

# ANZLIC Metadata Profile

An Australian/New Zealand Profile of AS/NZS ISO 19115:2005, *Geographic information — Metadata* (implemented using ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation*)

Version 1.1

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ANZLIC Metadata Profile: An Australian/New Zealand Profile of AS/NZS ISO 19115:2005, *Geographic information — Metadata* (implemented using ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation*)

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## Change history

Version	Date	Description of change
1.0	5 December 2006	Initial release of the document, endorsed by ANZLIC Council.
1.1	13 August 2007	ISO/TS 19139:2007 has been released since Version 1.0, references have been updated.  A change of approach to the implementation that now uses the existing ISO/TS 19139:2007 XSD for validation and uses Schematron to test the changes that the Profile makes on AS/NZS ISO 19115:2005 and the codelists.  References to a "source" attribute in the XSDs were removed.  Endorsed by ANZLIC Council.

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## Executive Overview

ANZLIC — the Spatial Information Council is the peak intergovernmental organisation providing leadership in the collection, management and use of spatial information in Australia and New Zealand. ANZLIC's role is to facilitate easy and cost effective access to the wealth of spatial data and services provided by a wide range of organisations in the public and private sectors.

### Business benefits

An organisation's information and services are valuable assets and a substantial amount of time, money and effort is invested in these assets. However, if the intended audience is unable to readily locate the information and services they seek, then the full value of those resources will not be realised. Standard resource descriptions (known as 'metadata'), conforming to the ANZLIC Metadata Profile, can be applied to each asset to help people or applications find what they need amidst the vast amount of information available.

Metadata is structured information that describes information or services. The information in the metadata enables people to find, manage, control, understand and preserve their data assets. A metadata standard improves the discoverability, utility and management of resources by adopting standard and structured descriptions, enabling organisations to improve the visibility and accessibility of their resources.

A metadata standard is a key component of an organisation's information management. By investing time and effort to provide quality and consistently structured metadata, organisations can significantly increase the return on investment of their assets.

### Maintaining metadata quality

Creating and maintaining quality metadata is a significant organisational commitment; however, it should not be seen as a major burden on resources or business processes. Organisations that conform to the ANZLIC Metadata Profile should find that the creation and maintenance of metadata becomes an integral and seamless component of their business processes.

The ANZLIC Metadata Profile will facilitate efficient access to descriptions of information resources, and in particular geographic (or spatial) data. Adoption of, and compliance with, the ANZLIC Metadata Profile will ensure a consistent approach to spatial information resources throughout Australia and New Zealand. This will help people and applications to locate resources without detailed knowledge of the data or resources being sought or an understanding of complex jurisdictional or organisational structures.

The use of standardised descriptions will enable online search engines to process queries more efficiently. This helps to ensure that people and applications conducting searches are presented with relevant and meaningful results.

Custodians of geospatial data assets will benefit as their information resources become discoverable by a much wider range of potential users, at negligible cost, than could ordinarily be found through traditional marketing and distribution channels.

**About the ANZLIC Metadata Profile**

The ANZLIC Metadata Profile adopts established Australian/New Zealand and International Standards. Widespread adoption of the Profile will facilitate interoperability within and between agencies and jurisdictions, both within the region and internationally, by providing a consistent basis for communicating information about resources.

This document provides the technical definition of the ANZLIC Metadata Profile. It is intended to provide technical experts with detailed information for software development and other technical purposes. The *ANZLIC Metadata Profile Guidelines*—a companion document to the ANZLIC Metadata Profile suitable for a more general audience—provides a more comprehensive guide to the Profile and how to implement it. To assist custodians to meet their organisational and jurisdictional obligations, the Guidelines also include information about how to upgrade existing metadata records to the ANZLIC Metadata Profile, and the Profile's relationship with the AGLS<sup>1</sup> (AS 5044, *AGLS Metadata element set*) and the New Zealand Government Locator Service (NZGLS).

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<sup>1</sup> AGLS: formerly known as the Australian Government Locator Service.

## Foreword

ANZLIC — the Spatial Information Council is the peak intergovernmental organisation providing leadership in the collection, management and use of spatial information in Australia and New Zealand. ANZLIC's role is to facilitate easy and cost effective access to the wealth of spatial data and services provided by a wide range of organisations in the public and private sectors.

ANZLIC encourages the development of consistent government policies and guidelines within Australia and New Zealand to minimise barriers to accessing resources wherever possible. ANZLIC's policies and guidelines adopt international best practice in spatial data management and are relevant to conditions found by practitioners and users of spatial information in both countries.

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies, including Standards Australia and Standards New Zealand. The ISO Technical Committee for Geographic information/Geomatics (known as ISO/TC211) has prepared a suite of International Standards for geographic information. This suite of standards, often referred to as the ISO 19100 series, is being progressively adopted as Australian/New Zealand Standards.

One such standard is AS/NZS ISO 19115:2005, *Geographic information — Metadata* which provides a structure for describing resources. Another example is AS/NZS ISO 19106:2005, *Geographic information — Profiles* which provides the basis for developing profiles of one or several of the geographic information standards.

This document provides a formal description of the ANZLIC Metadata Profile which is based on AS/NZS ISO 19115:2005, *Geographic information — Metadata*. Changes introduced by ISO 19115:2003/Cor.1:2006, *Geographic information — Metadata — Technical Corrigendum 1* have also been considered. Implementation of the Profile is based on ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation*.

The document is intended for those people responsible for implementing the Profile within their organisation. It is directed at technical experts and is intended to provide them with detailed information that will be needed for software development and other technical purposes. A less technical companion document, *ANZLIC Metadata Profile Guidelines*, has been produced for a more general audience, including data custodians and metadata authors.

