and their publication in documents called "International Standardized Profiles" (ISPs) in accordance with procedures contained in the Directives of JTC 1. The scope of Information Technology standardization to which this process is being applied is that which corresponds to the generally understood, but loosely defined, concept of “Open Systems“. The objective is to facilitate the specification of IT systems characterized by a high degree of interoperability and portability of their components.

In addition to ISO/IEC TR 10000, the secretariat of the Special Group on Functional Standardization maintains a standing document (SD-4) entitled "Directory of ISPs and Profiles contained therein". This is a factual record of which ISPs exist, or are in preparation, together with an executive summary of each profile. It is subject to regular updating by the Secretariat of ISO/IEC JTC 1/SGFS.

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Information technology — Framework and taxonomy of International Standardized Profiles —

Part 2:
Principles and Taxonomy for OSI Profiles

1 Scope

The purpose of this part of ISO/IEC TR 10000 is to provide principles and a classification scheme for OSI profiles which may be or have been submitted for ratification as International Standardized Profiles (ISPs).[1]

ISO/IEC TR 10000-1 defines the concept of profiles which are documented in ISPs. OSI profiles are a subset of OSE profiles. ISO/IEC TR 10000-3 defines the concept of OSE profiles and, along with ISO/IEC TR 10000-1, gives guidance to organizations making proposals for Draft ISPs, on the nature and content of the documents they are producing.

The existence of a profile classification in this part of ISO/IEC TR 10000 does not reflect a judgment by ISO/IEC JTC 1/SGFS that a profile is required for such capability. It merely provides a capability to identify uniquely such a function and to enable evaluation of PDISPs.

Since profiles will be proposed according to needs identified to SGFS and according to the progress of international base standardization, the Taxonomy will be periodically updated or have new parts added in order to reflect the progress reached. It is also recognized that there will be proposals for the extension of the Taxonomy to cover functions which were not identified during preparation of this edition of ISO/IEC TR 10000. These extensions may be identified by a variety of proposers and involve simple extensions to the existing Taxonomy or the addition of new functional areas not currently covered by ISO/IEC TR 10000. The inclusion of such extensions is administered following the procedures elaborated by SGFS.

A distinction has been made between a profile and an ISP documenting one or more profiles. The Taxonomy is only concerned with profiles, but further information is given in the "Directory of ISPs and Profiles contained therein" as to which ISP contains the documentation of a profile.

This *Directory* is maintained as an SGFS standing document SD-4 (see Annex A). For each draft profile submitted to SGFS, it will also provide additional information, including the status of the identified profiles.

2 References

ISO/IEC 9646-6:1994, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol profile test specification.* {ITU-T Rec. X.295 (1995)}

ISO/IEC 9646-7:1995, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements.* {ITU-T Rec. X.296 (1995)}

ISO/IEC TR 10000-1:1998, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: General principles and documentation framework.*

ISO/IEC TR 10000-3:1998, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 3: Principles and Taxonomy for Open System Environment Profiles.*

A number of other ISO, IEC, and ISO/IEC JTC 1 Standards and ITU-T Recommendations are quoted in examples which do not constitute provisions of this part of ISO/IEC TR 10000.

3 Definition

For the purposes of this part of ISO/IEC TR 10000, the following definition applies.

3.1 Group: A set of OSI profiles that are compatible, in the sense that an IT implementing one profile from a Group can interwork, according to OSI, with another IT system implementing a different profile from the same Group, in terms of the operation of the protocols specified within these profiles.

1 This part of ISO/IEC TR 10000 defines only a taxonomy for OSI based communication profiles; the issue of the placement of other communication profiles is not addressed.

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4 Abbreviations

4.1 General abbreviations

CGM	Computer Graphics Metafile
CL	Connectionless-mode
CLNS	Connectionless-mode Network Service
CLTS	Connectionless-mode Transport Service
CO	Connection-mode
CONS	Connection-mode Network Service
COTS	Connection-mode Transport Service
CSDN	Circuit Switched Data Network
CSI	Communication Services Interface
CSMA/CD	Carrier Sense, Multiple Access / Collision Detection
CULR	Common Upper Layer Requirements100
DFR	Document Filing and Retrieval
DSA	Directory Service Agent
DTAM-DM	Document Transfer and Manipulation - Document Manipulation
DTE	Data Terminal Equipment
DUA	Directory User Agent
EDI	Electronic Data Interchange
EDIMG	EDI Messaging
FDDI	Fibre Distributed Data Interface
FR PVC	Frame Relay Permanent Virtual Circuit
FR SVC	Frame Relay Switched Virtual Call
FRBS	Frame Relay Bearer Service
FRDN	Frame Relay Data Network
FRDTS	Frame Relay Data Transmission Service
IIF	Image Interchange Facility
IPI	Image Processing and Interchange
IPM	Interpersonal Message
ISDN	Integrated Services Digital Network
ISP	International Standardized Profile
LAN	Local Area Network
MAC	Media Access Control
MMS	Manufacturing Message Specification
MOTIS	Message Oriented Text Interchange System
MS	Message Store
MTA	Message Transfer Agent
MTS	Message Transfer System
ODA	Open Document Architecture
P1	Message Transfer Protocol
P2	Interpersonal Messaging Protocol
P3	MTS Access Protocol
P7	MS Access Protocol
PSDN	Packet Switched Data Network
PSTN	Public Switched Telephone Network
PVC	X.25 Permanent Virtual Circuit
QOS	Quality of Service
SGFS	ISO/IEC JTC 1/Special Group on Functional Standardization
SGML	Standardized General Markup Language
TP	Transaction Processing
TPSU	TP Service User
UA	User Agent
VC	X.25 Virtual Call
VT	Virtual Terminal

4.2 Abbreviations used in Profile identifiers

Abbr.	Profile sub-class (Applications)
ADF	Document Filing and Retrieval
ADI	Directory (1988) [2]
ADY	Directory (1993) [2]
AFT	File Transfer, Access and Management
ALD	Library, Documentation
AMH	Message Handling
AMM	Manufacturing Messaging
AOD	Interactive Manipulation of ODA Documents
ARD	Remote Database Access
ATP	Transaction Processing
AVT	Virtual Terminal

Abbr.	Profile sub-class (Formats)
FCG	Computer Graphics Metafile Interchange Format
FCS	Character Sets
FDI	Directory Data Definitions (1988) [2]
FDY	Directory Data Definitions (1993) [2]
FOD	Open Document Format
FSG	SGML Interchange Format
FVT	Virtual Terminal Registered Objects

Abbr.	Profile sub-class (Lower Layers)
TA	COTS over CLNS
TB	COTS over CONS
TC	COTS over CONS
TD	COTS over CONS
TE	COTS over CONS
UA	CLTS over CLNS
UB	CLTS over CONS
RA	Relaying the CLNS
RB	Relaying the CONS
RC	X.25 Protocol Relaying
RD	Relaying the MAC Service using transparent bridging
RE	Relaying the MAC Service using source routing
RZ	Relaying between CLNS and CONS

5 The OSI Taxonomy: Principles

5.1 General

OSI profiles are primarily arranged into classes, each class representing a category of functionality of reasonable independence from other classes. The different classes of profile correspond to the major divisions of the taxonomy.

Within each class, a class-specific subdivision will be used.

2 The taxonomy substructure for the 1988 edition of the Directory specifications differs from the taxonomy substructure developed for the 1993 edition.

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OSI profile identifiers are structured in accordance with the general OSE taxonomy defined in ISO/IEC TR 10000-3. Thus, an OSI profile identifier comprises:

- the suffix "-C" (for a CSI profile);
- a root mnenomic which is a character string commencing with one letter that indicates the primary class of the profile;
- an alphanumeric string that is as long as necessary to reflect the position of the profile within the hierarchic structure.

The syntax of all but the first letter is subject to individual definitions (see below).

NOTE - In the context of the general OSE taxonomy defined in ISO/IEC TR 10000-3, OSI profiles are identified as Communication Services Interface profiles by the suffix "-C". This suffix is omitted in the description of the OSI taxonomy in this part of ISO/IEC TR 10000.

5.2 The Class concept for OSI Profiles

In order to decouple representation of information or objects from communication protocols, and application-related protocol from subnetwork types, OSI and OSI-related profiles are divided into the following classes:

T - Transport profiles providing connection-mode Transport Service

U - Transport profiles providing connectionless-mode Transport Service

R - Relay profiles

A - Application profiles requiring connection-mode Transport Service

B - Application profiles requiring connectionless-mode Transport Service

F - Interchange format and representation profiles

Other classes may be required.

