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Information technology — Framework and taxonomy of International Standardized Profiles —

Part 1:
General principles and documentation framework

Technologies de l'information — Cadre et taxonomie des profils normalisés internationaux —
Partie 1: Principes généraux et cadre de documentation

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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. 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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.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 10000-1, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This third edition cancels and replaces the second edition (ISO/IEC TR 10000-1:1992), 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*

Introduction

The context of Functional Standardization is one part of the overall field of IT 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.

Information technology - Framework and taxonomy of International Standardized Profiles -

Part 1:

General principles and documentation framework

1   Scope

This part of ISO/IEC TR 10000 defines the concept of profiles, and the way in which they are documented in International Standardized Profiles. It gives guidance to organizations making proposals for Draft International Standardized Profiles on the nature and content of the documents they are producing.

This part of ISO/IEC/TR 10000 outlines concepts of profiles and taxonomies (or Classification Schemes), and the format and content of ISPs. Annex A gives details of the format and the content of ISPs as required by ISO/IEC JTC 1.

ISO/IEC TR 10000-2 provides principles and a classification scheme for OSI profiles which may be or have been submitted for ratification as International Standardized Profiles.

NOTE - These OSI profiles specify OSI base standards, and those base standards concerned with interchange formats and data representation which are expected to be used in conjunction with them.

ISO/IEC TR 10000-3 provides the context for functional standardization in support of Open System Environments (OSE), and principles and a classification scheme for OSE profiles which may be or have been submitted for ratification as International Standardized Profiles. It outlines the basic OSE objectives and concepts, and defines an approach and format for OSE profiles specified by International Standardized Profiles and, along with this part of ISO/IEC TR 10000, gives guidance to organizations making proposals for Draft ISPs on the nature and content of the documents they produce.

Part 2 and Part 3 may be extended for OSI and OSE profiles respectively and further parts of ISO/IEC TR 10000 may be developed to define other classes of profiles.

ISO/IEC TR 10000 is applicable to all International Standardized Profiles of ISO and IEC. Its primary focus is the area of competence of ISO/IEC JTC 1, but by mutual agreement with JTC 1, other Technical Committees may undertake similar functional standardization activities leading to the inclusion of additional material in this Technical Report.

2   References

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC TR 10000. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC TR 10000 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 9834-1:1993 *Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities - Part 1: General procedures. (Corresponds to ITU-T Recommendation X.660)*

ISO/IEC TR 10000-2: 1995, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2: Principles and Taxonomy for OSI profiles.*

ISO/IEC TR 10000-3: 1995, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 3: Principles and Taxonomy for Open System Environment profiles.*

IEC/ISO Directives Part 3: 1989, *Drafting and presentation of International Standards.*

ISO/IEC JTC 1 Directives: 1995, *Procedures for the technical work of ISO/IEC JTC 1 on Information Technology.*

3 Definitions

For the purposes of this part of ISO/IEC TR 10000, the following definitions apply.

3.1 Terms defined in this part of ISO/IEC TR 10000

3.1.1 base standard: An approved International Standard or ITU-T Recommendation.

3.1.2 International Standardized Profile: An internationally agreed-to, harmonized document which describes one or more profiles.

3.1.3 IT system: A set of IT resources providing services at one or more interfaces.

3.1.4 profile: A set of one or more base standards and/or ISPs, and, where applicable, the identification of chosen classes, conforming subsets, options and parameters of those base standards, or ISPs necessary to accomplish a particular function.

NOTE - JTC 1 allows on exceptional basis references to other specifications.

3.1.5 taxonomy: A classification scheme for referencing profiles or sets of profiles unambiguously.

3.2 Terms defined in ISO/IEC PDTR 14252, "Guide to the POSIX Open System Environment (OSE)"

The following terms are defined in ISO/IEC PDTR 14252, "Guide to the POSIX OSE", and are included here for convenience.

NOTE - Since PDTR 14252 is currently under ballot, this text will be updated when the ballot resolution process is completed.

3.2.1 interoperability: The ability of two or more IT systems to exchange information and to make mutual use of the information that has been exchanged.