This document and the companion document *ANZLIC Metadata Profile Guidelines* replace the *ANZLIC Metadata Guidelines: Core metadata elements for geographic data in Australia and New Zealand* (version 2, February 2001)<sup>2</sup>.

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<sup>2</sup> ANZLIC Metadata Guidelines: Core metadata elements for geographic data in Australia and New Zealand (version 2, February 2001), viewed 16 November 2006, <<http://www.anzlic.org.au/download.html?oid=2358011755>>.

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## Introduction

Prior to an international standard for geographic metadata, ANZLIC developed metadata guidelines for use in Australia and New Zealand, the current version being *ANZLIC Metadata Guidelines: Core metadata elements for geographic data in Australia and New Zealand* (version 2, February 2001).

Since then ISO, through its Technical Committee for Geographic information/Geomatics (ISO/TC211), has published an International Standard for Metadata: ISO 19115:2003, *Geographic information — Metadata*. This standard was then reviewed by Standards Australia and Standards New Zealand, through its own technical committee (IT-004, the Australia/New Zealand equivalent of ISO/TC211), and subsequently adopted in its entirety: AS/NZS ISO 19115:2005, *Geographic information — Metadata*.

Once established as a national standard for Australia and New Zealand, organisations began developing their own metadata profiles. In order to harmonise these efforts and ensure a consistent approach to metadata in Australia and New Zealand, ANZLIC established a project to create an Australian/New Zealand metadata profile, which resulted in this document:

ANZLIC Metadata Profile: An Australian/New Zealand Profile of AS/NZS ISO 19115:2005, *Geographic information — Metadata* (implemented using ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation*)

hereafter referred to as ‘the Profile’.

When developing the Profile, the following issues arising from *ANZLIC Metadata Guidelines* (version 2) were considered:

- there were too many mandatory elements
- there were insufficient optional elements
- the guidelines were only appropriate for *datasets* and *series* and not for other resources.

In response to these issues, ANZLIC has adopted all AS/NZS ISO 19115:2005 elements in the Profile. The Profile adopts all the associated obligations and conditions for these elements, with one exception: the metadata element *fileIdentifier* is now mandatory. The Profile allows metadata to be created for any type of resource, and specifies a minimum set that must be completed. The Profile also identifies core metadata for geographic datasets.

This document is intended to be used by information system analysts and developers, and others in order to understand the basic principles and the overall requirements for standardisation of geographic information. The Profile should be read in conjunction with the following standards: AS/NZS ISO 19115:2005, ISO 19115:2003/Cor.1:2006 and ISO/TS 19139:2007.

## **ANZLIC Metadata Profile 1.1 (2007)**

Adoption of the ANZLIC Metadata Profile will promote interoperability between information communities in Australia and New Zealand, as well as the rest of the world. Implementation of the Profile will:

- provide data producers with appropriate information to consistently record the characteristics of their resources
- facilitate the organisation and management of metadata
- enable users to apply geographic data in the most effective way by knowing their basic characteristics
- facilitate data discovery, retrieval and re-use: within the context of appropriate digital infrastructure, applications will be able to locate, evaluate, access, and transact resources that have been described with well structured and encoded metadata
- enable users to assess whether a resource is suitable for their intended purpose.

## 1 Scope

The ANZLIC Metadata Profile defines the appropriate content of metadata for resources and how this metadata will be implemented throughout Australia and New Zealand. The Profile has been derived from the base standard: AS/NZS ISO 19115:2005, *Geographic information — Metadata* (including changes made in ISO 19115:2003/Cor.1:2006, *Geographic information — Metadata — Technical Corrigendum 1*).

Implementation of the Profile is based on ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation*. Information about the XML documents required to implement the Profile is provided at Annex C.

Once a registration process has been established, it is intended that the ANZLIC Metadata Profile will be registered with the appropriate body in accordance with AS/NZS ISO 19135:2006, *Geographic information — Procedures for item registration*.

The Profile can be used when creating metadata records that provide information about the identification, spatial and temporal extent, quality, application schema, spatial reference system, and distribution of digital geographic data. The Profile is applicable to cataloguing datasets, clearinghouse activities, and the full description of geographic and non-geographic resources.

It is important to note that while primarily used to describe digital geographic data, the Profile is not restricted to only describing such resources. Other resources that can be described include maps, charts, textual documents and non-geographic resources. The Profile allows the description of resources, including those resources itemised in the code list *MD\_ScopeCode* <<Codelist>> (B.5.25, Annex B, AS/NZS ISO 19115:2005), namely: *attribute*, *attributeType*, *collectionHardware*, *collectionSession*, *dataset*, *series*, *nonGeographicDataset*, *dimensionGroup*, *feature*, *featureType*, *propertyType*, *fieldSession*, *software*, *service*, *model* and *tile*. This code list is not limited to these resources and can be extended to include additional resources if required.

The Profile defines:

- mandatory and conditional metadata sections, metadata entities, and metadata elements
- the minimum set of metadata elements for any resource in order to conform to the Profile
- the core metadata for geographic datasets
- optional metadata elements that allow for a more extensive standard description of resources
- the option to extend the Profile to cater for specialised needs.

## ANZLIC Metadata Profile 1.1 (2007)

Implementation of the Profile is based on ISO/TS 19139:2007, including:

- use of the ISO/TS 19139:2007 XSDs
- XML documents containing dictionaries to implement the AS/NZS ISO 19115:2005 code lists (XML data dictionaries of the ISO 19115:2003 code lists in GML format)<sup>3</sup>
- Schematron<sup>4</sup> code to implement the AS/NZS ISO 19115:2005 conditional statements
- Schematron code to make the *fileIdentifier* mandatory
- XML data dictionaries of the ANZLIC Geographic Extent Names and Search Words<sup>5</sup>
- Schematron to validate the code list values in the XML document instances against the content of the code lists.

