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Title

Information Processing Systems - International Standardized Profiles - Part 3: Taxonomy of Profiles

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Introductory note

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STATUS: Advance circulation of (Proposed) Draft Part 3 of Technical Report TR 10 000 to individual participants of the Tokyo meeting of the ISO/IEC JTC1 Special Group on Functional Standardization. According to resolution C of this meeting (as documented in SG-FS N 58), SG-FS P-members are requested to indicate by September 16, 1988, to the SG-FS convener and secretariat whether or not further processing of this Part 3 at DTR level is acceptable.

This Draft Part 3 was created by amendment of JTC 1/FSTG N39 following the editing instructions of the above meeting, as documented in FSTG N 95. An editor's report is provided in document SG-FS N 56.

Part 3. TAXONOMY OF PROFILES

CONTENTS

1 Scope

The purpose of the 'Taxonomy of Profiles' is to provide a full classification for Profiles which may be or have been submitted for ratification as ISPs.

This Technical Report is intended to be applied to Profiles in the area of competence of JTC 1, and within this, priority consideration has been given to Profiles in the OSI area, i.e. those which specify OSI base standards, and those which are expected to be used in conjunction with them.

The existence of a Profile classification does not reflect a judgement by the SG-FS Taxonomy Group 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 the needs of OSI User Groups and according to the progress of international base standardization, the Taxonomy will be periodically updated 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 Technical Report. 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 the Technical Report. The inclusion of such extensions is administered following the procedures described in part 2 of this Technical Report.

A distinction has been made between a Profile and an ISP documenting one or more Profiles. The Taxonomy is concerned with Profiles, but further information is given in Part 4 of this Technical report as to which ISP contains the documentation of a Profile.

For each Profile in the Taxonomy, additional information is provided in Part 4 of this Technical Report, including information about the status of the identified Profiles.

2 References

ISO 8073/DAD 2	Information Processing Systems - Open Systems Interconnection - Connection oriented transport protocol specification - Addendum 2: Class four operation over connectionless-mode network service
ISO 8602	Information Processing Systems - Open Systems Interconnection - Protocol for providing the connectionless-mode transport service
ISO/IEC 10021	Information Processing Systems - Text Communication - MOTIS
X.224	Transport Protocol Specification for Open Systems Interconnection for CCITT Applications

3 Abbreviations

ADI	Profile sub-class: Directory
AFT	Profile sub-class: File Transfer, Access and Management
AMH	Profile sub-class: Message Handling
AOM	Profile sub-class: OSI Management
ARD	Profile sub-class: Remote Database Access
ATP	Profile sub-class: Transaction Processing
AVT	Profile sub-class: Virtual Terminal
CL-NS	Connectionless-mode Network Service
CL-TS	Connectionless-mode Transport Service
CO-NS	Connection-mode Network Service
CO-TS	Connection-mode Transport Service
FCG	Profile sub-class: Computer Graphics Metafile Interchange Format

FOD	Profile sub-class: Office Document Format
FSG	Profile sub-class: SGML Interchange Format
ISP	International Standardized Profile
LAN	Local Area Network
MTA	Message Transfer Agent
MS	Message Store
MTS	Message Transfer System
PDISP	Proposed Draft ISP
PSDN	Packet Switched Data Network
SG-FS	JTC 1/Special Group on Functional Standardization
UA	User Agent

4 The Taxonomy: Principles

4.1 General

Profiles are primarily grouped in classes, each class representing a category of functionality of reasonable independence from other classes. Part 1 of this Technical Report provides some further information about the principles used in this primary classification.

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

Profile identifiers have been introduced such that each Profile is identified by a character string commencing with one letter (indicating the primary class of the Profile), and continuing with as many further letters or digits as are necessary to reflect its position within the hierarchic structure of the class. The syntax of all but the first letter is subject to individual definitions for each class (see below).

4.2 Main elements of the Taxonomy 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

A - Application Profiles requiring connection-mode Transport Service
B - Application Profiles requiring connectionless-mode Transport Service

F - Interchange format and representation Profiles

R - Relay 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 CSMA/CD LANs, other LANs, PSDNs, etc. In this way they isolate the A/B-Profiles and F-Profiles from network technology.

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 systems using different T- or U-Profiles to interwork. Relays between T- and U-Profiles are not provided.

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 Part 1 of this Technical Report. This leads to a hierarchical structure of Profile (sub-)classes which is given in full in clause 5 of this document.

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.

4.3 The Group concept

Part 1 of this Technical Report identifies a basic concept which will be used in this Taxonomy:

A Group is a set of T- or U-Profiles that are compatible in the sense that a system implementing one Profile from the Group can interwork, according to OSI, with another system implementing a Profile from the same Group, in terms of the operation of the protocols specified within those Profiles.

