# TECHNICAL REPORT

# ISO/IEC TR 10000-1

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# Information technology — Framework and taxonomy of International Standardized Profiles —

# Part 1: iTeh STFrameworkD PREVIEW (standards.iteh.ai)

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# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. 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 a technical committee is to prepare International Standards but in exceptional circumstances, the publication of a Technical Report of one of the following types may be proposed: (standards.iteh.ai)

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts; IEC TR 10000-1:1990

 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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.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 the Special Group on Functional Standardization of ISO/IEC JTC 1, *Information technology*.

The structure of ISO/IEC/TR 10000 is as follows:

- Part 1: Framework
- Part 2: Taxonomy of Profiles

This part of ISO/IEC/TR 10000 has four annexes:

- Annex A is an integral part of the Technical Report, and is binding on submitters of ISPs.
- Annex B is illustrative, and has no binding significance.
- Annexes C and D are for information only, and have no binding significance.

# 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 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 addition to ISO/IEC/TR 10000, the secretariat of the Special Group on Functional Standardization maintains a "Directory of ISPs and Profiles contained therein" This is a factual record of which ISPs exist, or are in preparation, together with a summary description of the scope, scenario, and model for each Profile. It is subject to regular updating by the Secretariat of ISO/IEC JTC 1/SGFS. ISO/IEC TR 10000-1:1990

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# Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: 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, the general Taxonomy (or Classification Scheme), and the format and content of ISPs. Annex A gives details of the format and content of ISPs as required by ISO/IEC JTC 1. Annex B gives examples of the ways in which Profile definitions are incorporated in ISPs for publication. Annex C gives guidance on conformance aspects of Profiles, and indicates the direction in which ISO/IEC/TR 10000 may be developed in the future. Annex D lists those ISO/IEC Standards and COTTE Recommendations which are quoted in examples.

ISO/IEC/TR 10000-2 provides a full classification for TR 100ain registers of Profiles which may be or have been submitted for ratifit and ards/sist/2211188 cation as International Standardized Profiles 30ac 7527c/iso-jec-te-10011198

ISO/IEC/TR 10000 is applicable to Profiles in the area of competence of ISO/IEC 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 concerned with interchange formats and data representation which are expected to be used in conjunction with them, though this subject is still for further study. In addition, as a lower priority, it is also applicable to Profiles specifying the use of other ISO/IEC JTC 1 base standards, for example:

- Open Distributed Processing;
- the representation of information or objects on storage media (as opposed to the current limitation to use with communications protocols);
- logical and physical storage structures.

However, it is recognized that the scope of the concept of Profiles may ultimately be wider than that of ISO/IEC JTC1. Examples of other areas to which the concept may eventually be extended by other Technical Committees are:

- interchange formats defined for particular application areas (e.g. trade data interchange formats in ISO/TC 154);
- protocols used in particular application areas (e.g. banking protocols in ISO/TC 68, industrial automation protocols in ISO/TC 184), which may also specify particular uses of the more generic Profiles included in this Taxonomy.

## 2 Normative 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 listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7498:1984. Information processing systems - Open Systems Interconnection - Basic Reference Model. (Corresponds to CCITT X.200)

ISO/IEC 9646-1:....,<sup>1)</sup> Information technology - OSI conformance testing methodology and framework - Part 1: General Concepts . (Corresponds to CCITT X.290 Part 1)

ISO/IEC 9646-2:....,<sup>1)</sup> Information technology - OSI conformance testing methodology and framework - Part 2: Abstract test suite specification. (Corresponds to CCITT X.290 Part 2)

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

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

A number of other ISO Standards and CCITT Recommendations are quoted in examples which do not constitute provisions of this part of ISO/IEC/TR 10000. They are listed in annex D.

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

**3.1.2 Profile:** A set of one or more base standards, and, where applicable, the identification of chosen classes, subsets, options and parameters of those base standards, necessary for accomplishing a particular function.