While the UML metadata class *ANZ\_Metadata* specialises the class *MD\_Metadata* (Figure 1), the specialisation only involves restrictions of the parent class. Hence, for the purpose of XML implementation, the *MD\_Metadata* element shall be used to support interoperability with other ISO 19100 standards for geographic information. This follows the recommendation in ISO/TS 19139:2007 Annex A.4.

ANZLIC recognises that standards are periodically reviewed and new editions published. At the time of publication, ANZLIC identified the following events as triggers for future reviews of the Profile:

- publication of ISO 19115-2: \_\_\_\_, *Geographic information — Metadata — Part 2: Extensions for imagery and gridded data*<sup>6</sup>
- review of ISO 19115:2003, *Geographic information — Metadata* that should occur in 2008
- changes to ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation* as a result of the proposed new work item to update this Standard.
- implementation of AS/NZS ISO 19119:2006, *Geographic information — Services*
- publication of ISO 19119:2005/DAmD 1, *Geographic information — Services — Amendment 1: Extensions of the service metadata model*
- changes to any relevant standard in the ISO 19100 series.

<sup>3</sup> Available on the ISO/TC 211 website, <http://www.isotc211.org/>

<sup>4</sup> Schematron: a rules-based schema language for XML. It establishes requirements for Schematron schemas and specifies when an XML document matches the patterns specified by a Schematron schema (refer to ISO/IEC 19757-3:2006, *Document Schema Definition Languages (DSDL) — Part 3: Rule-based validation — Schematron*).

<sup>5</sup> Reference to values from the ANZLIC lists do not appear using the code-list syntax utilised for the ISO 19115:2003 code lists

<sup>6</sup> At the time of publication, ISO 19115-2 had been approved as a Draft International Standard.

## 2 Conformance

### 2.1 Conformance of the Profile with standards

The ANZLIC Metadata Profile comprises all elements of AS/NZS ISO 19115:2005. The Profile also adopts all associated obligations and conditions for these elements, with one exception: the metadata element *fileIdentifier* is now mandatory.

The metadata element *fileIdentifier* has been extended to apply a more stringent metadata obligation. The extension (referred to as *ANZ\_Metadata*) has changed the obligation of *fileIdentifier* from optional to mandatory. This will facilitate implementation and management of metadata records by allowing instances of duplicate metadata records to be identified and defining the relationship of a child metadata record with its parent metadata record.

Based on the above definition of the ANZLIC Metadata Profile, and in accordance with AS/NZS ISO 19106:2005, the Profile meets the requirements of conformance class 1<sup>7</sup>. The Profile is a subset<sup>8</sup> of AS/NZS ISO 19115:2005 and includes an extension in the context permitted by the base standard<sup>9</sup>.

ANZLIC has determined that the metadata element *parentIdentifier* be included as core metadata for geographic datasets. If a dataset metadata record has a parent metadata record then this element becomes mandatory and therefore should be considered a 'core' element.

This document also provides direction at Annex C on how the ANZLIC Metadata Profile shall be implemented using XML documents.

### 2.2 Conformance to the Profile

Any metadata claiming conformance to the Profile shall:

- have content according to the data dictionary definitions in Annex B (AS/NZS ISO 19115:2005, including changes required by ISO 19115:2003/Cor.1:2006) with the exception of the metadata element *fileIdentifier* which has a mandatory obligation
- prove conformance by validating XML document instances against the ANZLIC Metadata Profile schemas which are available on the ANZLIC website at <http://www.anzlic.org.au/>.

### 2.3 Profiles based on the Profile

Organisations and Communities of Practice throughout Australia and New Zealand are encouraged to adopt the Profile and, if necessary, develop a profile of the Profile in accordance with AS/NZS ISO 19106:2005 and AS/NZS ISO 19115:2005. In doing so, the resultant profile shall provide an XSL that can translate the XML document instances of that profile into the ANZLIC Metadata Profile XML format. These resulting XML document instances shall be validated using the ISO/TS 19139:2007 XSDs and the ANZLIC Metadata Profile Schematron.

<sup>7</sup> The ANZLIC Metadata Profile complies with conformance class 1 as described at Section 2 *Conformance* and Appendix B.3 *Example of a profile with specialisations* (AS/NZS ISO 19106:2005).

<sup>8</sup> A profile of a single base standard can include a subset, which is equivalent to the entire base standard. That is, a subset can equal the whole (AS/NZS 19106:2005, p15).

<sup>9</sup> This conforms to the rules included at Annex C.6 (AS/NZS ISO 19115:2005).

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### 3 Normative references

The following referenced documents are essential for the application of this document. Australian/New Zealand Standards are cited in preference to the equivalent International Standard in the first instance. International Standards are cited where they are yet to be adopted by Australia/New Zealand. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including amendments) applies.

#### 3.1 Profile definition

The following documents were the references used to define the ANZLIC Metadata Profile:

- AS/NZS ISO 19115:2005, *Geographic information — Metadata*
- ISO 19115:2003/Cor.1:2006, *Geographic information — Metadata — Technical Corrigendum 1*
- ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation.*

#### 3.2 Creation and registration of the Profile

The following documents were the references used to create the ANZLIC Metadata Profile and inform the process for registration:

- AS/NZS ISO 19106:2005, *Geographic information — Profiles*
- Clause C.6 *Rules for creating a profile* (Annex C, AS/NZS ISO 19115:2005)
- ISO/IEC Directives, Part 2: *Rules for the structure and drafting of International Standards*
- AS/NZS ISO 19135:2006, *Geographic information — Procedures for item registration*
- Annex A (normative) *Abstract Test Suite (ISO/TS 19139:2007) including conformance requirements for constraints, extensions and restrictions*

NOTE Please note that the above Standards are subject to change. To maintain their currency, all Standards are periodically reviewed and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Information about International and joint Australian/New Zealand Standards can be found by visiting the Standards Australia web site at <http://www.standards.com.au> or the Standards New Zealand web site at <http://www.standards.co.nz> and looking up the relevant Standard in the online catalogue.