Transport profiles of classes T and U specify how the two modes of OSI Transport Service are provided over the two modes of OSI Network Service, and over specific subnetwork types, such as individual types of LANs, PSDNs, etc. In this way they isolate the A/B-profiles and F-profiles from network technology.

T- and U-profiles are further subdivided into Groups.
See "5.4 The Group concept for OSI Lower Layer Profiles" for details.

Application profiles of classes A and B specify communications protocol support for particular application types over the two modes of OSI Transport Service, respectively.

F-profiles specify the characteristics and representation of various types of information interchanged by A- and B-profiles.

R-profiles specify Relay functionality needed to enable IT systems using different T- or U-profiles to interwork. Interworking between T- and U-profiles is not contemplated in any JTC 1 work.

Within each of these classes, sub-classes of profiles are identified which, again, may require further subdivision such that the granularity of the Taxonomy meets the requirements outlined in ISO/IEC TR 10000-1. This leads to a hierarchical structure of profile (sub-)classes which is given in full in clause "6 Taxonomy of Profiles".

For the identification of sub-classes and a further subdivision within a given class, a class-dependent methodology is applied. This is explained in the subsequent class-individual sections.

5.3 Relationship between OSI Profiles

The schematic illustration in Figure 1 brings together examples of the relationships which exist between OSI profiles, particularly the three main subdivisions of the Taxonomy, and the combinations which can be made between profiles from different classes.

5.3.1 A/T and B/U Boundaries

Actual use of an A- or B-profile requires that an IT system operate it in combination with a T- or U-profile, in order to provide a particular application protocol over a particular subnetwork type. The separation of A- and B-profiles from T- and U-profiles is represented by an A/T or B/U boundary. This relationship is illustrated vertically in Figure 1. The location of a set of A-profiles above a set of T-profiles, separated by a common A/T boundary, represents the possibility of combining any pair of A- and T-profiles, one from each of the two classes.

A similar situation exists for the B- and U-profiles. The A/T boundaries correspond to the OSI Connection-mode Transport Service, and the B/U-boundaries to the OSI Connectionless-mode Transport Service. The possibility of making the combination arises from the fact that a T- or U-profile is specified to provide the OSI Transport Service and an A- or B-profile is specified to use the OSI Transport Service.

5.3.2 A/F and B/F Boundaries

The combination of an A- or B-profile with one or more F-profiles will be selected by the user to meet the functional requirements in each case. The various general possibilities are illustrated by the vertical relationships in Figure 1. The location of one or more F-profiles above one or more A-/B-profiles, represents the possibility of combining profiles from each class.

Unlike the A/T and B/U boundaries, the A/F and B/F boundaries are not characterized by a single service definition.

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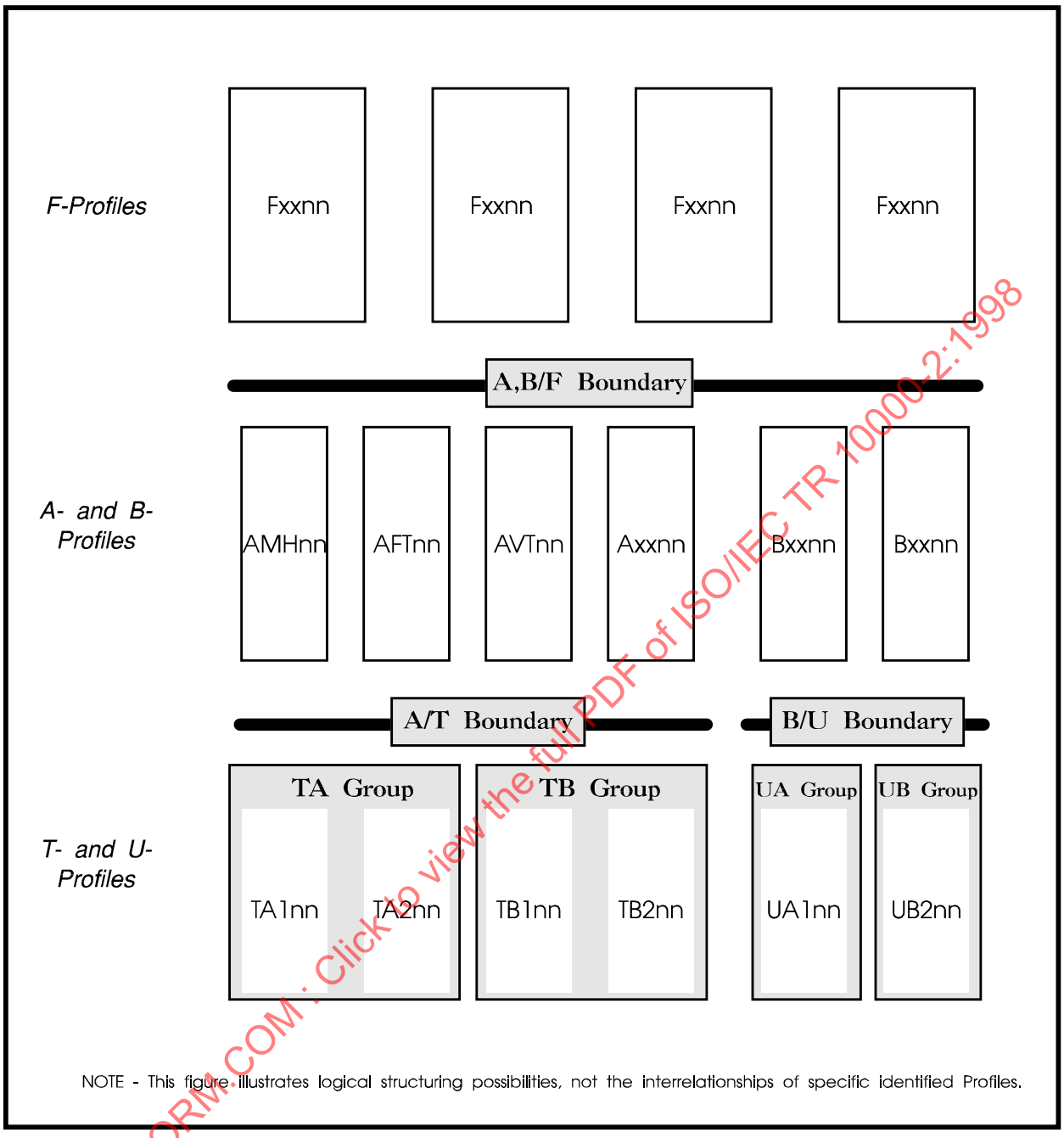

Figure 1: Examples of relationships between Profiles in the OSI Taxonomy

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The Application Layer base standards require, implicitly or explicitly, the structure of information carried or referenced by them to be specified for each instance of communication. The combination of A-/B-profiles with one or more F-profiles will be selected by the user to meet the functional requirements in each case. However, the choice may be subject to constraints which can be expressed within either A-/B-profiles, F-profiles, or both.

In other A-/B-profiles, the Application Layer base standards themselves constrain the choice of presentation context.

Constraints may also exist within an F-profile, arising either from its base standard, or as a result of profile creation. These constraints will limit the A-/B-profiles which can be used to transfer the information.

In summary, therefore, there are three forms of constraints affecting the combination of A-/B- and F-profiles:

a) the choice of information to be transferred may be constrained by the Application Layer base standards, and possibly further constrained by the A-/B-profile;

b) some interchange and representation base standards may limit transfer to particular Application base standards; this choice may be further constrained by the F-profiles;

c) the combinations are not constrained by base standards, but may be constrained by either A-/B- or F-profiles to achieve some general function.

Note that, as always, in making his choice of combination, a user must in practice take account not only of the constraints derived from profiles, but also the capabilities implemented in the end systems involved in each instance of communication, to support the various profiles.

5.4 The Group concept for OSI Lower Layer Profiles

The Group concept is used in the Taxonomy as follows:

A Group is a set of T- or U-profiles that are compatible in the sense that an IT system implementing one profile from the Group and another IT system implementing a profile from the same Group can be expected to interwork, according to OSI, to some minimum level which is determined by the mandatory features of the profiles in the Group.

Interworking according to OSI means end-to-end operation across a single subnetwork, or across multiple subnetworks linked by means of Network (or lower) Layer relays.

An example of a Group is the set of T-profiles that provide the Connection-mode Transport Service, using Class 4 Transport Protocol over the Connectionless-mode Network Service, provided by ITU-T Rec. X.233 | ISO/IEC 8473-1. This Group has members which correspond to different subnetwork technologies but inter-working between IT systems conforming to them is made possible by LAN bridges and/or Network Layer relays.

A Group is identified by labels of the form YXnnn, where Y is the class identifier and X is a letter identifying the Group.