NOTE - An International Standardized Profile includes the specification of one or more Profiles.

**3.1.3 ISP Implementation Conformance Statement:** A statement made by the supplier of a system which claims to conform to an ISP, stating the capabilities and options which have been implemented, and all optional features which have been omitted.

**3.1.4 Group:** A set of Profiles that are compatible, in the sense that a system implementing one Profile from a Group can interwork, according to OSI, with another system implementing a different Profile from the same Group, in terms of the operation of the protocols specified within those Profiles.

3.1.5 Base Standard: An approved International Standard, Technical Report or CCITT Recommendation which is used in the definition of a Profile.

NOTE - See also 6.1 for an indication of circumstances under which documents other than these may be referenced informatively in an ISP.

## 3.2 Terms defined in ISO 9646-1

This part of ISO/IEC/TR 10000 uses the following terms defined in ISO 9646-1:

- a) Conformance testing
- b) Conforming implementation
- c) Dynamic conformance requirements
- d) Protocol Implementation Conformance Statement (PICS)
- e) PICS proforma
- f) Static conformance requirements

## 4 Abbreviations

ISP	International Standardized Profile
IPRL	ISPICS Requirements List
ISPICS	ISP Implementation Conformance State- ment
PICS	Protocol Implementation Conformance Statement
A-Profile	Application Profile (requiring Connec- tion-mode Transport Service)
B-Profile	Application Profile (requiring Connec- tionless-mode Transport Service)
F-Profile	Interchange Format and Representation Profile
R-Profile	Relay Profile
T-Profile	Transport Profile (providing Connection- mode Transport Service)
U-Profile	Transport Profile (providing Connection-

# 5 Purpose of Profiles

Profiles define combinations of base standards for the purpose of

less-mode Transport Service)

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- identifying the base standards, together with appropriate classes, subsets, options and parameters, which are necessary to accomplish identified functions for purposes such as interoperability;
- providing a system of referencing the various uses of base standards which is meaningful to both users and suppliers;
- providing a means to enhance the availability for procurement of consistent implementations of functionally defined groups of base standards, which are expected to be the major components of real application systems;
- promoting uniformity in the development of conformance tests for systems that implement the functions associated with the Profiles.

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 Taxonomy of International Standardized Profiles has been developed by ISO/IEC JTC 1 in order to create a common classification scheme, and documentation scope and style, into which the work of Functional Standardization bodies can be submitted, along with corresponding work from the members and subcommittees of ISO/IEC JTC 1. It is not sufficient, however, just to create a framework of this sort. Interoperability, and product development and procurement, need to be seen on a global, and not just on a regional or sectional 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.

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 laboratories. ISPs are produced not simply to "legitimize" a particular choice of base standards and options, but to promote real system interoperability. The development and widespread acceptance of conformance testing based on ISPs is crucial to the successful realization of this goal.

NOTE - The remainder of this part of ISO/IEC/TR 10000 is concerned with the concepts and structures of Profiles as they apply to the use of standards in the area of competence of ISO/IEC JTC 1, and primarily as they apply to the use of OSI and OSI-related standards. This means:

- Profiles for the use of OSI protocol standards for systems interoperability;
- Profiles for the use of standards which define the format and content of the data that is carried between end systems by means of the OSI protocols.

# 6 Concept of a Profile

of applications and taking into account different capabilities of real systems and networks.

Profiles promote interoperability 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 interworking between systems implementing different selections of such Profile options, consistent with achieving the objective of the Profile.

An approved ISP shall make normative reference only to base standards or other ISPs (see 3.1.5).

When it is useful to make informative reference to other documents in the process of defining a Profile, reference may be made to applicable regional or national standards. Examples of the functionality which may require the use of this expedient are:-

# (standards: sately requirements

character repertoires

physical connectors

electrical characteristics

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 system.