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## 4 Terms and definitions

For the purpose of this document, the following terms and definitions apply. All definitions have been sourced from established Standards.

### 4.1

#### **base standard**

ISO geographic information standard or other information technology standard that is used as a source from which a profile may be constructed

[AS/NZS ISO 19106:2005]

### 4.2

#### **code list**

value domain including a code for a permissible value

[ISO 19136<sup>10</sup>]

### 4.3

#### **dataset**

identifiable collection of data

NOTE A dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically a dataset may be as small as a single feature or feature attribute contained within a larger dataset. A hardcopy map or chart may be considered a dataset.

[AS/NZS ISO 19115:2005]

### 4.4

#### **dataset series**

a collection of datasets sharing the same product specification

[AS/NZS ISO 19115:2005]

### 4.5

#### **feature**

abstraction of real world phenomena

[AS/NZS ISO 19101:2003]

### 4.6

#### **geographic information**

information concerning phenomena implicitly or explicitly associated with a location relative to the Earth

[AS/NZS ISO 19101:2003]

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<sup>10</sup> At the time of publication, ISO 19136 had been approved for publication.

#### **4.7**

##### **metadata**

data about data

[AS/NZS ISO 19115:2005]

#### **4.8**

##### **metadata element**

discrete unit of metadata

NOTE 1 Metadata elements are unique within a metadata entity.

NOTE 2 Equivalent to an attribute in UML terminology.

[AS/NZS ISO 19115:2005]

#### **4.9**

##### **metadata entity**

set of metadata elements describing the same aspect of data

NOTE 1 May contain one or more metadata entities.

NOTE 2 Equivalent to a class in UML terminology.

[AS/NZS ISO 19115:2005]

#### **4.10**

##### **metadata section**

subset of metadata which consists of a collection of related metadata entities and metadata elements

NOTE Equivalent to a package in UML terminology.

[AS/NZS ISO 19115:2005]

#### **4.11**

##### **profile**

set of one or more base standards or subsets of base standards, and, where applicable, the identification of chosen clauses, classes, options and parameters of those base standards, that are necessary for accomplishing a particular function.

[AS/NZS ISO 19106:2005]

NOTE A profile is derived from base standards so that by definition, conformance to a profile is conformance to the base standards from which it is derived.

#### **4.12**

##### **resource**

asset or means that fulfils a requirement

EXAMPLE Dataset, service, document, person or organisation.

[AS/NZS ISO 19115:2005]

## 5 Abbreviated terms

The following abbreviated terms have been referred to in this document.

ANZLIC	ANZLIC—the Spatial Information Council (formerly known as the Australia New Zealand Land Information Council)
AS/NZS	Australian/New Zealand Standard
DIS	Draft International Standard
GML	Geography Markup Language
FDIS	Final Draft International Standard
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ISO/TC211	ISO Technical Committee for Geographic information/Geomatics
IT-004	Standards Australia/Standards New Zealand Technical Committee for Geographic information/Geomatics (Australian/New Zealand equivalent of ISO/TC211)
TS	Technical Specification
UML	Unified Modelling Language
XML	eXtensible Markup Language
XSD	World Wide Web Consortium XML Schema Definition
XSL	eXtensible Stylesheet Language
XLink	XML Linking Language

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## 6 Requirements

### 6.1 Metadata for describing geographic data and other resources

The Profile identifies the metadata required to describe digital geographic data and other types of resources. Metadata is applicable to independent datasets, aggregations of datasets, individual geographic features and the various classes of objects that comprise a resource.

Metadata shall be implemented for the Profile by the creation of XML document instances that are validated against the ANZLIC Metadata Profile XSDs, Schematron and relevant code lists and enumerations.<sup>11</sup>

To produce a metadata record that conforms to the Profile a minimum set of metadata elements (elements that are either mandatory or become mandatory under certain conditions) must be completed for both geographic datasets and other resources (see Section 6.3). Completion of this minimum requirement will provide a baseline metadata record that will conform to the Profile.

ANZLIC has identified additional elements that will enhance the description of geographic datasets, in particular for discovery. This set of metadata, comprising the minimum metadata for geographic datasets and some additional optional elements, is referred to as core metadata for geographic datasets (see Section 6.4). ANZLIC strongly recommends completion of the core metadata for geographic datasets.

In addition to the core, the Profile encompasses a large number of other elements that may be used to describe resources in more detail. Completing these elements can aid a range of uses including evaluation of the resource's fitness for purpose, and enabling applications to discover and transact directly with a resource. ANZLIC encourages completion of as many metadata elements as possible in order to better describe the resource.

### 6.2 Obligations/conditions

An obligation/condition is a descriptor indicating whether a metadata entity or metadata element shall always be documented in the metadata or sometimes be documented (i.e. contains value(s)). This descriptor may have the following values: M (mandatory), C (conditional) or O (optional). The following definitions for these values have been sourced from B.1.5 *Obligation/Condition* (Annex B, AS/NZS ISO 19115:2005).

A **mandatory (M)** obligation means the metadata entity or metadata element shall be documented.

A **conditional (C)** obligation specifies an electronically manageable condition under which at least one metadata entity or a metadata element is mandatory. 'Conditional' is used for one of the three following possibilities:

- Expressing a choice between two or more options. At least one option is mandatory and must be documented.

