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Australian/New Zealand Standard™

**Geographic information—Schema for  
coverage geometry and functions**



## **AS/NZS ISO 19123:2006**

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**OF**  
**AS/NZS ISO 19123:2006**  
**Geographic information—Schema for coverage geometry and functions**

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Australian/New Zealand Standard™

**Geographic information—Schema for  
coverage geometry and functions**

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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT-004, Geographical Information/Geomatics.

The objective of this Standard is to provide systems users and designers with definitions of conceptual schema for the spatial characteristics of coverages.

This Standard is identical with, and has been reproduced from ISO 19123:2005, *Geographic information—Schema for coverage geometry and functions*.

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| <i>Reference to International Standard</i>                         | <i>Australian/New Zealand Standard</i>                             |
|--|--|
| ISO  | AS/NZS ISO   |
| TS 19103 Geographic information—<br>Conceptual schema language     | 19103 Geographic information—<br>Conceptual schema language        |
| 19107 Geographic information—Spatial<br>schema                     | 19107 Geographic information—Spatial<br>schema                     |
| 19108 Geographic information—<br>Temporal schema                   | 19108 Geographic information—Temporal<br>schema                    |
| 19109 Geographic information—Rules for<br>application schema       | 19109 Geographic information—Rules for<br>application schema       |
| 19111 Geographic information—Spatial<br>referencing by coordinates | 19111 Geographic information—Spatial<br>referencing by coordinates |
| 19115 Geographic information—Metadata                              | 19115 Geographic information—Metadata                              |

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex to which they apply. A ‘normative’ annex is an integral part of a Standard, whereas an ‘informative’ annex is only for information and guidance.

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## INTRODUCTION

Geographic phenomena fall into two broad categories — discrete and continuous. Discrete phenomena are recognizable objects that have relatively well-defined boundaries or spatial extent. Examples include buildings, streams and measurement stations. Continuous phenomena vary over space and have no specific extent. Examples include temperature, soil composition and elevation. A value or description of a continuous phenomenon is only meaningful at a particular position in space (and possibly time). Temperature, for example, takes on specific values only at defined locations, whether measured or interpolated from other locations.

These concepts are not mutually exclusive. In fact, many components of the landscape may be viewed alternatively as discrete or continuous. For example, a stream is a discrete entity, but its flow rate and water quality index vary from one position to another. Similarly, a highway can be thought of as a feature or as a collection of observations measuring accidents or traffic flow, and an agricultural field is both a spatial object and a set of measurements of crop yield through time.

Historically, geographic information has been treated in terms of two fundamental types called vector data and raster data.

“Vector data” deals with discrete phenomena, each of which is conceived of as a feature. The spatial characteristics of a discrete real-world phenomenon are represented by a set of one or more geometric primitives (points, curves, surfaces or solids). Other characteristics of the phenomenon are recorded as feature attributes. Usually, a single feature is associated with a single set of attribute values. ISO 19107:2003 provides a schema for describing features in terms of geometric and topological primitives.

“Raster data”, on the other hand, deals with real-world phenomena that vary continuously over space. It contains a set of values, each associated with one of the elements in a regular array of points or cells. It is usually associated with a method for interpolating values at spatial positions between the points or within the cells. Since this data structure is not the only one that can be used to represent phenomena that vary continuously over space, this International Standard uses the term “coverage,” adopted from the Abstract Specification of the Open GIS Consortium [1], to refer to any data representation that assigns values directly to spatial position. A coverage is a function from a spatial, temporal or spatiotemporal domain to an attribute range. A coverage associates a position within its domain to a record of values of defined data types.

In this International Standard, coverage is a subtype of feature. A coverage is a feature that has multiple values for each attribute type, where each direct position within the geometric representation of the feature has a single value for each attribute type.

Just as the concepts of discrete and continuous phenomena are not mutually exclusive, their representations as discrete features or coverages are not mutually exclusive. The same phenomenon may be represented as either a discrete feature or a coverage. A city may be viewed as a discrete feature that returns a single value for each attribute, such as its name, area and total population. The city feature may also be represented as a coverage that returns values such as population density, land value or air quality index for each position in the city.

A coverage, moreover, can be derived from a collection of discrete features with common attributes, the values of the coverage at each position being the values of the attributes of the feature located at that position. Conversely, a collection of discrete features can be derived from a coverage, each discrete feature being composed of a set of positions associated with specified attribute values.



## AUSTRALIAN/NEW ZEALAND STANDARD

# Geographic information — Schema for coverage geometry and functions

## 1 Scope

This International Standard defines a conceptual schema for the spatial characteristics of coverages. Coverages support mapping from a spatial, temporal or spatiotemporal domain to feature attribute values where feature attribute types are common to all geographic positions within the domain. A coverage domain consists of a collection of direct positions in a coordinate space that may be defined in terms of up to three spatial dimensions as well as a temporal dimension. Examples of coverages include rasters, triangulated irregular networks, point coverages and polygon coverages. Coverages are the prevailing data structures in a number of application areas, such as remote sensing, meteorology and mapping of bathymetry, elevation, soil and vegetation. This International Standard defines the relationship between the domain of a coverage and an associated attribute range. The characteristics of the spatial domain are defined whereas the characteristics of the attribute range are not part of this standard.

## 2 Conformance

This International Standard specifies interfaces for several types of coverage objects. In addition, it supports the interchange of coverage data independently of those interfaces. Thus, it specifies two sets of conformance classes: one for implementation of the interfaces, the other for the exchange of coverage data. Each set includes one conformance class for each type of coverage specified in this International Standard (Table 1).

**Table 1 — Conformance classes**

| Conformance class                       | Subclause |
|---|-----------|
| Simple coverage interface               | A.1.1     |
| Discrete coverage interface             | A.1.2     |
| Thiessen polygon coverage interface     | A.1.3     |
| Quadrilateral grid coverage interface   | A.1.4     |
| Hexagonal grid coverage interface       | A.1.5     |
| TIN coverage interface                  | A.1.6     |
| Segmented curve coverage interface      | A.1.7     |
| Discrete coverage interchange           | A.2.1     |
| Thiessen polygon coverage interchange   | A.2.2     |
| Quadrilateral grid coverage interchange | A.2.3     |
| Hexagonal grid coverage interchange     | A.2.4     |
| TIN coverage interchange                | A.2.5     |
| Segmented curve coverage interchange    | A.2.6     |