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# Information technology — Programming languages, their environments and system software interfaces — Guidelines for the preparation of Language-Independent Service Specifications (LISS)

*Technologies de l'information — Langues de programmation,  
leurs environnements et interfaces du logiciel d'exploitation —  
Lignes directrices pour l'élaboration de spécifications de service  
indépendantes du langage (LISS)*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

## Introduction

This Technical Report is dedicated to Brian L. Meek in grateful recognition of his leadership and vision in the development of the concepts on programming language independent specifications, and his efforts in producing a set of standards documents in this area. Without his commitment this Technical Report never would have been published.

### 0.1 Background

This Technical Report provides guidance to those writing specifications of services, and of interfaces to services, in a language-independent way, in particular as standards. It can be regarded as complementary to ISO/IEC/TR 10182, which provides guidance to those performing language bindings for such services and their interfaces.

NOTE 1 Here and throughout, “language”, on its own or in compounds like “language-independent”, means “programming language”, not “specification language” nor “natural (human) language”, unless explicitly stated.

NOTE 2 A “language-independent” service or interface specification may be expressed using either or both of a natural language like English or a formal specification language like VDM-SL or Z; in a sense, a specification might be regarded as “dependent” on (say) VDM-SL. The term “language-independent” does not imply otherwise, since it refers only to the situation where programming language(s) might otherwise be used in defining the service or interface.

The development of this Technical Report was prompted by the existence of an earlier draft IEEE Technical Report (IEEE TCOS-SCC Technical Report on Programming Language Independent Specification Methods, draft 4, May 1991). The TCOS draft was concerned with specifications of services in a POSIX systems environment, and as such contained much detailed POSIX-specific guidance; nevertheless it was clear that many of the principles, if not the detail, were applicable much more generally. This Technical Report was conceived as a means of providing such more general guidance. Because of the very different formats, and the POSIX-related detail in the TCOS draft, there is almost no direct correspondence between the two documents, except in the discussion of the benefits of a language-independent principles below. However, the spirit and principles of the TCOS draft were of great value in developing this Technical Report, and reappear herein, albeit in much altered and more general form.

NOTE 3 The TCOS draft has not in fact been published, as the result of an IEEE decision to concentrate activities in other POSIX areas.

### 0.2 Principles

Service or interface specifications that are independent of any particular language, particularly when embodied in recognized standards, are increasingly seen as an important factor in promoting interoperation and substitution of system components, and reducing dependence on and consequent limitations due to particular language platforms.

NOTE It is of course possible for a specification to be “independent” of a particular language in a formal sense, but still be dependent on it through inbuilt assumptions derived from that language which do not necessarily hold for other languages. The term “language-independent” here is meant in a much stronger sense than that, though complete independence from all inbuilt assumptions may be difficult if not impossible to achieve.

Potential benefits from language-independent service or interface specifications include:

- A language-independent interface specification specifies those requirements that are common to all language bindings to that interface, and hence provides a specification to which language bindings may conform.
- A language-independent interface specification is a re-usable component for constructing language bindings.
- A language-independent interface specification aids the construction of language bindings by providing a common reference to which all bindings can relate. Through this common reference it is possible to make use of pre-existing language bindings to language-independent standards

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for common features such as datatypes and procedure calls, and to other language-independent specifications with related concepts.

- A language-independent service or interface specification provides an abstract specification of a service in isolation from language-dependent extensions or restrictions, and hence facilitates more rigorous modelling of services and interfaces.
- Language-independent service specifications facilitate the specification of relationships between one service and another, by making it easier to relate common concepts than is generally possible when the specifications are dependent on different languages.
- A language-independent interface specification facilitates the definition of relationships between different language bindings to a common service (such as requirements for interoperability between applications based on different languages that are sharing a common service implementation), by providing a common reference specification to which all the languages can relate.
- A language-independent interface specification facilitates the definition of relations between bindings to multiple services, including the requirements on management of multiple name spaces.
- fort and resources needed to ensure compatibility and consistency of behaviour between implementations of the same service in different languages or between applications based on different languages using the same interface.