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 ISO 8473. This Group has members which correspond to different subnetwork technologies but interworking between systems conforming to them is made possible by LAN bridges and/or Network Layer relays.

4.4 Profile classes for OSI

4.4.1 Transport Profiles

4.4.1.1 Principles

Transport Profiles define the use of 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 clause 4.2) 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);
- can interwork via OSI relays.

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.

c) Further subdivisions are made according to the characteristics of a particular subnetwork, e.g., switched vs leased line/virtual connection

4.4.1.2 Connection-mode Transport Service: Profile class T

Based on functional standardization already under way in organizations represented in the Taxonomy Group and on standards already developed in ISO, 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 T A

The Connection-mode Transport Service (CO-TS) is provided over the Connectionless-mode Network Service (CL-NS) using the Class 4 Transport Protocol as defined in ISO 8073/DAD2.

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

The Connection-mode Transport Service (CO-TS) is provided over the Connection-mode Network Service (CO-NS).

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

	mandatory [1] transport protocol classes
Group TB:	0 and 2 and 4
Group TC:	0 and 2
Group TD:	0 [2]
Group TE:	2

4.4.1.3 Connectionless-mode Transport Service: Profile class U

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

Group UA

The Connectionless-mode Transport Service (CL-TS) is provided using the ISO 8602 Transport Protocol. This Group supports the mandatory operation of ISO 8602, over Connectionless-mode Network Service.

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[1] mandatory means those Transport Protocol classes made mandatory by the base Standard plus any class required for Group membership

[2] The class negotiation rules to be employed are those in CCITT Recommendation X.224.

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

Group UB

The Connectionless-mode Transport Service (CL-TS) is provided using the ISO 8602 Transport Protocol. This Group supports the option of ISO 8602 that operates over Connection-mode Network Service.

NOTE: A system of Group UB claiming conformance to ISO 8602 also has to implement the mandatory operation of ISO 8602.

4.4.1.4 Transport Profile identifier

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

yXabc

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 4.4.1.2 and 4.4.1.3 above.

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.

4.4.1.5 Interworking between Transport Profile Groups

The following tables 1 and 2 show the interworking capabilities between Profiles in classes T and U. No interworking is possible between Groups in class T and U because of the different mode of Transport Service provided.

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	special	special	special
TB	CO	special	full	full	full	full
TC	CO	special	restricted	full	full	full
TD	CO	special	restricted	restricted	full	special
TE	CO	special	restricted	restricted	special	full

Table 2 - Interworking amongst Groups in class U

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

Entries in the tables have the following meaning:

Full: Full OSI interworking (an OSI relay may be required)
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 clause 4.4.2.1)

4.4.2 Relays

4.4.2.1 Principles

Relay Profiles define the use of Standards from OSI layers 1-4, 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.

4.4.2.2 Relay Profile identifier

The identifier for a Relay Profile is of the form

Rtp.q

where

R = relay function
t = relay type identifier
This identifier will cover
- the layer at which the relay operates
- the service mode being supported
- the type of relay

The values for t are currently under study.
p, q = subnetwork 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).

Rtp.q represents a relay of type t between subnetwork type p and subnetwork type q.

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

4.4.3 Application Profiles for OSI

4.4.3.1 Principles

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

Currently, only Application Layer services defined by JTC1/SC18 and SC21 are included.

Each Application Profile is a complete definition of the upper layer protocols, though it may share one or more common definitions of some part of its content with other Application-Profiles.

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, as they are currently identified as main projects in JTC 1/SC 18 and SC 21.

4.4.3.2 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 JTC1.

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.

4.4.4 Interchange Format and Representation Profiles

4.4.4.1 Principles

These 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 by JTC1/SC18 and SC21 are included.

4.4.4.2 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.

4.4.4.3 Principles for the Office Document Format Taxonomy

The structure of the Office Document Format (FOD) Profiles in section 5.4.1 consists of three levels of subdivision a, b and c.

- Level a reflects the document structures (logical and/or layout) specified in the Profile. They relate to the intended use of the documents: modification requires logical information, for presentation only layout information has to be provided, processing (editing, formatting) and presentation of the document requires logical and layout information.

- Level b mainly reflects the hierarchically increasing complexity and functionality of the document architecture, i.e. of the logical and layout features of the Profile.

- In general, level c reflects the content architectures supported by the Profile: Character Content or Mixed Mode, i.e. character, raster graphics, geometric graphics.

