

## 14 Conformance

### 14.1 Introduction

This clause specifies conformance of:

- a) functional implementations of the SRM ([14.2](#)),
- b) exchange formats that use SRM data structures and associated data types ([14.3](#)),
- c) language bindings of the SRM API ([14.4](#)),
- d) applications that use the SRM API ([14.5](#)), and
- e) specifications that reference this International Standard ([14.6](#)).

Functional implementation and exchange format conformance are based on profiles. Profiles are defined in [Clause 12](#). Conformance of an application to a profile is defined in [14.5](#).

### 14.2 Functional implementation conformance

#### 14.2.1 Functional accuracy

The computational accuracies of SRF operations are required in determining the (degree of) conformance of functional implementations of the SRM. This clause addresses the computational accuracy requirements for SRF operations.

Computational accuracy requirements are specified as the maximum computational error for an implementation of an SRF operation over a subset of the CS domain of an SRF, termed an accuracy domain. The computational accuracy requirement does not apply to a sequence or chain of SRF operations, only to each individual SRF operation in the sequence. This clause does not directly address the software environment, performance, or resource requirements of applications or implementations that conform to profiles of this International Standard. This clause does not define the application requirements or dictate the functional content of applications that use SRM implementations.

An *accuracy domain* is a subset of the CS domain of the SRF expressed in terms of coordinate-component value constraints. Accuracy domains for all SRFs derived from the same SRFT may be conveniently specified using an accuracy domain template for that SRFT.

An *accuracy domain template* for an SRFT is a subset of the CS domain expressed in terms of coordinate-component value constraint expressions that are parameterized with SRFT parameters and/or ORM RD parameters. Substituting parameter values for a given SRF derived from the SRFT produces an accuracy domain for that SRF.

**EXAMPLE** For SRFT [TRANSVERSE MERCATOR](#), the upper and lower constraints on coordinate-component  $\lambda$  given by

$$-3,5\left(\frac{\pi}{180}\right) \leq \lambda - \lambda_{\text{origin}} \leq 3,5\left(\frac{\pi}{180}\right),$$

are dependent on the SRFT parameter  $\lambda_{\text{origin}}$ .

The *error criteria for operations on the SRFs* derived from a given SRFT are determined by an accuracy domain template specification together with a set of error bounds. Operations on the SRFs derived from the SRFT satisfy the error criteria if the error at any coordinate in the accuracy domain, determined by the accuracy domain template, is less than the error bounds for those operations.

A *computational accuracy requirement* of a profile consists of the error criteria specification for each of the SRFTs belonging to the profile. An implementation conforms to the computational accuracy requirement of a profile if, for each SRFT in the profile, each implemented operation on the SRFs derived from the SRFT satisfies the error criteria for that SRFT.

#### 14.2.2 Functional conformance

A functional implementation of the SRM *conforms* to a standardized or registered profile P, if the following conditions are satisfied:

- a) Each SRM concept instance in P shall be identified by the label and code specified for that concept instance in this International Standard or by registration; this includes, but is not limited to, ORMs, SRFTs, SRFs, SRF sets, and DSSs,
- b) The implementation shall support the data types required for the API functionality of each of the SRM concept instances in P. Additional functionality and data types may be supported by an implementation. If the implementation supports the API functionality specified in this International Standard, the methods and functions shall use the data types specified in this International Standard.
- c) The implementation shall support the full functionality of all operations defined for each SRM concept instance in P in accordance with [Clause 5](#), [Clause 6](#), and [Clause 10](#),
- d) The data types and data structures shall match the specification of the corresponding data types as defined in this International Standard,
- e) The units of measure that are used in data structures shall be as specified in this International Standard (see [4.12](#)), and
- f) The implementation shall conform to the [computational accuracy requirement](#) of profile P (see [12.2](#)).

A functional implementation of the SRM is free to exceed the required conditions of any profile to which it claims conformance. A functional implementation may support additional standardized and/or registered SRM concept instances that are not included in any profile to which it claims conformance, including ORMs, SRFTs, SRFs, SRF sets, and/or DSSs. For any supported SRFTs, a functional implementation may satisfy smaller error bounds than those specified in the computational accuracy requirements for those SRFTs.

A functional implementation that conforms to profile P satisfies an application if all of the concept instances and associated operations that the application references are included in profile P.

#### 14.3 Conformance of exchange formats

An exchange format *conforms* to a standardized or registered profile P, if the following conditions are satisfied:

- a) Each SRM concept instance in P shall be identified by the label and/or code specified for that concept instance in this International Standard or by registration; this includes, but is not limited to, ORMs, RTs, SRFTs, SRFs, SRF sets, and DSSs,
- b) The data types and data structures shall match the specification of the corresponding data types as defined in this International Standard,

- c) All data types and data structures shall be used to represent coordinates in their corresponding SRF as defined in [11.5](#), and
- d) The units of measure that are used in data structures shall be as specified in this International Standard (see [4.12](#)).

#### 14.4 Conformance of language bindings of the SRM API

A language binding of the SRM API to a programming language *conforms* to the SRM, if the following conditions are satisfied:

- a) All functions specified in [Clause 11](#), including output values and error conditions, shall be so bound as to present the specified interfaces as closely as possible given the strictures of that programming language,
- b) All data types specified in this International Standard shall be represented in that programming language,
- c) The resulting language binding shall follow the cultural conventions of that programming language, and
- d) The language binding shall provide a mapping of SRM concept instance labels to identifiers and/or constants within the language in such a manner as to maintain the symbolic names of this International Standard as closely as possible within the strictures of the programming language for which the binding is created.

Language bindings are allowed to append additional identification to the beginning or end of SRM concept instance labels as necessary to make the symbolic names corresponding to those labels unique and identifiable as part of the subject language binding.

#### 14.5 Conformance of applications that use the SRM API

An application that uses the SRM API shall be *conformant*, if the following conditions are satisfied:

- a) The use of any functionality of the SRM API by the application shall conform to the provisions of [Clause 11](#) as it applies to that functionality,
- b) Invocations of the SRM API shall pass all parameters in the required units as specified in [4.12](#), and
- c) All error messages received from the API shall be processed as required by this International Standard (see [11.3.1](#)).

An application conforms to a profile P if all of the concept instances and associated operations included in profile P are fully supported by the application.

If an application conforms to a profile P, it can use any functional implementation of the SRM that also conforms to profile P.

#### 14.6 Conformance of specifications that reference this International Standard

Specifications that reference this International Standard shall also use the data types specified in this International Standard (see [11.5](#)).

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