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<sup>11</sup> Enumeration: a fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list (source: ISO 19136:\_\_, *Geographic information — Geography Markup Language (GML)*). At 31/7/2007, this Standard was under publication.

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- Documenting a metadata entity or a metadata element if another element has been documented.
- Documenting a metadata element if a specific value for another metadata element has been documented.

If the answer to the condition is positive, then the metadata entity or the metadata element shall be mandatory.

An **optional (O)** obligation means that the metadata entity or the metadata element may be documented or may not be documented. Optional metadata entities and optional metadata elements have been defined to provide a guide to those looking to fully document their data. (Use of this common set of defined elements will help promote interoperability among geographic data users and producers world-wide.) If an optional entity is not used, the elements contained within that entity (including mandatory elements) will also not be used. **Optional entities may have mandatory elements; those elements only become mandatory if the optional entity is used.**

### 6.3 Minimum metadata requirements

The minimum requirements for recording metadata to describe geographic datasets and other resources are those metadata elements that shall be completed in order to conform to the Profile. It should be noted that the obligation for some metadata elements is conditional and only becomes mandatory under certain conditions.

Table 1 identifies the metadata elements that shall be completed for datasets and other resources. Minimum metadata for describing geographic datasets also form part of the core metadata for geographic datasets (see Table 2).

Note that the obligations of some elements are dependent on the stated *hierarchyLevel*.

NOTE The ANZLIC Metadata Profile imposes a more stringent obligation for the metadata element *fileIdentifier* than the AS/NZS ISO 19115:2005. The obligation was made mandatory to assist with implementation of the Profile.

Table 1 — Minimum for geographic datasets and other resources

Name	Path	Datasets	Other resources
Metadata file identifier	MD_Metadata.fileIdentifier	M	M
Metadata language	MD_Metadata.language	C <sup>a</sup>	C <sup>a</sup>
Metadata character set	MD_Metadata.characterSet	C <sup>b</sup>	C <sup>b</sup>
Metadata file parent identifier	MD_Metadata.parentIdentifier	C <sup>c</sup>	C <sup>c</sup>
Metadata hierarchy level	MD_Metadata.hierarchyLevel	O <sup>d</sup>	M <sup>e</sup>
Metadata hierarchy level name	MD_Metadata.hierarchyLevelName	O <sup>f</sup>	M <sup>e, g</sup>

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<b>Name</b>	<b>Path</b>	<b>Datasets</b>	<b>Other resources</b>
Metadata contact individual name	MD_Metadata.contact > CI_ResponsibleParty.individualName	C <sup>h</sup>	C <sup>h</sup>
Metadata contact organisation	MD_Metadata.contact > CI_ResponsibleParty.organisationName	C <sup>i</sup>	C <sup>i</sup>
Metadata contact position	MD_Metadata.contact > CI_ResponsibleParty.positionName	C <sup>j</sup>	C <sup>j</sup>
Metadata contact role	MD_Metadata.contact > CI_ResponsibleParty.role > CI_RoleCode	M	M
Metadata date stamp	MD_Metadata.dateStamp	M	M
Resource title	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.title	M	M <sup>k</sup>
Resource reference date	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date > CI_Date.date	M	M <sup>k</sup>
Resource reference date type	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date > CI_Date.dateType > CI_DateTypeCode	M	M <sup>k</sup>
Abstract describing the resource	MD_Metadata.identificationInfo > MD_DataIdentification.abstract	M	M <sup>k</sup>
Resource language	MD_Metadata.identificationInfo > MD_DataIdentification.language	M	C <sup>l</sup>
Resource character set	MD_Metadata.identificationInfo > MD_DataIdentification.characterSet	C <sup>m</sup>	C <sup>m</sup>
Topic category	MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory	M	C <sup>n</sup>
Geographic location of the resource (by description)	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicDescription.geographicIdentifier > MD_Identifier.code	C <sup>o,p</sup>	O <sup>p</sup>
West longitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.westBoundLongitude	C <sup>o,p</sup>	O <sup>p</sup>
East longitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.eastBoundLongitude	C <sup>o,p</sup>	O <sup>p</sup>
South latitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.southBoundLatitude	C <sup>o,p</sup>	O <sup>p</sup>
North latitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.northBoundLatitude	C <sup>o,p</sup>	O <sup>p</sup>

a language: documented if not defined by the encoding process

b characterSet: documented if ISO 10646-1, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)* is not used and not defined by the encoding process

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- c parentIdentifier: documented if the hierarchy of a higher level exists
- d hierarchyLevel: assumed to be 'dataset' if MD\_Metadata.hierarchyLevel is omitted
- e hierarchyLevel: documented if hierarchyLevel not = 'dataset'
- f hierarchyLevelName: assumed to be 'dataset' if MD\_Metadata.hierarchyLevelName is omitted
- g hierarchyLevelName: documented if hierarchyLevel not = 'dataset'
- h individualName: documented if 'organisationName' and 'positionName' not documented
- i organisationName: documented if 'individualName' and 'positionName' not documented
- j positionName: documented if 'individualName' and 'organisationName' not documented
- k MD\_ServiceIdentification may be used instead of MD\_DataIdentification if hierarchyLevel = 'service'
- l only used if MD\_DataIdentification has been used
- m characterSet: documented if ISO 10646-1 is not used
- n topicCategory: if hierarchyLevel = 'series' topicCategory is mandatory
- o for a geographic dataset, include metadata for the geographic bounding box (West longitude, East longitude, South latitude and North latitude) or the geographic description identifier (ANZLIC prefers the use of geographic bounding box — see Section 6.5.3)
- p if any one of west longitude, east longitude, south latitude or north latitude exists, then the remaining three must also be completed

### 6.4 Core metadata for geographic datasets

AS/NZS ISO 19115:2005 defines an extensive set of metadata elements; though typically only a subset of the full number of elements is used. It is essential that a minimum number of metadata elements be maintained for a dataset (Table 1); however, when describing geographic datasets, ANZLIC recommends the use of metadata in addition to the minimum requirements for geographic datasets. This set of metadata, which includes the minimum set of metadata and some additional optional elements, is referred to as core metadata. Table 2 lists the core metadata required to describe a *dataset*, typically for catalogue purposes. This list contains metadata answering the following questions:

- 'Does a dataset on a specific topic exist ("what")?'
- 'For a specific place ("where")?'
- 'For a specific date or period ("when")?'
- 'A point of contact to learn more about or order the dataset ("who")?'