3.2.2 Open System Environment: The comprehensive set of interfaces, services, and supporting formats, plus user aspects, for interoperability and/or portability of applications, data, or people, as specified by information technology standards and profiles.

3.3 Conformance terminology

This part of ISO/IEC TR 10000 uses the following term related to conformance:

3.3.1 Implementation Conformance Statement [ICS]: A statement made by the supplier of an implementation or IT system claimed to conform to one or more specifications, stating which capabilities have been implemented, specifically including the relevant optional capabilities and limits.

NOTE - The ICS can take several forms (e.g. in OSI it can be a profile ICS, protocol ICS, information object ICS or profile specific ICS, as defined in ITU-T Rec. X.290 | ISO/IEC 9646-1, and in POSIX it is a POSIX Conformance Document as defined in ISO/IEC DIS 13210).

4 Abbreviations

ICS   Implementation Conformance Statement

ISP   International Standardized Profile

OSE   Open System Environment

OSI   Open Systems Interconnection

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5   Purpose of profiles

Profiles define combinations of base standards or other profiles for the purpose of

- identifying the standards and ISPs, together with appropriate classes, conforming subsets, options and parameters, which are necessary to accomplish identified functions (e.g. interoperability) or to support a class of applications (e.g. Transaction Processing applications);

- providing a scheme of referencing the various uses of standards and ISPs which is meaningful to both users and suppliers in response to a systematic identification and analysis of user requirements;

- providing a means to enhance the availability for procurement of consistent implementations of functionally defined groups of standards and ISPs, which are expected to be the major components of real IT systems, and which realise the intentions of the corresponding reference models or frameworks with which the standards are associated;

- promoting uniformity in the development of conformance tests for IT systems that implement the functions associated with the profiles.

Underlying all these purposes is the assumption that there exists a requirement for the definition, standardization, implementation, and testing of such a profile. The processes employed shall therefore include the identification, recording, and monitoring of such requirements, as expressed by the eventual users of the profile.

Various bodies throughout the world are undertaking work, in either regional or topic-oriented groups, in the area of functional standardization. Various names are given to the results of this work (such as profiles, functional standards, implementation agreements, specifications) and various approaches are being taken to the scope of the profiles and to the style in which they are documented. This Documentation Framework of International Standardized Profiles has been developed by ISO/IEC JTC 1 in order to create a consistent classification scheme (a taxonomy), and a consistent documentation scope and style, into which the work of functional standardization bodies can be submitted, along with corresponding work from the members, technical committees and subcommittees of ISO and IEC.

It is not sufficient, however, just to create a documentation framework of this sort. Product development and procurement need to be seen on a global, and not just on a national, regional or sectoral scale. Therefore an objective of ISO/IEC JTC 1 is to create the climate for the production of harmonized profiles, where a wide measure of agreement is reached before proposals are submitted to ISO/IEC JTC 1.

Profiles should provide a clear identification of the specific user requirements which are satisfied by the profiles. Occasionally, satisfaction of some of these requirements may identify functionality that is not covered by accepted base standards. This is defined as a "gap" in available standards.

One purpose of identifying gaps in profiles is to define areas where standardization activities are needed. Gaps should be identified by describing the missing functionality.

NOTE - JTC 1 allows on exceptional basis references to other specifications.

One of the most important roles for an International Standardized Profile is to serve as the basis for the establishment of internationally recognized conformance test suites and test methods. ISPs are produced not simply to legitimize a particular choice of base standards and options, but to promote the implementation of the referenced standards and ISPs in real IT systems in such a way as to achieve their intended goals - for example, interoperability and application portability. The development and widespread acceptance of conformance tests for profiles specified in ISPs is important to the successful realization of this goal.

6   Concept of a profile

The concept of a profile, which fulfils the purposes defined in clause 5, is considered first in an abstract sense, with particular emphasis on the significance of the claim of conformance to a profile. This concept of an individual profile is then extended to include defining its relationship to other profiles, i.e. the concept of a taxonomy of profiles, and its place within it. Finally, since a profile has to have a concrete existence in order for it to be used effectively, these conceptual aspects are related to a formal documentation scheme.