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 systems which implement them. The practical implications of these relationships are developed in the following subclauses, some of which specify requirements that shall be satisfied by Profiles defined in ISPs.

NOTE - The development of ISO/IEC 9646 parts 1 and 2 and of this part of ISO/IEC/TR 10000 in the area of protocol Profile Conformance Tests for ISPs is for further study.

### 6.1 The relationship to base standards

Base standards specify procedures and formats that facilitate the exchange of information between systems. They provide options, anticipating the needs of a variety

Such reference to regional or national standards shall be placed in an informative annex to the ISP, or in a separate, non-normative, 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.

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

The development of an ISP may indicate the need to modify or to add to the requirements specified in a base standard. 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.

Entry of a Profile into the Taxonomy may occur before the referenced base standards are all stable and approved. In these circumstances, regional or sectional bodies may make use of interim or preliminary draft versions of Profiles in their own controlled environment.

#### 6.2 The relationship to Registration **Authorities**

The base standards referenced in Profiles may include objects such as abstract syntaxes, document types, Virtual Terminal Environments and control objects, which require a Registration Authority to administer them. Profiles should specifically define the use of such objects (i.e. indicate whether they are included in the Profile or not) and shall refer to the objects using the registered name in the base standard. Profiles may, in addition to the registered name, define particular registered values associated with the name for use in the Profile.

Where registration mechanisms are not yet set up, objects of this kind shall in the meantime be maintained in an informative annex to the ISP which defines the Profile. Entry of an object into such an annex does not imply registration.

NOTE - It is for further study whether a Profile could create the requirement to register a type of object that is not already accomodated by the Registration Authority mechanism for the base standards referenced.

#### 6.3 **Principles of Profile Content**

for interworking between systems. While it adheres to the structure defined by the Basic Reference Model for OSI, it does not define the total OSI functionality of a system, but only that part relevant to the function being defined.

### 6.3.3 Main elements of a Profile Definition

The definition of a Profile shall comprise the following elements:

- a concise definition of the scope of the function for a) which the Profile is defined, and of its purpose;
- an illustration of the scenario within which the function b) is applicable; where a Profile is a member of a Group (7.2 and ISO/IEC/TR 10000-2, subclause 4.3), the scenario includes reference to the possibilities for interoperation that this provides (see also A.4.2);
- normative reference to a single set of base standards, c) including precise identification of the actual texts of the base standards being used and of any approved amendments and technical corrigenda (errata), conformance to which is identified as potentially having an impact on achieving interoperation using the Profile:
- 6.3.1 General Principles informative reference to any other relevant source Teh STANDARD<sup>#</sup>P documents; A Profile makes explicit the relationships between a set

of base standards used together (relationships which are US specifications of the application of each referenced implicit in the definitions of the base standards thembase standard, covering recommendations on the selves), and may also specify particular details of each choice of classes or subsets, and on the selection of

base standard being used. options, ranges of parameter values, etc, and refer-//standards.iteh.ai/catalog/standards/sist/292 ence to registered objects;

It follows that a Profile

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- shall restrict the choice of base standard options to a) the extent necessary to maximise the probablility of interworking between systems implementing the Profile; thus a Profile may retain base standard options as options of the Profile provided that they do not affect interworking:
- shall not specify any requirements that would contrab) dict or cause non-conformance to the base standards to which it refers:
- may contain conformance requirements which are c) 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 Principles of OSI Profile Content

An OSI Profile specifies the application of one or more OSI base standards in support of a specific requirement f) a statement defining the requirements to be observed by systems claiming conformance to the Profile, including any remaining permitted options of the referenced base standards, which thus become options of the Profile.

Interoperable systems can perform different but complementary roles (e.g. an initiator-responder or a masterslave relationship). In such a situation the Profile shall identify the separate roles which may be adopted by a system, and these shall be stated as either mandatory requirements or options of the Profile, as appropriate.