By using the core metadata recommended in the Profile interoperability will be enhanced, allowing users to understand without ambiguity the geographic data and the related metadata provided by either the producer or the distributor. Additional metadata elements provided by either the producer or the distributor also allow users to more clearly evaluate the characteristics of geographic datasets.

Table 2 — Core metadata for geographic datasets

Name	Path	Obligation
Metadata file identifier	MD_Metadata.fileIdentifier	M <sup>a</sup>
Metadata language	MD_Metadata.language	C <sup>b</sup>
Metadata character set	MD_Metadata.characterSet	C <sup>c</sup>



Name	Path	Obligation
Metadata file parent identifier	MD_Metadata.parentIdentifier	C <sup>d</sup>
Metadata point of contact	MD_Metadata.contact > CI_ResponsibleParty	M
Metadata date stamp	MD_Metadata.dateStamp	M
Metadata standard name	MD_Metadata.metadataStandardName	O
Metadata standard version	MD_Metadata.metadataStandardVersion	O
Dataset title	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.title	M
Dataset reference date	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date	M
Abstract describing the data	MD_Metadata.identificationInfo > MD_DataIdentification.abstract	M
Dataset responsible party	MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty	O
Spatial representation type	MD_Metadata.identificationInfo > MD_DataIdentification.spatialRepresentationType	O
Spatial resolution of the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.spatialResolution > MD_Resolution.distance or MD_Resolution.equivalentScale	O <sup>e</sup>
Dataset language	MD_Metadata.identificationInfo > MD_DataIdentification.language	M
Dataset character set	MD_Metadata.identificationInfo > MD_DataIdentification.characterSet	C <sup>f</sup>
Dataset topic category	MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory	M
Geographic location of the dataset (by four coordinates or by description)	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox or EX_GeographicDescription	C <sup>g, h</sup>
Temporal extent information for the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.temporalElement	O
Vertical extent information for the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.verticalElement > EX_VerticalExtent	O
Lineage	MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage	O
Reference system	MD_Metadata.referenceSystemInfo > MD_ReferenceSystem.referenceSystemIdentifier > RS_Identifier	O

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Name	Path	Obligation
Distribution Format	MD_Metadata.distributionInfo > MD_Distribution > MD_Format	O
On-line resource	MD_Metadata.distributionInfo > MD_Distribution > MD_DigitalTransferOption.onLine > CI_OnlineResource	O

- a the Profile imposes a mandatory obligation on the metadata element *fileIdentifier*
- b language: documented if not defined by the encoding process
- c characterSet: documented if ISO 10646-1, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)* is not used and not defined by the encoding process
- d documented if a higher level of hierarchy level exists (e.g. if the geographic 'dataset' is part of a 'series')
- e distance is preferred over *equivalentScale* because the scale will change when presented at different sizes on a screen
- f characterSet: documented if ISO 10646-1 is not used
- g include either the geographic bounding box (*extents*) or the geographic description (ANZLIC prefers the use of geographic bounding box — see Section 6.5.3)
- h if any one of west longitude, east longitude, south latitude or north latitude exists, then the remaining three must also be completed

Source: Adapted from Table 3 — *Core metadata for geographic datasets* (AS/NZS ISO 19115:2005).

## 6.5 Variations and preferences

### 6.5.1 Metadata element *fileIdentifier*

The obligation for the metadata element *fileIdentifier* is 'optional' in AS/NZS ISO 19115:2005. The ANZLIC Metadata Profile applies a more stringent obligation and defines an extension to make the obligation 'mandatory'. ANZLIC recommends the use of the UUID (Universally Unique Identifier) for the *fileIdentifier*.

This extension was necessary to support linkage between parent and child metadata records. The content of the child's *parentIdentifier* element is the same as the content of the parent's *fileIdentifier* element, thus supporting the hierarchical relationship between metadata records.

The *fileIdentifier* can also be used to identify duplicate copies of metadata records. If there is a difference between the two metadata records then one can determine the appropriate version by the content of other elements in the metadata record. The authoritative metadata record should be the only one made publicly available in metadata search systems such as a catalogue service.

### 6.5.2 Metadata element *parentIdentifier*

In the Profile the metadata element *parentIdentifier* (conditional obligation) has been included as a core metadata element for describing geographic datasets. Under certain conditions this metadata element is mandatory. For instance, in some cases dataset metadata may be part of a dataset series. As such it is possible for the dataset metadata to have a *parentIdentifier* record.

### 6.5.3 Geographic extent of the dataset

The AS/NZS ISO 19115:2005 condition for spatial extent determines that if the *hierarchyLevel* is 'dataset' then either the geographic bounding box or the geographic description is mandatory. To make spatial searches more effective,

ANZLIC prefers that the extent be described as a geographic bounding box in preference to a geographic description. Completing only the geographic description code may not satisfy the needs of spatial searches as the extent could be ambiguous (e.g. 'Australia' could mean the mainland only or include all external territories) or meaningless (e.g. a numeric code is used, such as '001').