Clauses 6 and 7 concentrate on defining the concept and taxonomy of the profiles, independently of the way they are documented in ISPs. Clause 8 defines the actual documentation scheme and shows how there is not necessarily one separate document (ISP) for each profile definition.

Profiles are related to Base Standards, to Registration Mechanisms, and to Conformance Tests of the IT systems which implement them. The practical implications of these relationships are developed in the following sub-clauses, some of which specify requirements that shall be satisfied by profiles defined in ISPs.

6.1 The relationship to base standards

6.1.1 Reduction of options

Some base standards provide options, anticipating the needs of a variety of applications of the functionality described.

Profiles promote integration of base standards by defining how to use a combination of base standards for a given function and environment. In addition to the selection of base standards, a choice is made of permitted options for each base standard and of suitable values for parameters left unspecified in the base standard.

Profiles shall not contradict base standards but shall make specific choices where options and ranges of values are available. The choice of the base standard options should be restricted so as to maximise the probability of achieving the objective of the profile. Clause 6.3.1 states the requirements for deriving the functionality of a profile from the functionality of a base standard.

6.1.2 Use of normative References

An approved ISP shall make normative reference only to base standards or other ISPs.

In exceptional circumstances, described below, normative reference may be made to ISO/IEC Technical Reports. Such reference, which requires that the following conditions are met, shall be justified on a case-by-case basis:

•	no base standard addressing the requirements is available, but a Technical Report is;

•	the use is identified and discussed in the Explanatory Report which accompanies the proposed draft for an ISP, justifying that use;

•	the JTC 1 body responsible for that Technical Report agrees that a normative reference is an appropriate use of that Technical Report;

•	the National Bodies approve this usage in the draft ISP ballot.

NOTE - In this Technical Report, any text which describes the relationship of an ISP to a base standard, shall be taken to be referring also to its relationship to any Technical Reports which have been accepted according to the criteria given above.

6.1.3 Use of informative References

It may be useful to make informative reference to other documents in the process of defining a profile.

For example:

a)	Reference may be made to applicable regional or national standards. Examples of the functionality which may require the use of this expedient are:

•	physical connectors

•	electrical characteristics

•	safety requirements

•	character repertoires

Such reference to regional or national standards shall be placed within informative text within an ISP, or in a separate, informative, part of a multi-part ISP. Such usage shall be justified on a case-by-case basis, either as a consequence of the lack of appropriate functionality in International Standards, or because of the existence of national or regional regulatory requirements. It shall be accompanied by details of the body responsible for the distribution and maintenance of the standard.

b)	There may be a need to define some aspect of the required functionality of a profile where suitable base standards or ISPs do not yet exist. Informative reference to the missing material may be made (see 6.1.4 c).

This should only be done where the missing functionality is a relatively small proportion of the total scope of the profile. Where larger sections of the functionality are missing (see 6.1.4 b).

c)	There may be a need to provide a reference to background material helpful in understanding the profile, suitable for citation in the Bibliography (as provided for in Annex A.4.3 and A.6.1).

6.1.4 Other Factors

Approval of an ISP by ISO/IEC members does not change the status of any documents referenced by it.

Entry of a profile identifier into a taxonomy may occur before the referenced base standards are all stable and approved. In these circumstances, regional or sectoral bodies may make use of interim or preliminary draft versions of profiles in their own controlled environment

In those cases where the specification of a required element of functionality for a profile does not exist in an approved base standard or in a set of approved base standards cited by an ISP, there are a number of possible approaches, one or more of which can be adopted in the writing of ISPs:

a) *Postpone the creation of the ISP until it has been possible to modify or to add to the requirements specified in a base standard, or to create new base standards. In this case, it is necessary for the ISP developer to liaise with the standards group responsible for that base standard so that the required changes may be made through established methods such as defect reporting, amendment procedures, or the introduction of new work.*

b) *Propose a change to a taxonomy to add a further profile identifier with a scope which matches the available base standards, and progress an ISP to specify a profile with this revised scope.*

c) *Draft the ISP in such a way that it clearly identifies what required functionality of the profile is missing, and, if possible, makes informative reference to examples of possible specifications which the user of the ISP may choose to implement.*

6.2   Registration in ISPs

6.2.1   General provisions

The application of base standards may involve reference to specifications that are subject to registration procedures (for example, for abstract syntaxes). Profiles that reference such base standards must define the use of such specifications (i.e. indicate whether they are included in the specification or not).