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

#### The meaning of conformance to a 6.4 Profile

#### 6.4.1 **OSI Profiles**

The concepts of static conformance, dynamic conformance and Protocol Implementation Conformance Statements (see ISO/IEC 9646 parts 1 and 2) are incorporated in the concept of Profiles.

In the context of OSI, a real system is said to exhibit conformance if it complies with the requirements of applicable OSI standards in its communication with other real systems.

4

Since OSI standards form a set of inter-related standards which combine to define behaviour of open systems in their communication, it is necessary to express conformance of real systems with reference to this set.

A Profile shall address the following two topics:

- static conformance requirements (details as given in 6.6);
- dynamic conformance requirements (details as given in 6.7);

These requirements are stated in an ISP Implementation Conformance Statement (ISPICS), using the PICS Proformas of the referenced base standards and an ISPICS Requirements List (IPRL - details as given in 8.4)

In order to conform to a Profile, a system shall perform correctly all the capabilities defined in the ISPICS as mandatory and also any options of the ISP which it claims to include. Conformance to a base standard in this context is conformance to a particular identified publication of a referenced base standard as defined in 6.3.3 (c), irrespective of however many additional technical corrigenda to it may have been published.

But a system may have the ability to operate according to several Profiles which make use of different capabilities of the same base standards, and either to negotiate between such different uses, or to be configured appropriately.

A Profile shall be defined in such a way that testing of an TR 10000-1:190° (n) in the context of the Profile. implementation of it can be carried out in the most andards/sist/ Conditional contional requirements may be made complete way possible, given the available testing methodologies.

NOTE - The subject of testing concepts and methodologies for ISPs is for further study.

### 6.4.2 Profiles for Interchange Formats and Representation

The concept of static conformance (as given in 6.6) shall be applied to Interchange Format and Representation Profiles.

Interchange Format and Representation Profiles shall include an IPRL based on a PICS-style proforma, which may vary from the PICS defined in ISO/IEC 9646 Parts 1 and 2.

For example, Office Document Architecture (ISO 8613) includes the concept of Document Application Profiles (DAPs) which define different levels of functionality. Although specifying a subset of the base standard, the DAPs still leave some options open, and it is therefore relevant to include a PICS-style proforma to allow suppliers to specify the options that have been implemented. NOTE - Work on defining the method of specifying this conformance is under way, and will be incorporated in ISO/IEC/TR 10000 when stable.

### 6.5 Conformance requirements of OSI Profiles

The conformance requirements of an OSI protocol Profile shall relate to the conformance requirements in the base standards in the following ways, based on the definitions in ISO/IEC 9646-2:

- a) **Mandatory requirements in the base standards:** these shall remain mandatory in the Profile.
- b) Conditional requirements in the base standards: these shall remain conditional in the Profile with the exception that if the condition always evaluates to True or False given the requirements of the Profile, then the status can be changed to the result obtained. (See clause C.4 for additional information).
- c) Optional requirements in the base standards: these may be changed in various ways within the profile:
  - Mandatory: support may be made mandatory.
  - Optional: support may be remain optional.

• Out of Scope: optional requirements which are not relevant to the Profile. For example, functional units of layer (n-1) which are unused by layer (n) in the context of the Profile.

• Excluded: the use of an optional feature may be prohibited in the context of the Profile. This should only be used to restrict the dynamic behaviour in terms of the transmission of protocol elements.

NOTE - Exclusion of an optional feature in a base standard should be done only with great care. An example of an appropriate situation would be when use of an optional feature would lead directly to future interoperability problems.

- d) Non-applicable features in the base standards: (i.e. those that are logically impossible, according to the base standard) these shall remain non-applicable in the Profile.
- e) **Excluded requirements in the base standards:** these shall remain excluded in the Profile.

See 8.4 for the way in which these types of conformance requirements are handled in the ISP Implementation Conformance Statement (ISPICS).

NOTE - See also Annex C for further information about the way in which these concepts may be applied in writing ISPs.

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