5.5 Profile classes

5.5.1 Transport Profiles

5.5.1.1 Principles

Transport profiles define the use of protocol standards from OSI layers 1 to 4, to provide the OSI Transport Service.

A primary distinction is made between Transport profiles, based on the mode of Transport Service offered:

— Connection-mode Transport Service:
profile class T

— Connectionless-mode Transport Service:
profile class U

For the Transport profile classification within each class, the following methodology is applied:

a) As a first level distinction the Group concept
(see "5.4 The Group concept for OSI Lower Layer Profiles") is used in the following way:

A lower layer Group is a collection of profiles which:

- support the same combination of modes of Transport and Network Service;
- support the same Transport Protocol Class(es);

The notion of a Group is incorporated in the classification.

b) The second level distinction between profiles, i.e. within a Group, is made according to the subnetwork type supported
(see "6.1.1 Taxonomy of Subnetworks" for examples of subnetwork types).

c) Further subdivisions are made according to the characteristics of a particular subnetwork, e.g., switched versus leased line
(see 6.1.1 for examples of such characteristics).

5.5.1.2 Transport Profile Identifier

The identifier for a profile in the lower layers is of the form:

YXabcde

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where:

Y = class designator, indicating the Transport Service mode:

T for Connection-mode
U for Connectionless-mode

X = one letter indicating the lower-layer Group within the class, as defined in "5.5.1.3 Connection-mode Transport Service: profile class T" and "5.5.1.4 Connectionless-mode Transport Service: Profile class U" below.

abcde = the structured numerical identifier indicating the subnetwork type supported in this profile. It is possible that a further level of identifier may become necessary. In general, when referencing a profile, only that level of identifier which is necessary for uniqueness needs to be used.

The identifier structure is not meant to capture the variety of details and options of OSI layer 1 such as attachment speeds and connectors. However, it is recognized that this issue must be covered by the appropriate profile specification.

5.5.1.3 Connection-mode Transport Service: profile class T

Based on functional standardization already under way in organizations represented in SGFS and on standards already developed, the following lower layer Groups are identified as being of value. They are characterized as follows:

a) Connection-mode Transport Service over Connectionless-mode Network Service:

Group TA

The Connection-mode Transport Service (COTS) is provided over the Connectionless-mode Network Service (CLNS) by requiring the use of the Class 4 Transport Protocol as defined in ITU-T Rec. X.224 | ISO/IEC 8073.

NOTE - An IT system implementing a profile from Group TA and claiming conformance to ITU-T Rec. X.224 | ISO/IEC 8073 also has to implement the mandatory transport protocol classes for operation over CONS as required by ITU-T Rec. X.224 | ISO/IEC 8073.

b) Connection-mode Transport Service over Connection-mode Network Service

The Connection-mode Transport Service (COTS) is provided over the Connection-mode Network Service (CONS).

Profiles of this characteristic are further grouped according to their required support of Transport Protocol class(es):

mandatory (see note 1)
transport protocol classes

Group TB: 0 and 2 and 4 (see note 2)
Group TC: 0 and 2 (see note 2)
Group TD: 0
Group TE: 2 (see note 3)

NOTES

1 'Mandatory' means those Transport Protocol classes made mandatory by the base standard, ISO/IEC 8073, plus any class required for Group membership.

2 The class negotiation rules to be employed are those in ITU-T Recommendation X.224.

3 An IT system implementing a profile from Group TE and claiming conformance to ITU-T Recommendation X.224 also has to implement transport protocol class 0.

5.5.1.4 Connectionless-mode Transport Service: Profile class U

a) Connectionless-mode Transport Service over Connectionless-mode Network Service:

Group UA

The Connectionless-mode Transport Service (CLTS) is provided using the ITU-T Rec. X.234 | ISO/IEC 8602 Connectionless-mode Transport Protocol. This Group supports the mandatory operation of the ITU-T Rec. X.234 | ISO/IEC 8602, over Connectionless-mode Network Service.

b) Connectionless-mode Transport Service over Connection-mode Network Service:

Group UB

The Connectionless-mode Transport Service (CLTS) is provided using the ITU-T Rec. X.234 | ISO/IEC 8602 Connectionless-mode Transport Protocol. This Group supports the option of the ITU-T Rec. X.234 | ISO/IEC 8602 that operates over Connection-mode Network Service.

NOTE - An IT system implementing a profile from Group UB and claiming conformance to the ITU-T Rec. X.234 | ISO/IEC 8602 also has to implement the mandatory operation over CLNS as required by the ITU-T Rec. X.234 | ISO/IEC 8602.

5.5.1.5 Interworking between Transport Profile Groups

The following tables 1 and 2 show the interworking capabilities between profiles. Table 1 shows the interworking between profiles in profile class T, and table 2 shows the interworking among profiles in profile class U. Successful establishment of a Transport Connection is dependent upon successful negotiation of parameters, some of which are not considered in the following tables.

No interworking is possible between Groups in class T and U because of the different mode of Transport Service provided.

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Entries in the tables have the following meaning:

Full: Full OSI interworking (an OSI relay may be required (see “6.2 Relay Profiles“))

Restricted: Interworking capabilities are restricted in the sense that the choice of Transport Protocol classes may be restricted by the static capability of the responder. Successful interworking is dependent on the satisfactory outcome of class negotiation.

Special: Non-OSI relay required for interworking (see also “5.5.2.1 Principles“)

Special 1: Special restrictions for interworking exist (see “6.2.4 CO/CL Interworking“).

Special 2: Interworking between these profile types is not contemplated in any JTC 1 work.

NOTE - Successful interworking depends not only on the satisfactory outcome of the transport protocol class negotiation but also on dynamic responses during transport initiation. Such dynamic responses can include, amongst others, responder reactions to the offered Quality of Service (QOS) or to the specific options requested by the initiator.

Table 1 - Interworking amongst Groups in class T

Responder in Group	Network Service mode	Initiator in Group				
		TA	TB	TC	TD	TE
TA	CL	full	special 1	special 1	special 1	special 1
TB	CO	special 1	full	full	full	full
TC	CO	special 1	restricted	full	full	full
TD	CO	special 1	restricted	restricted	full	special 2
TE	CO	special 1	restricted	restricted	special 2	full

Table 2 - Interworking amongst Groups in class U

Responder in Group	Initiator in Group	
	UA	UB
UA	full	special 2
UB	special 2	full

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5.5.1.6 Introduction to the Taxonomy of Subnetwork Profiles

Subnetwork types are characterized by a structured numerical identifier. The first digit of the numerical identifier classifies the major subnetwork type being used for system interconnection while the subsequent digits represent a subdivision of the subnetwork type, indicating how use is made of the subnetwork type, or describing how the subnetwork is accessed. The major subnetwork types, as identified by the first digit of the subnetwork identifier, are the following:

1 Packet Switched Data Network (PSDN)
2 Digital Data Circuit
3 Analogue Telephone Circuit
4 Integrated Services Digital Network (ISDN)
5 Local Area Network (LAN)
6 Frame Relay Data Network (FRDN)

The number of ways in which subnetworks may be implemented and used is potentially very large. There are also cases where one subnetwork type is used to access another subnetwork type which has a higher network functionality. For example, an ISDN or a FRDN may be used to access a PSDN which offers a higher functionality. The subnetwork taxonomy needs to reflect such combinations which are defined by ITU recommendations and offered by public network service providers.

Other subnetwork variations have been deemed to be, in practice, less important to the goal of end system interoperability, e.g. some electrical and physical interfaces that are prerequisites to subnetwork connection establishment but transparent to data exchange. Therefore, aspects such as line speed, connector type, or modem type have, in general, not been reflected in the subnetwork taxonomy. Such requirements may be included in actual ISPs, if considered important, or this area may be left as a local matter for system installation.

5.5.1.6.1 Packet Switched Data Network

The second digit of the subnetwork taxonomy identifier makes the overall distinction as to whether the access to the PSDN is permanent or switched. For each of these two major types of access to the PSDN, the third digit of the subnetwork identifier denotes the type of network used to gain access to the PSDN. Currently defined networks for gaining access to the PSDN are a PSTN line, a CSDN line, an ISDN B-channel, and a FRDN.

Except for the more complicated case of a FRDN access, the fourth digit of the PSDN subnetwork taxonomy identifier indicates whether the X.25 logical channel operates on a Virtual Call or a Permanent Virtual Circuit. In the case of switched access to the PSDN, only Virtual Call operation is possible.

In the case of FRDN access to a PSDN, the fourth digit of the subnetwork identifier indicates that a Frame Relay Permanent Virtual Circuit (FR PVC) is used while a fifth digit indicates that the PSDN is used to provide for X.25 DTE operation.