Where such a specification is already registered, the profile specification shall refer to it using its regis-

tered name. Where the registered specification allows, the profile specification may define particular parameter values.

Where such a specification is not already registered, then action must be taken to register it according to the procedures defined by the base standard itself or by an associated registration procedure standard, in accordance with the general registration requirements of the ISO/IEC JTC 1 Directives.

6.2.2   Provisions of ITU-T Rec. X.660-series | ISO/IEC 9834

Where a requirement for registration is covered by the provisions of ITU-T Rec. X.660-series | ISO/IEC 9834, then an ISP may act as the registration authority, provided that an international registration authority does not exist, and the type of specification to be registered falls within the scope of one of the classes of profile defined in a taxonomy in this Technical Report. The ISP concerned may be the ISP in which the specification is used, or a multi-part ISP may be used as the registration authority. In such a case, the general registration requirements of the ISO/IEC JTC 1 Directives, the provisions of this part of ISO/-IEC TR 10000, and the provisions of ITU-T Rec. X.660 | ISO/IEC 9834-1, and of any other part or parts of ITU-T Rec. X.660-series | ISO/IEC 9834 that concern this type of specification, are all applicable.

Where the provisions of ITU-T Rec. X.660-series | ISO/IEC 9834 apply, an ISP may also act as a registration authority for derivative and/or composite specifications contained in the ISP. Such objects may be created:

a)   by the selection of specific optional elements in a registered specification of the same type in a base standard or another ISP, or

b)   as a composition of registered specifications of the same type from multiple base standards or ISPs, or

c)   by a combination of a) and b).

NOTE - 1 The referenced specifications must be of the same type as the new specification. Only the selection of optional elements makes the specification new.

NOTE - 2 Proliferation of registered specifications is strongly discouraged because it creates 'islands of isolation' i.e. registered specifications that differ in only the slightest manner are perceived as being totally different. Every attempt should be made to develop composite specifications with the broadest possible fields of use to promote interoperability.

6.3 Principles of profile content

6.3.1 General Principles

A profile makes explicit the relationships within a set of base standards used together (relationships which can be implicit in the definitions of the base standards themselves), and may also specify particular details of each base standard being used.

A profile may refer to other International Standardized Profiles in order to make use of the functions and interfaces already defined by them, and thus limit its own direct reference to base standards.

It follows that a profile

a)   shall restrict the choice of base standard options to the extent necessary to maximise the probability of achieving the objective of the profile; for example to facilitate interworking between IT systems, or porting an application between them, where they have implemented different selections of options of the profile. Thus a profile may retain base standard options as options of the profile provided that they do not affect interworking or portability.

b)   shall not specify any requirements that would contradict or cause non-conformance to the base standards to which it refers;

c)   may contain conformance requirements which are more specific and limited in scope than those of the base standards to which it refers. Whilst the capabilities and behaviour specified in a profile will always be valid in terms of the base standards, a profile may exclude some valid optional capabilities and optional behaviour permitted in those base standards.

Thus conformance to a profile implies by definition conformance to the set of base standards which it references. However, conformance to that set of base standards does not necessarily imply conformance to the profile.