NOTE 1: The third level will not be used in those cases where for a given level b only one Profile exists.

NOTE 2: Further levels of subdivision may be identified later.

5 Taxonomy of Profiles

The inclusion of a Profile in this clause is purely for the purpose of assigning a unique, meaningful identifier. It should not be assumed that the inclusion of a Profile in this section implies that a requirement for that Profile has been identified by a national body or an OSI User Group. For such information, see Part 4 of this Technical Report.

5.1 Transport Profiles

5.1.1 Taxonomy of subnetworks

The following Taxonomy of subnetworks 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	Switched Virtual Circuit (SVC)
1 1 2	Permanent Virtual Circuit (PVC)
1 2	Switched Access to a PSDN
1 2 1	PSTN Case
1 2 1 1	Switched Virtual Circuit (SVC)
1 2 2	CSDN Case
1 2 2 1	Switched Virtual Circuit (SVC)
1 2 3	ISDN Case
1 2 3 1	Switched Virtual Circuit (SVC)
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	Circuit-switched bearer service for basic access at S or T reference point
4 1 1	B-channel
4 1 1 1	Semi-permanent
4 1 1 2	Switched
4 2	Packet-switched bearer service for basic access at S or T reference point
4 2 1	using D-channel
4 2 1 1	Switched Virtual Circuit (SVC)
4 2 2	using B-channel
4 2 2 1	Semi-permanent
4 2 2 1 1	Switched Virtual Circuit (SVC)
4 2 2 2	Switched
4 2 2 2 1	Switched Virtual Circuit (SVC)
5	LOCAL AREA NETWORKS
5 1	CSMA/CD
5 2	Token Bus
5 3	Token Ring

NOTE: It may be necessary to extend the ISDN part of the subnetwork Taxonomy (4 xxx) to cover ISDN Primary Rate Access and access at the U reference point

5.1.2 Transport Groups

TA Group TA: CO-TS over CL-NS

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1 with the exception that in Group TA subnetworks of type ISDN (TA 4 xxxx) are for further study.

TB Group TB: CO-TS over CO-NS : with mandatory Transport Protocol Classes: 0 and 2 and 4

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1.

TC Group TC: CO-TS over CO-NS : with mandatory Transport Protocol Classes: 0 and 2

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1.

TD Group TD: CO-TS over CO-NS : with mandatory Transport Protocol Class: 0

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1.

TE Group TE: CO-TS over CO-NS : with mandatory Transport Protocol Class: 2

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1.

UA Group UA: CL-TS over CL-NS

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1.

UB Group UB: CL-TS over CO-NS

For the detailed subnetwork Taxonomy within this Group see clause 5.1.1.

5.2 Relay Profiles

The Taxonomy of Relay Profiles is for further study.

5.3 Application Profiles

5.3.1 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

5.3.2 Message Handling

AMH Message Handling

a b c	Substructure
1	Interpersonal Messaging
1 1	UA + MTA (P1 and P2)
1 1 1	UA + MTA (P1 and P2, normal mode)
1 1 2	UA + MTA (P1 and P2, X.410-1984 mode)
1 1 3	UA + MTA (P1 and P2, 1984)
1 2	MTS Access (P3 and P2)
1 3	MS Access (P7 and P2)

NOTE 1: All except AMH 113 refer to X.400 (1988) recommendations and their JTC 1 equivalents on MOTIS, ISO/IEC 10021.

NOTE 2: AMH 113 exceptionally requires the visibility of more than Transport Service mode.

5.3.3 Virtual Terminal

AVT Virtual Terminal

a b	Substructure
1	BASIC CLASS (A-mode)
1 1	A-mode Default
1 2	TELNET
1 3	Page Scroll
1 4	CCITT X.3 PAD compatible
1 5	Transparent
2	BASIC CLASS (S-mode)
2 1	S-mode Default
2 2	Forms
2 3	Line Scroll

5.3.4 Transaction Processing

ATP Transaction Processing

a b Substructure

(to be studied)

5.3.5 Remote Database Access

ARD Remote Database Access

a b Substructure

(to be studied)

5.3.6 OSI Management

AOM OSI Management

a b Substructure

(to be studied)

5.3.7 Directory

ADI Directory

a b Substructure

(to be studied)

5.4 Interchange Format and Representation Profiles

5.4.1 Office Document Format

FOD Office Document Format

a b Substructure

(to be studied)

5.4.2 Computer Graphics Metafile Interchange Format

FCG Computer Graphics Metafile Interchange Format

a b Substructure

(to be studied)

5.4.3 SGML Interchange Format

FSG SGML Document Interchange Format

a b Substructure

(to be studied)