Place holders have been left in the PSDN subnetwork taxonomy to allow for future specification of access to the PSDN through other means, e.g. through an ISDN D-channel or H-channel, or through various combinations of a Frame Relay service operating over ISDN.

5.5.1.6.2 Digital Data Circuit

A Digital Data Circuit is typically an X.21 based service offering although other interfaces are conceivable, e.g. ITU-T Rec. G.703 based service offerings. The taxonomy currently makes no distinction on this point which is left to actual profile definitions.

The second digit of the subnetwork taxonomy identifier determines whether the circuit is established permanently (leased service) or established by circuit-switching (dial-up). There is no further subdivision of the Digital Data Circuit subnetwork taxonomy identifier.

5.5.1.6.3 Analogue Telephone Circuit

The subnetwork identifiers for Analogue Telephone Circuits are structured identically to the subnetwork identifiers for Digital Data Circuits, i.e. the second digit of the subnetwork identifier indicates whether the analogue circuit is established permanently (leased service) or by circuit-switching (dial-up).

5.5.1.6.4 Integrated Services Digital Network

The second digit of the ISDN subnetwork taxonomy identifier indicates the type of service being assumed from the ISDN. Four types of such service have been identified at this time; these being permanent service (including semi-permanent service), circuit-mode service, packet-mode service and frame relay bearer service.

The permanent and circuit-mode services operate on ISDN B-channels (indicated by the third digit of the subnetwork identifier) through which the communicating DTEs are connected transparently. In this case, the taxonomy uses the fourth digit to indicate whether the B-channel is used to operate the X.25 packet layer protocol between DTEs or whether the connection is used to operate the ITU-T Rec. X.233 | ISO/IEC 8473-1. connectionless-mode network protocol between DTEs. This last case of operating the ITU-T Rec. X.233 | ISO/IEC 8473-1. connectionless-mode network protocol without an underlying X.25 protocol is applicable only to the RA and TA groups of profiles whereas the X.25 operation over an ISDN subnetwork may be used to provide either the connection-mode network service or the connectionless-mode network service.

In the case of packet-mode service or frame relay bearer service being used from the ISDN, the third digit of the ISDN subnetwork taxonomy identifier determines the type of ISDN channel being used to access the service. Such channels may be a (semi-)permanent B-channel, a demand access B-channel, a D-channel, or a permanent H-channel.

For packet-mode service or frame relay bearer service over ISDN, the fourth digit of the ISDN taxonomy identifier indicates the type of virtual path being used (Virtual Call, Permanent Virtual Circuit or Switched Virtual Call) while the fifth digit, if present, provides further detail on call control (with or without use of ITU-T Rec. Q.931) or the type of DTE operation (TE1 operation for frame relay bearer service).

Place holders have been left in the ISDN subnetwork taxonomy to allow for future expansion of the level of detail in operation of the frame relay bearer service, as well as addition of a frame switching bearer service over ISDN.

5.5.1.6.5 Local Area Networks

The subnetwork identifier has only two digits where the second digit indicates the type of LAN, no matter what protocol is operating over such LAN. The types of LAN that are currently recognized in the taxonomy are CSMA/CD, Token Bus, Token Ring and FDDI.

5.5.1.6.6 Frame Relay Data Networks

The FRDN subnetwork taxonomy is applicable to situations where a FRDN is used directly for system interconnection. Frame relay subnetwork technology may also be used to access a PSDN (covered under the PSDN subnetwork taxonomy) or to operate as a service within an ISDN (covered under the ISDN subnetwork taxonomy).

The second digit of the subnetwork taxonomy denotes whether access to the FRDN is permanent (leased service) or switched (dial-up). The third digit of the FRDN taxonomy indicates the type of network used to access the FRDN. This may be an analogue data circuit (PSTN leased or dial-up) or a special FRDTS (Frame Relay Data Transmission Service, permanent or switched access).

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The fourth digit of the FRDN taxonomy is used to distinguish between the types of frame relay virtual connection (permanent virtual circuit or switched virtual call) whereas a fifth digit is used to indicate the type of terminal operation (Frame Relay TE1 as defined by the ITU-T).

Place holders have been left in the FRDN subnetwork taxonomy to allow for future expansion of the level of detail in operation of the frame relay service.

5.5.2 Relay Profiles

5.5.2.1 Principles

Relay profiles define the use of standards from OSI layers 1 to 4, to provide relaying functions between OSI Transport profiles.

No relays exist between different profiles of different Transport profile classes (T, U).

Relays may operate at various layers up to layer 4. However, relays operating at layer 4 are not OSI relays and hence some restrictions or limitations may be expected in their operation. Many proposals for such relays have significant architectural issues associated with them relating to integrity, security, QOS, etc., and the fact that an identifier has been allocated to them does not indicate that such issues have been resolved.

5.5.2.2 Relay Profile Identifier

The identifier for a Relay profile is of the form

RXp.q

where

R = relay function

X = relay type identifier

This identifier will cover

- the layer at which the relay operates

- the service mode being supported

- the type of relay

p, q= subnetwork type identifier

p and q may each take the value of the abcde-structured numerical identifier defined for Transport profiles. The fully qualified structure need only be used where necessary (e.g., for circumstances where a distinction must be made between LANs).

RXp.q represents a relay of type X between subnetwork type p and subnetwork type q.

A relay RXp.q is considered to provide the same functionality as RXq.p unless otherwise stated.

5.5.3 Application Profiles

5.5.3.1 Principles

Application profiles define the use of protocol standards from OSI layers 5 to 7, to provide for the structured transfer of information between end systems.

Each Application profile is a complete definition of the use of protocol standards from OSI layers 5 to 7, though it may share one or more common definitions of some part of its content with other Application profiles.
To avoid, wherever appropriate, duplication of text related to common parts, the concept of the Common Upper Layer Requirements has been introduced. These Common Upper Layer Requirements can be documented in a separate ISP or part thereof, to be referenced by using Application profiles
(see "5.5.3.2 Common Upper Layer Requirements").

Furthermore, Application profiles can build on each other in such a way that one Application profile makes use of services provided by another Application profile for specific modes of communication (i.e. ALD22 profile, which is based on AMH2n profiles and AMH2n profiles, which themselves are based on AMH1n profiles). The resulting combination of A-/B-profiles with one or more underlaying A-/B-profile(s) will be selected by the user to meet the functional requirements in each case. However, the choice may be subject to constraints which can be expressed within either A-/B-profile.

In analogy with the primary distinction made between Transport profiles, a primary distinction is made between Application profiles, based on the mode of Transport Service they require:

Profile class A: Application profiles requiring Connection-mode Transport Service, i.e., using T-profiles

Profile class B: Application profiles requiring Connectionless-mode Transport Service, i.e., using U-profiles

A further distinction is based on Application categories, related to Application Layer OSI standards defined by JTC 1 and ITU-T.

In addition, Application categories have been identified related to the use of OSI protocols by other Technical Committees such as ISO TC 184 (Manufacturing Messaging) and TC 46 (Library and Documentation).

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5.5.3.2 Common Upper Layer Requirements

Profiling specifications on Common Upper Layer Requirements (CULR) describe sets of upper layer elements for common use by several Application profiles and are documented in an ISP.

CULR define the common use of OSI standards for the session layer, presentation layer and part of the application layer.

An ISP defining an Application profile may reference the CULR as the common basis for the selection of options for the upper layers and may add it's own requirements in the form of further additional choices for the use of the upper layer standards.

CULR do not specify a complete profile, and therefore have no entry within the taxonomy of this Technical Report and no profile identifier will be assigned.

5.5.3.3 Application Profile Identifier

The identifier for a profile in the Application class is of the form:

CXYabc

where:

C = Application profile class designator:

- **A** for profiles requiring Connection-mode Transport Service
- **B** for profiles requiring Connectionless-mode Transport Service

XY = two letters corresponding to the names of the primary subdivisions. These subdivisions are taken from the main categories of application functions and OSI management, as identified as main projects in JTC 1.

abc = the structured numerical identifier for the member(s) of the subdivision. It is possible that a further level of subdivision may become necessary. Only that level of identifier will be used which is necessary for uniqueness. This level may vary among application functions (see Note).

NOTE - An extension has been adopted for the use by the Network Management taxonomy, which proposes to use also lower-case letters. See "5.5.3.4.5 OSI Management" for details.

5.5.3.4 Introduction to the Taxonomy of Application Profiles

5.5.3.4.1 File Transfer, Access and Management

The profiles for File Transfer, Access and Management are based on ISO/IEC 8571. These profiles are subdivided into four classes.