6.3.2 Main elements of a profile definition

The definition of a profile shall comprise the following elements:

a)   a concise definition of the scope of the function for which the profile is defined and the user requirements which it will satisfy, which

is capable of being used as an Executive Summary of the profile;

b)   an illustration of the scenario within which the profile is applicable, giving, where possible, a diagrammatic representation of the IT systems, applications and interfaces which are relevant;

c)   normative reference to a single set of base standards or ISPs, including precise identification of the actual texts of the base standards or ISPs being used; also identification of any approved amendments and technical corrigenda (errata), conformance to which is identified as potentially having an impact on achieving interoperability or portability using the profile;

d)   specifications of the application of each referenced base standard or ISP, stating the choice of classes or conforming subsets, and the selection of options, ranges of parameter values, etc, and reference to registered objects;

e)   a statement defining the requirements to be observed by IT systems claiming conformance to the profile, including any remaining permitted options of the referenced base standards or ISPs, which thus become options of the profile;

f)   if relevant, a reference to the specification of conformance tests for the profile;

g)   informative reference to any amendments or technical corrigenda to the base standards referenced in the profile, which have been determined to be not applicable to the profile, and to any other relevant source documents (see 6.1.3 c);

NOTE - Clause 8 and annex A provide information on the way in which a profile shall be defined in an ISP.

6.4 The meaning of conformance to a profile

The purpose of a profile, as indicated in earlier clauses, is to specify the use of sets of specifications to provide clearly defined functionally. Hence, conformance to a profile specification always implies conformance to the referenced specifications.

There can also be conformance requirements for the combined use of specifications which are distinct from any requirements associated with the specifications in isolation.

Conformance requirements may be

a)   mandatory requirements: these are to be observed in all cases;

b)   options: these may be selected to suit the implementation, provided that any requirements applicable to support of the option are observed.

In addition, conformance requirements may be specified

c)   unconditionally: these requirements or options apply without qualification;

d)   conditionally: conditional requirements are ones which may be mandatory under some specified conditions, may be optional under other specified conditions, and may be out of scope or not applicable under other specified conditions; these are to be observed if the specified conditions apply.

Furthermore, conformance requirements may be stated

e)   positively: they state what is required to be done;

f)   negatively: they state what is required not to be done.

To evaluate the conformance of a particular implementation, it is necessary to have a statement of the capabilities which have been implemented in support of one or more specifications, specifically including the relevant optional capabilities and limits, so that the implementation can be tested for conformance to the relevant requirements, and only to those requirements. Such a statement is called an Implementation Conformance Statement (ICS).

An IT system may support more than one profile, making use of different capabilities of the same base standards. In this case, it may be able to negotiate which profile to use in different circumstances, or may need to be configured separately in order to support each profile. Similarly, a single ICS may state support of multiple profiles, or there may be a separate ICS provided for each profile.

Within the implementation of a profile, points can be defined at which the occurrence of test events can be controlled and observed. These points could be, for example, at interfaces defined in OSE profiles.

Testing an implementation for conformance to a profile requires the specification of conformance tests for the profile. Since a profile is, by definition, a set of references to base standards, then the specification of the conformance tests for a profile should be based on conformance tests specified for those referenced base standards, with appropriate selection and parameterization of tests. The methodology and nature of conformance tests for each domain of profiles is identified, as appropriate, in other parts of ISO/IEC TR 10000.

6.5   Conformance requirements of profiles

The conformance requirements of a profile shall relate to the conformance requirements in the base standards in the following ways, subject to any more specific constraints that may be given for particular domains of profiles in other parts of ISO/IEC TR 10000:

a)   Unconditional mandatory requirements in the base standard shall remain mandatory in the profile.

b)   Unconditional options in base standards may remain optional or may be changed within the profile to become:

• mandatory;

• conditional, giving rise to different statuses dependent upon some appropriate condition;

• out of scope, if the option is not relevant to the scope of the profile - for example functional elements which are unused in the context of the profile;

• prohibited, if the use of the option is to be regarded as non-conformant behaviour within the context of the profile - this choice should only be used when really necessary, "out of scope" may often be more appropriate.

c)   If the conditions in the conditional requirements in the base standards can be fully evaluated in the context of the profile, then these requirements become unconditional mandatory requirements or unconditional options, or they become out of scope or prohibited. Otherwise the conditions remain conditional, with the appropriate, possibly partially, evaluated conditions.