#### 6.5.4 Metadata extension information

The *ANZ\_Metadata* class specialises the *MD\_Metadata* class, restricting the obligation of *fileIdentifier* from optional to mandatory. Tables 3 and 4 provide relevant information about the extension for *ANZ\_Metadata*. A modified UML diagram is provided at Annex A, the modified values for the data dictionary are provided at Annex B (Table 5 — *Modifications to data dictionary AS/NZS ISO 19115:2005*).

Table 3 — Metadata extension for *ANZ\_Metadata*

MD_MetadataExtensionInformation		
MD_MetadataElementInformation		
name	ANZ_Metadata	
shortName	ANZMetadata	
definition	ANZLIC Metadata Profile of MD_Metadata	
obligation	Mandatory	
condition		
dataType	specifiedClass	
maximumOccurrence	1	
domainValue		
parentEntity	MD_Metadata	
rule	New class	
rationale	Extension of MD_Metadata to include change of obligation to <i>fileIdentifier</i>	
Source	organisationName	ANZLIC—the Spatial Information Council
	role	owner

Table 4 — Metadata extension for the metadata element *fileIdentifier*

MD_MetadataExtensionInformation		
MD_MetadataElementInformation		
name	fileIdentifier	
shortName	mdFileId	
definition	Existing AS/NZS ISO 19115:2005 element (2)	
obligation	mandatory	
condition		
dataType	characterString	
maximumOccurrence	1	
domainValue	free text	
parentEntity	ANZ_Metadata	
rule	Change obligation to mandatory	
rationale	To ensure a file identifier is always entered	
Source	organisationName	ANZLIC—the Spatial Information Council

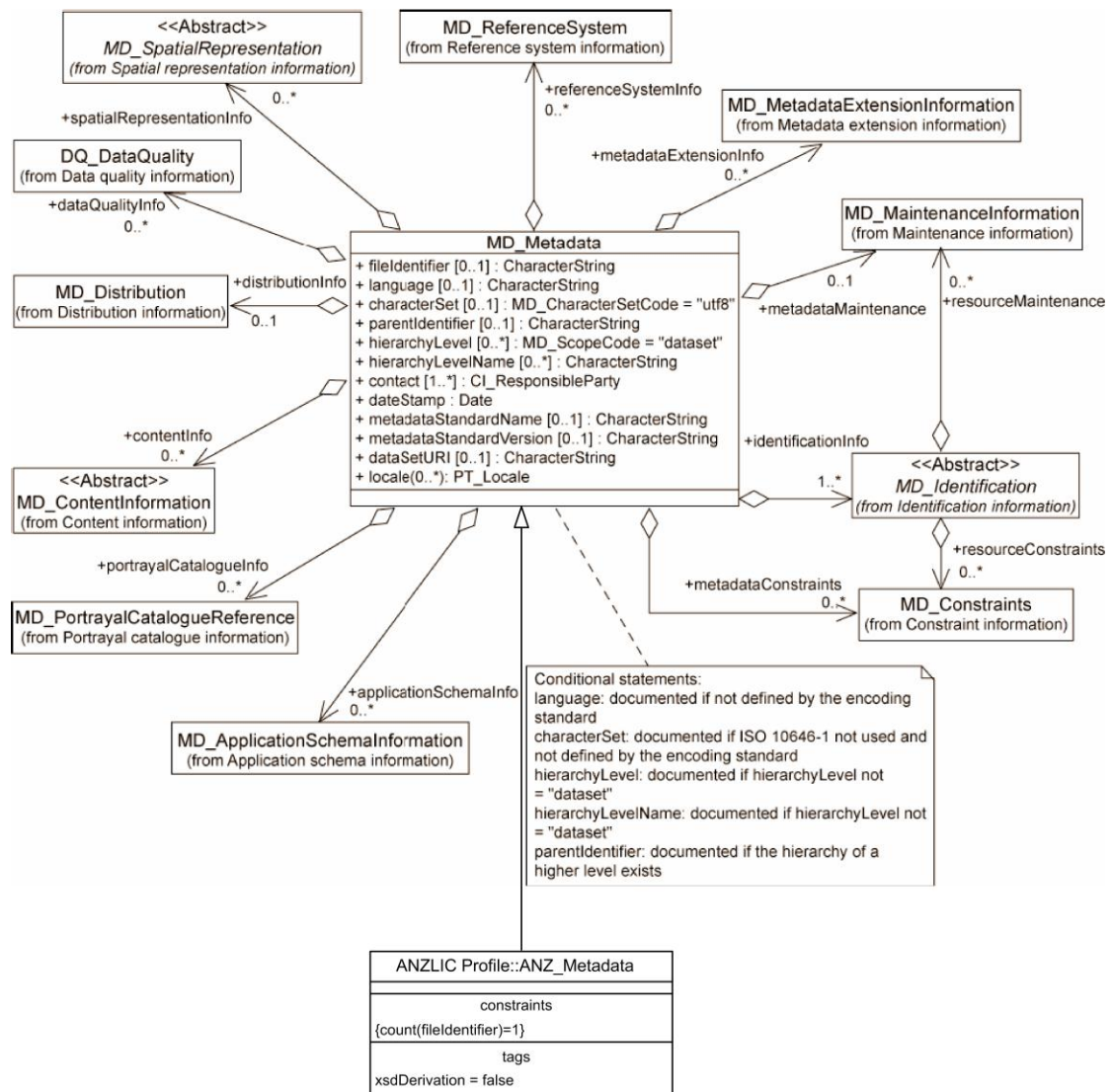
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	<b>role</b>	owner
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**Annex A. Metadata entity set information (normative)**

The structure of metadata included in the ANZLIC Metadata Profile is defined in reference to UML diagrams that identify metadata packages and classes included at Annex A of AS/NZS ISO 19115:2005 (and further modified by Technical Corrigendum 1 ISO 19115:2003/Cor.1:2006).