The AFT1n profiles are for the file transfer service covering a single transfer of a file or part of a file between the filestores of two end systems, taking into account files with differing complexity of their internal file structure (constraint sets).

The AFT2n profiles are for the file access service covering repeated read/write access to files between the filestores of two end systems, again for files with differing complexity of their internal file structure.

AFT3 is a profile for the creation and deletion of files and the management of their characteristics, and AFT4 profiles the function to manage directories of files in the filestore of a remote system.

5.5.3.4.2 Message Handling

The Message Handling profiles AMH1n, AMH2n and AMH3n are based on ISO/IEC 10021 and the equivalent CCITT/ITU-T X.400 Recommendations.

The common messaging profiles (AMH1n) specify generic requirements that are expected to be supported by all MHS implementations. The AMH13 profile covers the common requirements to be supported by a UA or MS component when using the P7 protocol versions defined in ITU-T X.413(1992) | ISO/IEC 10021-5:1990, while the AMH15 profile covers the common requirements to be supported by a UA or MS component when using the new P7 protocol versions defined in ITU-T X.413(1995) | ISO/IEC 10021-5:1994. The AMH14 profile covers the common requirements to be supported by a UA or MS component when using the new P7 protocol versions defined in ITU-T X.413(1995) | ISO/IEC 10021-5:1994. Additionally, the AMH13 and AMH15 profiles allow minimal support of content type-specific MS attributes to be claimed if support of the corresponding content type is claimed. The AMH12 profile covers the common requirements to be supported by a MTS-user or MTA component when using the P3 protocol versions defined in ITU-T X.411(1992) | ISO/IEC 10021-4:1990, while the AMH14 profile covers the common requirements to be supported by a MTS-user or MTA component when using the new P3 protocol versions defined in ITU-T X.411(1996) | ISO/IEC 10021-4:1996.

The content type-specific profiles (AMH2n, AMH3n and further content types to be defined in the future) cover both end-to-end UA-to-UA communication (the content protocol and associated UA functionality) and use of Message Handling services (by requiring conformance to the appropriate AMH1n profile(s) plus any additional content type-specific requirements).

The AMH24/AMH34 and AMH26/AMH36 profiles allow an IPM/EDIMG UA to interact with an MS in a full and flexible manner without having to retrieve complete messages. The AMH24/AMH34 profiles cover the P7 protocol aspects in relation to IPM/EDIMG as defined in ITU-T X.413(1992) | ISO/IEC 10021-5:1990 and ITU-T X.435(1991) | ISO/IEC 10021-9:1995, while the AMH26 profile covers the IPM P7 aspects defined in the context of the new P7 protocol versions, as defined in ITU-T

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X.420(1996) | ISO/IEC 10021-7:1996. The AMH36 profile will cover the EDIMG P7 aspects defined in the context of the new P7 protocol versions and will be based on future new edition of ITU-T X435 | ISO/IEC 10021-9. The AMH25 profile covers the IPM P7 aspects defined in the context of the new P7 protocol versions, as defined in ITU-T X.413(1995) | ISO/IEC 10021-5:1994 and ITU-T X.420(1992) | ISO/IEC 10021-7:1995. Minimal attribute support for MS access in an IPM/EDIMG environment can be specified by claiming conformance to AMH13 and/or AMH15 with an additional claim of IPM/EDIMG content type and attribute support. The AMH23/AMH33 profiles cover the P3 protocol aspects in relation to IPM/EDIMG as defined in ITU-T X.420(1992) | ISO/IEC 10021-7:1990 and ITU-T X.435(1991) | ISO/IEC 10021-9:1995, while the AMH25 profile covers the IPM P3 aspects defined in the context of the new P3 protocol versions, as defined in ITU-T X.420(1996) | ISO/IEC 10021-7:1996. The AMH35 profile will cover the EDIMG P3 aspects defined in the context of the new P3 protocol versions and will be based on future new edition of ITU-T X435 | ISO/IEC 10021-9.

5.5.3.4.3 Directory

Profiles for the Directory, based on the use of ISO/IEC 9594 and the corresponding ITU-T X.500 Recommendations fall into two classes:

- Protocol and associated procedures;
- Schema and contents.

The first of these is for the 1988 edition of the Directory specifications represented by the ADInn series of profiles, the second by the FDInn series (see "5.5.4.3.4 Directory Data Definitions").

Withing the ADInn series, three classes are currently defined which relate to the protocol for accessing The Directory from Directory User Agents, the protocol for interworking between Directory System Agents within The Directory, and procedures for distributed operation of The Directory.

Sub-categorisation relates to support for mechanisms related to the distinct rôles of Directory User Agents and Directory System Agents, responders and initiators.

A new taxonomy has been developed for the 1993 edition of the Directory specifications. The ISPs developed for the 1988 edition of the Directory specification will be current in parallel with the ISPs for the 1993 edition. There should therefore be no overlap between taxonomy identifiers for the two editions. The taxonomy developed for the 1993 edition of the Directory uses the taxonomy identifier ADYnn for the protocol and associated procedures and FDYnn for the Schema and contents (see 5.5.4.3.4).

Interoperability between profiles belonging to the ADInn series and the profiles belonging to the ADYnn series is being addressed by the ADYnn profiles.

5.5.3.4.4 Virtual Terminal

The Application profiles for the Virtual Terminal protocol have taxonomy identifiers of the form AVT*ab*, in which the identifier component *a* is a single digit and *b* is an integer that is not restricted to a single digit. At present only two values are defined for the component *a*, corresponding to the two modes of operation of the Virtual Terminal Basic Class protocol specified in ISO 9041-1. These are the asynchronous mode (A-mode) and the synchronous mode (S-mode) of operation. Other values of the component *a* are reserved for future developments that may specify additional modes of operation within the Basic Class, or additional classes of operation of the Virtual Terminal protocol besides the Basic Class.

The Virtual Terminal protocol also makes use of Interchange Format and Representation Profiles. An introduction to the taxonomy of these profiles is given in "5.5.4.3.5 Virtual Terminal Environment".

5.5.3.4.5 OSI Management

The taxonomy identifiers for OSI Management are of the form AOM*abc.e*.

The first digit of the taxonomy identifier, *a*, identifies the nature of profiles within OSI Management:

AOM1*bc* are the Management Communications profiles, i.e. the profiles that specify the use of the OSI Upper layers and CMIP protocol. Within AOM1*bc* profiles, the second digit, *b*, identifies Management Communications profiles offering different support levels of the OSI management communications features.

AOM2*bc* are the Systems Management Functions profiles, i.e. the profiles that specify the use of Systems Management Functions as defined in ISO/IEC 10164 series and corresponding ITU-T X.700 Recommendations. Within AOM2*bc* profiles, the second digit, *b*, identifies separate Management functionalities or capabilities such as Performance or Security. These functionalities can undergo one or more levels of refinement and grouping, with identifiers in the form AOM2*ab..e*. For these taxonomy identifiers, a value of "1" in positions *c*, *d* or *e* indicates a "general" profile, i.e. a profile that represents a grouping of functionalities which is of a general applicability nature and includes all detailed capabilities associated with other values of the taxonomy identifier in the same position.

AOM3*bc* are the Management Ensemble profiles.

In the area of Network Management it is probable that the use of numerical identifiers alone would limit the substructuring of the taxonomy. It is therefore planned to use alphanumerical identifiers in the sequence 1, 2, ..., 8, 9, a, b, ..., y, z. Only lower-case letters shall be used and the lower-case letter "l" has to be avoided.

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5.5.3.4.6 Transaction Processing

The first level of the Taxonomy substructure corresponds to the definition of the three conformance classes defined in the OSI TP standard. The second level corresponds to the selection between Polarized Control and Shared Control for each of the conformance classes.

5.5.3.4.7 Remote Database Access

(for further study)

5.5.3.4.8 Manufacturing Messaging

The Manufacturing Message Specification allows interworking of various equipment such as computers and programmable devices within the manufacturing environment. It resides in the Application Layer of the OSI Reference Model and uses an object modelling approach for the description of manufacturing applications. MMS defines a set of messages suitable for the manipulation of the real devices in the manufacturing environment.

MMS has evolved into a multi-part ISO standard, ISO 9506. Parts 1 and 2, known as the core, describe the modelling approach, the syntax and semantics of the service and protocol. Additional parts, known as the companion standards, describe the extensions of the core for specific application areas, for example numerical controllers, robot controllers and process control systems.

5.5.3.4.9 Library and Documentation

The Library and Documentation (ALD) profiles are based on ISO/IEC 10163 Search & Retrieve (SR) and ISO/IEC 10161 Interlibrary Loan (ILL) protocols. These specifications for SR and ILL enable interworking between IT systems supporting services for organizations such as libraries, information utilities and union catalogue centres.

SR is intended for use by IT systems supporting information retrieval services. SR provides capabilities for an IT system to search a database in another open system for a record and receive a result set of records in response.

ILL is intended for use by IT systems supporting interlibrary loan services. These may participate in an interlibrary loan transaction in the role of a requester (i.e. an initiator of ILL requests), responder (i.e. a provider of bibliographic material or information) and/or intermediary (i.e. an agent that acts on behalf of a requester to find suitable responders).

5.5.3.4.10 Document Filing and Retrieval

Functional Standards for ISO/IEC 10166 DFR are required in order to satisfy the market needs of interactive access to documents stored in office and library systems. This approach covers the most urgent needs of open document interchange for the office systems in the market today.

The market requires open access to office libraries and archives in a heterogenous environment, i.e. interchange of documents accross domains using open standards. Existing products are specifically designed to the needs of their application areas. Therefore they support only parts of the basic DFR functionality, however, providing extended functionality for the domain they are designed for. In order to ensure a DFR based integration of these products in a heterogeneous office joint functional subsets of DFR have to be defined.

The functionality covered by DFR is currently implemented by a wide variety of products supporting a subset of the DFR functionality, namely:

- access to manuals on line
- access to project documentation
- document archives and retieval systems
- databases tailored for the storage of images or forms
- distributed file systems

DFR functional standards provide the common subset of the different systems - offering a unified access protocol to these different applications, flexible enough to provide the functionality concerned with the storage and archiving requirements of the different office systems.

Besides native DFR implementations gateways may be used. A gateway maps the internal protocol of the client applications in one domain to the DFR protocol, therefore allowing applications to access other DFR sotres connected to the network. Also the DFR protocol is mapped to the internal protocol, allowing outside DFR client applications to use the data stored within the domain. If required the information content may be converted to a standardized format within the gateway. To use existing applications without modifications to the greatest extent possible, functional levels have to be introduced in the DFR protocol.

The following substructure of the taxonomy has been chosen:

a) Common Filing and Retrieval (ADF1n)

In many offices, some document stores and terminals such as personal computers are connected by network. However, one terminal can not access to all document stores on the network, because there are many kinds of protocols between document stores and terminals. The market needs interactive access to all multi-vendors' document stores on the network. Therefore DFR Functional standards are required.

b) Remote Store Management (ADF2n)

There is a need of having functional profiles oriented to the management of a document store from remote applications.

An example of this kind of application is when a user is provided with the ability to handle a document store and manipulate, remotely, a selected document. For the selection of the document and hte handling of the store, DFR is needed. For

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the inner manipulation of the documents, a second standards for inner manipulation of the document is necessary. For example, if documents follow the ODA standard structure, the ODA Abstract Interface for Manipulation, combined with a communication mechansism, could be used.

The "Remote Store Management" profiles are oriented towards:

– remote manipulation of the remote store structure, without reading documents or creating new ones, because all document manipulation is performed at the server;
– remote handling of DFR objects for further manipulation of selected documents by other applications that know the structure of the document.

All ADFnn profiles are defined hierarchically, with ADFn1 having the lowest functionality, ADFn2 including the functionality of ADFn1, etc.

5.5.3.4.11 Interactive Manipulation of ODA Documents

This taxonomy (AOD) specifies profiles for the remote interactive manipulation of ODA documents. The profiles specify constraints on the ODA manipulation operations, as specified in [1], and on the communication protocols to use.

The taxonomy is based first on the communication protocols to use:

– AOD1x profiles: DTAM-DM service and protocol [3][4]
– AOD2y profiles: Reserved for other services and protocols.

For the moment, only one communication mechanism (DTAM-DM) has been identified.

Then the second level of the structure is the subset of the manipulation operations used.

The different aspects of the Abstract Interface (AI) for the manipulation of ODA documents [1] and related communications standards, DTAM Manipulation [3] [4], that are considered in the profiles for interactive ODA manipulations are:

– which operations to implement;
– which restrictions to apply to the arguments and results of the allowed operations. Arguments and results have a direct relationship with the use of the mechanism for identification of ODA document fragments [2];
– which errors to support;
– which application contexts to use.

Other aspects of the manipulation process should be considered in the applications using the profiles, but not in the profiles themselves. These may include:

– which manipulation rules should be used:
– which DFR profiles should be used.

[1] ITU-T Recommendation T.413 (1994) | ISO/IEC 8613-3:1994, *Information technology - Open Document Architecture (ODA) and interchange format: Abstract interface for the manipulation of ODA documents*.

[2] ITU-T Recommendation T.422 (1995) | ISO/IEC 8613-12:1996, *Information technology - Open Document Architecture (ODA) and interchange format: Identification of document fragments*.

[3] ITU-T Recommendation T.435 (1995) *Document Transfer And Manipultion (DTAM) - Services and Protocols - Abstract service definition and procedures for confirmed document manipulation*.

[4] ITU-T Recommendation T.436 (1995) *Document Transfer And Manipultion (DTAM) - Services and Protocols - Protocol specifications for confirmed document manipulation*.

5.5.4 Interchange Format and Representation Profiles

5.5.4.1 Principles

Interchange Format and Representation Profiles define the structure and/or content of the information being interchanged by Application profiles. Hence, the main feature which distinguishes them from Application profiles is the absence of a transfer function.

Currently, only interchange formats defined in standards prepared by JTC 1/SC18, SC21, SC24 and ITU-T Study Group 7 and 8 are included.[3]

5.5.4.2 Interchange Format and Representation Profile Identifier

The identifier for a profile in the Interchange Format and Representation class is of the form:

FXYabc

where:

F = Interchange Format

XY = two letters corresponding to the names of the primary subdivisions.

abc = the structured numerical identifier for the member(s) of the subdivision. It is possible that a further level of subdivision may become necessary. Only that level of identifier will be used which is necessary for uniqueness. This level may vary among the primary subdivisions.

3 F-profiles may also be relevant for OSE profiles (rather than only of OSI profiles).

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5.5.4.3 Introduction to the Taxonomy of Interchange Format and Representation Profiles

5.5.4.3.1 Open Document Format

The Open Document Format (FOD) profiles consist of a hierarchy of related ODA Document Application profiles supporting formatted, as well as, processable documents and image applications.

The structure of the Open Document Format (FOD) profile Taxonomy consists of three levels of subdivision: *a*, *b* and *c* and will have the appearance of FOD*abc*.

— Level *a* reflects the source of application or use and two initial values are proposed:

0 Document processing applications
1 Image applications

— Level *b* reflects the hierarchically related complexity and functionality of the document structures and provides for three values as currently defined:

1 Simple Document Structure
2 Enhanced Document Structure
3 Extended Document Structure

The Simple Document Structure is intended to address the general requirements of current word processing applications. The Enhanced Document Structure is intended to address the general requirements of emerging word processing applications that have been enhanced from the earlier, simple document structures supported by current word processing applications. The Extended Document Structure is intended to address the general requirements of emerging personal publishing, document processing applications.

— Level *c* reflects the combination of content architectures supported and four values as currently defined (see note 2):

1 Character Content Architecture only.
2 Raster Graphics Content Architecture only.
3 Geometric Graphics Content Architecture only.
6 Character, Raster Graphics and Geometric Graphics Content Architectures.

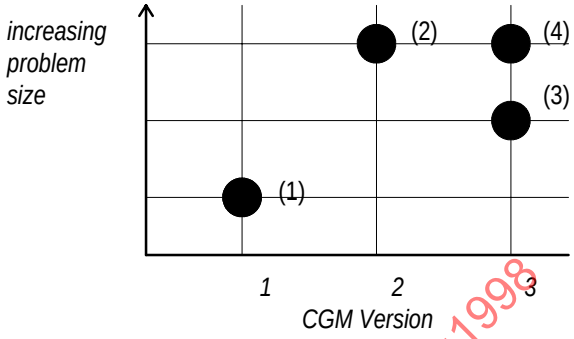
NOTES

1 For a given profile all three levels should be specified.

2 Other values may be added as additional ISPs with different content architectures are developed.

5.5.4.3.2 Computer Graphics Metafile Interchange Format

The CGM Format (FCG) profiles support the interchange of picture information. Profiles fit within the conceptual model shown in the figure below. This shows profiles being described within the model by the complexity of the problem and by the CGM version (as defined in the base standard).