The new class *ANZ\_Metadata* shows the relationship to *MD\_Metadata* and its related metadata classes (Figure 1). For the purpose of the ANZLIC Metadata Profile Figure 1 — *Metadata entity set information* replaces the equivalent diagram Figure A.1 in AS/NZS ISO 19115:2005.



Source: Adapted from Figure A.1 in AS/NZS ISO 19115:2005 and ISO 19115:2003/Cor.1:2006.<sup>12</sup>

**Figure 1 — Metadata entity set information**

<sup>12</sup> Note: In ISO 19115:2003/Cor.1:2006, there is a discrepancy between the use of "locale" in the UML diagram (Figure A.1) and element 11.2 "locate" in Table B.2.1. The word "locale" in MD\_Metadata shown here (Figure 1) is the correct reference. This comment will be forwarded to ISO for correction.

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## Annex B. Data dictionary (normative)

The data dictionary in Annex B of AS/NZS ISO 19115:2005 (and further modified by ISO 19115:2003/Cor.1:2006) describes the characteristics of the metadata identified in the UML package diagrams included at Annex A of the same.

Modifications to the data dictionary, required to recognise the extension to the metadata element *fileIdentifier* that was introduced in the Profile, are included at Table 5. The information contained in this table replaces, or is in addition to, that provided at B.2.1, Annex B, AS/NZS ISO 19115:2005 and ISO 19115:2003/Cor.1:2006.

Table 5 — Modifications to data dictionary AS/NZ ISO 19115:2005

	Name / Role name	Short Name	Definition	Ob	Max Occ	Data type	Comment
1	MD_Metadata	Metadata	root entity which defines metadata about a resource or resources	M	1	Class	See B.2.1, Annex B, AS/NZS ISO 19115:2005
1.1	ANZ_Metadata	ANZMetadata	root entity which defines metadata about a resource or resources	M	1	Class	Specialises <i>MD_Metadata</i> class
2	fileIdentifier	mdFileID	unique identifier for this metadata file	M	1	CharacterString	Free text (changed obligation from optional to mandatory)

**Ob** = Obligation / Condition

**Max Occ** = Maximum occurrence

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## Annex C. Metadata implementation (normative)

### C.1 Background

AS/NZS ISO 19115:2005 defines the content of a set of metadata elements, their definitions, data types and inherent dependencies. The logical model of the metadata specifies the content and not the form of implementation or the form of presentation. A primary goal in the management of metadata for resources is the ability to access the metadata and the related resource it describes. This requires software implementations using common encoding methods to achieve operational use of the metadata.

It is necessary to implement the Profile in order to prove compliance. ISO/TS 19139:2007 is an XML schema implementation of ISO 19115:2003 and can be used to prove partial compliance to ISO 19115:2003. ISO/TS 19139:2007 does not fully implement ISO 19115:2003<sup>13</sup>. The XML documents provided by ANZLIC allow full implementation of AS/NZS ISO 19115:2005. ANZLIC has also developed XML documents to allow the implementation of the ANZLIC Metadata Profile. The ISO/TS 19139:2007 XSDs have been used for this implementation. Schematron has been used to further validate the content of XML document instances against the Profile.

The XML documents consist of:

- ISO/TS 19139:2007 XSDs,
- Schematron code to implement the AS/NZS ISO 19115:2005 conditional statements
- Schematron code to implement the Profile by making the *fileIdentifier* mandatory
- Schematron to validate the code list entries against the code lists.
- GML XML document instances for each of the ANZLIC Geographic Extent Name category lists and the ANZLIC Search words so they can be registered according to AS/NZS ISO 19135:2006 and be referenced from XML metadata document instances.

Proof of compliance to the ANZLIC Metadata Profile will be via validation of the XML document instances against the ISO/TS 19139:2007 XSDs, the AS/NZS ISO 19115:2005 Schematron, the ANZLIC Metadata Profile Schematron and the Schematron that checks code list values in XML document instances against the content of code lists. Resources required to implement the Profile are available on the ANZLIC web site at <http://www.anzlic.org.au>.

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<sup>13</sup>See ISO/TS 19139:2007, Table A.1 — Conformance Rules not enforceable with XML Schema.

## **C.2 Granularity of geographic data supported**

The notion of cataloguing a set of related documents together in a discoverable series is common practice for map catalogues. With digital spatial data, the definition of what constitutes a *dataset* is more problematic and reflects the institutional and software environments of the originating organisation. Common metadata can be derived for a series of related geographic datasets, and such metadata is generally relevant or can be inherited by each of the dataset instances. Software to support this inheritance of metadata for geographic data within a cataloguing system can simplify data entry, update and reporting.

There is a potential hierarchy of reusable metadata that can be employed in implementing a metadata collection. By creating several levels of abstraction, a linked hierarchy can assist in filtering or targeting user queries to the requested level of detail. The hierarchy should not necessarily be interpreted to require multiple copies of metadata being managed online. Conversely, the definition of general metadata can be supplemented by spatially specific metadata that, when queried, either inherits or overrides the general case.

Through the use of pointers this method can reduce the redundancy of metadata managed at a site and provide for different views of the holdings by users. These 'pointers' are implemented in the ANZLIC XSDs by XLink attributes.

Dependencies between metadata document elements and elements in other metadata documents may exist, allowing inheritance of metadata between hierarchy levels. Dependencies between metadata document elements and resources from standard registers may exist, allowing re-use of standard resources without copying the content. For either purpose the dependency may be made explicit through use of the XLink attributes which are available on most property elements in the XML representation. XLink:href is used to point to the re-used resource. XLink:arcrole is used to indicate the kind of re-use. XLink:role is used to indicate the nature of the re-used resource.