The following profiles are defined and are described on the model shown in the figure above:

(1) FCG11 Basic Scientific and Technical Graphics (BST); e.g. business presentation graphics, simple desk top publishing;

(2) FCG23 Advanced Scientific and Technical Graphics (AST); e.g. CAD, mapping, earth sciences;

(3) FCG32 Basic Presentation and Visualization (BPV); - the model profile from the CGM standard, e.g. graphics arts, high end desk top publishing;

(4) FCG33 Advanced Presentation and Visualization (APV); e.g. imaging, scientific visualization.

5.5.4.3.3 SGML Interchange Format

(for further study)

5.5.4.3.4 Directory Data Definitions

The Directory Data Definition Format (FDI) profiles specify the properties of Object Classes, Attribute Types, and Attribute Syntaxes related to the use of the Directory Application profiles (ADInn - see “5.5.3.4.3 Directory“). Two types of usage are covered - common usage relevant to all such cases, and specific usage relevant to particular Application profiles.

Similarly to the profiles for the Directory, a new taxonomy has been developed for the 1993 edition of the Directory specifications. The ISPs developed for the 1988 edition of the Directory specification will be current in parallel with the ISPs for the 1993 edition. There should therefore be no overlap between taxonomy identifiers for the two editions. The taxonomy developed for the 1993 edition of the Directory uses the taxonomy identifier FDYnn.

5.5.4.3.5 Virtual Terminal Environment

The Interchange Format and Representation profiles for the Virtual Terminal protocol have taxonomy identifiers of the form

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FVT*abc*, in which the identifier components *a* and *b* are single digits and *c* is an integer that is not restricted to be a single digit. Each taxonomy entry corresponds to an information object that may be referenced in a particular instance of communication by the Virtual Terminal Basic Class protocol specified in ISO 9041-1.

The specifications of these information objects are subject to registration in accordance with ISO/IEC 9834. Two of the parts of ISO/IEC 9834, namely parts 4 and 5, concern registration procedures that are specific to the Virtual Terminal service and protocol. The three values defined in the identifier component a distinguish between the object types that are subject to one of these specific procedures and the object types that are subject to the general registration procedures of ISO/IEC 9834-1.

The significance of the identifier component *b* differs according to the value of the component *a*. The objects registered in accordance with ISO/IEC 9834-4 are VTE-profiles that are specific to one of the two modes of operation of the Virtual Terminal Basic Class protocol. The component *b* distinguishes between these two modes. The objects registered in accordance with ISO/IEC 9834-5 are control object type definitions, each of which is entered into one of a number of sub-registeres defined by these registration procedures. The component *b* distinguishes between these different sub-registers. The Virtual Terminal service defined in ISO 9040 also identifies a number of other object types that are subject to registration under the general procedures of ISO/IEC 9834-1. For these, the component *b* distinguishes between these different types of object.

5.5.4.3.6 Character Sets

Taxonomy identifiers for character set profiles are of the form FCS*ab*. The first level, FCS*a*, represents the top level categorization of character set profiles. To date, only one category has been identified - Code Structures. Other categories may be added as the result of future study. Within code structures, the second level, FCS1*b*, corresponds to the different classes of code structure. To date, two classes are identified. Further classes may be added. Within each class a number of options may be identified. Each option may identify a type of use which may be, for instance, dependent on a particular region of the world.

6 Taxonomy of Profiles

OSI profile identifiers are structured in accordance with the general OSE taxonomy defined in ISO/IEC TR 10000-3. Thus, an OSI profile identifier comprises:

- the suffix "-C" (for a CSI profile) [4];
- a root mnenomic which is a character string commencing with one letter that indicates the primary class of the profile;
- an alphanumeric string that is as long as necessary to reflect the position of the profile within the hierarchic structure.

The syntax of all but the first letter is subject to individual definitions.

For historical reasons ISPs exist which use profile identifiers without the suffix "-C". ISPs using these profile identifiers remain valid. In case of existing ISPs, the suffix "-C" will be added when revisions or maintenance occurs. New ISPs containing OSI profiles will include the suffix "-C".

The inclusion of a profile in this clause is purely for the purpose of assigning a unique, meaningful identifier. It should be noted that the inclusion of a profile identifier in this clause does not imply that such a profile has been developed or is under development. For such information, see the "Directory of ISPs and Profiles contained therein" (Standing document SD-4).

Furthermore, additional details of the functionality addressed by a specific taxonomy entry can be found in the Executive Summary of the profile, which is included in SD-4.

6.1 Transport Profiles

6.1.1 Taxonomy of Subnetworks

The following Taxonomy classifies subnetworks and, where existing, different modes of operation over a particular subnetwork, to provide the OSI Network Service. The Taxonomy is used in all Transport profile Groups, unless otherwise stated.

a b c d e	Subnetwork Type
1	PACKET SWITCHED DATA NETWORK (PSDN)
1 1	Permanent Access to a PSDN
1 1 1	PSTN leased line
1 1 1 1	Virtual Call (VC)
1 1 1 2	Permanent Virtual Circuit (PVC)
1 1 2	Digital data circuit / CSDN leased line
1 1 2 1	Virtual Call (VC)
1 1 2 2	Permanent Virtual Circuit (PVC)
1 1 3	ISDN B-channel, permanent[5]
1 1 3 1	Virtual Call (VC)
1 1 3 2	Permanent Virtual Circuit (PVC)
1 1 4	ISDN H-channel, permanent [6]
1 1 5	ISDN D-channel [5]
1 1 6	Frame Relay Data Network (FRDN)
1 1 6 2	Frame Relay PVC [7]
1 1 6 2 1	X.25 operation, Virtual Call[8 9 10]

4 This suffix is omitted in the description of the OSI taxonomy in this part of ISO/IEC TR 10000.

5 Also includes the semi-permanent case.

6 For further study.

7 It is for further study that the profiles make a distinction between the cases when the Frame Relay connection is established over a circuit-switched connection and when the Frame Relay connection is established using the frame relaying capabilities of the FRDN.

8 This profile may be replaced with the following profiles: X.25 DTE operation, VC; X.25 DTE operation, PVC.

9 In case of X.25 DTE, it is for further study that the profiles make a distinction between the case when an ISO/IEC 7776 frame is encapsulated within LAPF frame and the case when ISO/IEC 8208 operates directly over LAPF using the generic multiprotocol encapsulation method.

10 It is for further study that the profiles make a distinction between the cases when access to PSDN is by port access or by call control mapping.

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a b c d e	Subnetwork Type
1 2	Switched Access to a PSDN
1 2 1	PSTN Case
1 2 1 1	Virtual Call (VC)
1 2 2	CSDN Case
1 2 2 1	Virtual Call (VC)
1 2 3	ISDN B-channel Case
1 2 3 1	Virtual Call (VC)
2	DIGITAL DATA CIRCUIT
2 1	Leased (Permanent) Service
2 2	Dial-up (CSDN)
3	ANALOGUE TELEPHONE CIRCUIT
3 1	Leased (Permanent) Service
3 2	Dial-up (PSTN)
4	INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
4 1	Permanent Service [5]
4 1 1	B-channel
4 1 1 1	X.25 DTE to DTE operation
4 1 1 2	CLNS DTE to DTE operation
4 2	Circuit-mode Service
4 2 1	B-channel
4 2 1 1	X.25 DTE to DTE operation
4 2 1 2	CLNS DTE to DTE operation
4 3	Packet-mode Service
4 3 1	D-channel access
4 3 1 1	Virtual Call (VC)
4 3 1 1 1	without use of Q.931
4 3 1 1 2	with use of Q.931
4 3 1 2	Permanent Virtual Circuit (PVC)
4 3 2	B-channel permanent access [5]
4 3 2 1	Virtual Call (VC)
4 3 2 1 1	without use of Q.931
4 3 2 1 2	with use of Q.931
4 3 2 2	Permanent Virtual Circuit (PVC)
4 3 3	B-channel demand access
4 3 3 1	Virtual Call (VC)
4 4	Frame Relay Bearer Service (FRBS)
4 4 2	B-channel, permanent
4 4 2 3	Frame Relay PVC
4 4 2 3 1	TE1 operation [11]
4 4 4	H-channel, permanent
4 4 4 3	Frame Relay PVC
4 4 4 3 1	TE1 operation [11]

a b c d e	Subnetwork Type
5	LOCAL AREA NETWORKS
5 1	CSMA/CD
5 2	Token Bus
5 3	Token Ring
5 4	FDDI
6	FRAME RELAY DATA NETWORK (FRDN)
6 1	Permanent access
6 1 2	Frame Relay Data Transmission Service (FRDTS), permanent access
6 1 2 2	Frame Relay Permanent Virtual Connection
6 1 2 2 1	TE1 to TE1 operation [9 12]

6.1.2 Transport Groups

TA Group TA: COTS over CLNS

For the detailed subnetwork Taxonomy see “6.1.1 Taxonomy of Subnetworks“.

TB Group TB: COTS over CONS :
with mandatory Transport Protocol Classes: 0 and 2 and 4

For the detailed subnetwork Taxonomy see 6.1.1.

TC Group TC: COTS over CONS :
with mandatory Transport Protocol Classes: 0 and 2

For the detailed subnetwork Taxonomy see 6.1.1.

TD Group TD: COTS over CONS :
with mandatory Transport Protocol Class: 0

For the detailed subnetwork Taxonomy see 6.1.1.

TE Group TE: COTS over CONS :
with mandatory Transport Protocol Class: 2

For the detailed subnetwork Taxonomy see 6.1.1.

UA Group UA: CLTS over CLNS

For the detailed subnetwork Taxonomy see 6.1.1.

UB Group UB: CLTS over CONS

For the detailed subnetwork Taxonomy see 6.1.1.

11 A Frame Relay TE1 is defined as a Terminal Equipment that operates any Layer 3 protocol (probably X.25 Packet Layer Procedures (PLP) or X.25 Data Transfer Phase (DTP) as candidates among many others) over the core functions of Q.922. An X.25 Data Terminal Equipment (DTE) is a DTE that operates X.25 PLP or X.25 DTP in Layer 3 of data transfer. Therefore, "X.25 DTE operation" is considered as a special case of "TE1 operation" and this profile may be replaced with the following profiles: TE1 operation; X.25 DTE operation.

12 This profile may be replaced with the following profiles: TE1 operation to TE1 operation; X.25 DTE to X.25 DTE operation, VC; X.25 DTE to X.25 DTE operation, PVC.

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6.2 Relay Profiles

6.2.1 Relaying the Network Internal Layer Service, as defined in ISO/IEC 10028

RA Relaying the Connectionless-mode Network Service

For the subnetwork identifiers p, q (as defined in "5.5.2.2 Relay Profile Identifier") see the detailed subnetwork Taxonomy in "6.1.1 Taxonomy of Subnetworks".

RB Relaying the Connection-mode Network Service

For the subnetwork identifiers p, q (as defined in "5.5.2.2 Relay Profile Identifier") see the detailed subnetwork Taxonomy in "6.1.1 Taxonomy of Subnetworks".

6.2.2 Network Layer Protocol Relaying

RC X.25 Protocol Relaying

An approach for this type of relay could be as suggested in ISO/IEC TR 10029.

For the subnetwork identifiers p, q (as defined in "5.5.2.2 Relay Profile Identifier") see the detailed subnetwork Taxonomy in "6.1.1 Taxonomy of Subnetworks".

Only the following subnetwork type identifiers are valid: 11n, 21n, 31n, 41n, 43111, 4312, 43211, 4322, 5n.

6.2.3 Relaying the MAC Service

RD Relaying the MAC Service using transparent bridging

For the subnetwork identifiers p, q (as defined in "5.5.2.2 Relay Profile Identifier") see the detailed subnetwork Taxonomy in "6.1.1 Taxonomy of Subnetworks".

Only subnetwork type identifiers of the form 5n are valid for use with RD relays.

RE Relaying the MAC Service using source routing

For the subnetwork identifiers p, q (as defined in "5.5.2.2 Relay Profile Identifier") see the detailed subnetwork Taxonomy in "6.1.1 Taxonomy of Subnetworks".

Only subnetwork type identifiers of the form 53 and 54 are valid for use with RE relays.

6.2.4 CO/CL Interworking

RZ Relaying between Connectionless-mode Network Service and Connection-mode Network Service

The final position in the Taxonomy and the substructure of this relay type is for further study.

An approach for this type of relay could be as suggested in ISO/IEC TR 10172.

6.3 Application Profiles

6.3.1 File Transfer, Access and Management

AFT File Transfer, Access and Management

a	b	Substructure
1		FILE TRANSFER SERVICE
1	1	Simple (Unstructured)
1	2	Positional (Flat)
1	3	Full (Hierarchical)
2		FILE ACCESS SERVICE
2	2	Positional (Flat)
2	3	Full (Hierarchical)
3		FILE MANAGEMENT SERVICE
4		FILESTORE MANAGEMENT SERVICE

6.3.2 Message Handling

AMH Message Handling

a	b	c	Substructure
1			COMMON MESSAGING
1	1		Message Transfer (P1)
1	1	1	Normal mode
1	1	2	X.410(1984) mode
1	2		MTS Access (P3)
1	3		MS Access (P7)
1	4		MTS 94 Access (P3)
1	5		MS 94 Access (P7)
2			INTERPERSONAL MESSAGING (IPM)
2	1		IPM Content
2	2		IPM Requirements for Message Transfer (P1)
2	3		IPM Requirements for MTS Access (P3)
2	4		IPM Requirements for Enhanced MS Access (P7)
2	5		IPM Requirements for MTS 94 Access (P3)
2	6		IPM Requirements for Enhanced MS 94 (P7)
3			EDI MESSAGING (EDIMG)
3	1		EDIMG Content
3	2		EDIMG Requirements for Message Transfer (P1)
3	3		EDIMG Requirements for MTS Access (P3)
3	4		EDIMG Requirements for Enhanced MS Access (P7)
3	5		EDIMG Requirements for MTS 94 Access (P3)
3	6		EDIMG Requirements for Enhanced MS 94 (P7)

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6.3.3 Directory

6.3.3.1 Edition 1988

ADI Directory

a	b	Substructure
1		DIRECTORY ACCESS
1	1	DUA Support of Directory Access
1	2	DSA Support of Directory Access
2		DIRECTORY SYSTEM
2	1	DSA Responder Role
2	2	DSA Initiator Role
3		DISTRIBUTED OPERATIONS
3	1	DUA Support of Distributed Operations
3	2	DSA Support of Distributed Operations

6.3.3.2 Edition 1993

ADY Directory

a	b	Substructure
1		DUA BASIC FUNCTIONALITY
1	1	DUA Support of Directory Access
1	2	DUA Support of Distributed Operations
2		DSA BASIC FUNCTIONALITY
2	1	DSA Support of Directory Access
2	2	DSA Support of Distributed Operations
4		SECURITY CAPABILITIES
4	1	DUA Authentication as DAP initiator
4	2	DSA Authentication as DAP responder
4	3	DSA Authentication for DSP
4	4	DSA Simple Access Control
4	5	DSA Basic Access Control
5		SHADOWING CAPABILITIES
5	1	Shadowing using ROSE
5	2	Shadowing using RTSE
5	3	Shadowing subset
6		DIRECTORY ADMINISTRATION AND MANAGEMENT
6	1	Administrative areas
6	2	Establishment and utilisation of shadowing agreements
6	3	Schema administration and publication
7		DIRECTORY OPERATIONAL BINDING MANAGEMENT PROTOCOL (DOP) CABAILITIES
7	1	Shadowing Operational Binding
7	2	Hierarchical Operational Binding
7	3	Non-specific Hierarchical Operational Binding

6.3.4 Virtual Terminal

AVT Virtual Terminal

a	b	Substructure
1		BASIC CLASS (A-MODE)
1	1	A-mode Default
1	2	Telnet
1	3	Scroll
1	4	ITU-T X.3 PAD Interworking
1	5	Transparent
1	6	Generalized Telnet
2		BASIC CLASS (S-MODE)
2	1	S-mode Default
2	2	Forms
2	3	Paged
2	4	Enhanced [13] Forms
2	5	Enhanced Paged

6.3.5 OSI Management

AOM OSI Management

a	b	c	d	e	Substructure
1					MANAGEMENT COMMUNICATIONS
1	1				Basic Management Communications
1	2				Enhanced Management Communications
2					MANAGEMENT FUNCTIONS
2	0				Super Combinations [14]
2	1				Management Capabilities
2	1	1			General Management Capabilities
2	1	2			Alarm Reporting and State Management Capabilities
2	1	3			Alarm Reporting Capabilities
2	2				Event Report Management
2	2	1			General Event Report Management
2	3				Log Control
2	3	1			General Log Control
2	4				Security
2	4	1			General Security Capability
2	4	2			Security Management Capabilities
2	4	2	1		General Security Management Capability
2	4	2	2		Security Alarm Reporting Capabilities
2	4	2	3		Security Audit Trail Capabilities
2	4	3			Security Services and Mechanism for Management

13 The "enhanced" entries are placeholders for the addition of facilities which will be specified in the forthcoming second addenda to the Basic Class Virtual Terminal standards. These include specifically "ripple" editing functions.

14 The identification of these profiles is for further study.

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