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Australian STANDARD

Geographic information—Ubiquitous public access—Reference model

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Australian Bureau of Statistics
Australian Hydrographic Office
Bureau of Meteorology (Australian Government)
Curtin University of Technology
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Preface

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

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to define a reference model for ubiquitous public access (UPA) to geographic information. This reference model uses standard concepts from both the Open distributed processing reference model (RM-ODP) in ISO/IEC 10746-1 and AS/NZS ISO 19101.

The reference model specified in AS/NZS ISO 19154:2014 defines the following:

(a) conceptual models for ubiquitous public access (UPA) to geographic information;

(b) a reference model and framework to support current and future specification development in this area;

(c) the semantics of information and processing within systems and services for the UPA of geographic information;

(d) the architectural relationship between this International Standard and other ISO geographic information standards.

This Standard is identical with, and has been reproduced from, ISO 19154:2014, *Geographic information - Ubiquitous public access - Reference model.*

As this document has been reproduced from an International Standard, the following applies:

(i) In the source text 'this International Standard' should read 'this Australian Standard'.

(ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms 'normative' and 'informative' are used in Standards to define the application of the appendices or annexes to which they apply. A 'normative' appendix or annex is an integral part of a Standard, whereas an 'informative' appendix or annex is only for information and guidance.

Contents

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 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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/TC 211, *Geographic information/Geomatics*.

Introduction

Recent advances of web-based and mobile computing technologies have ushered in an era where the general public are not only consumers of content, but also act as creators or providers of new, enriched content.

One sector in particular that is experiencing rapid change and growth is that of geographic information.

“Location” in a general sense is one of the basic requirements of all mobile users. In early development, users were only “consuming” location-based content, but with ever increasingly sophisticated mobile hardware devices and the ever expanding extent of telecommunications networking and sensor web enabled infrastructure, mobile users are now able to create many types of geographic data. Creation of content can be on an individual level, using a coordinate location to enable navigation to a new café described in a blog entry, or as a collaborative effort, such as collecting GPS tracks and incorporating them into the Open Street Map project.

Smaller devices, embedded systems, wireless communication, and sensor networks (ubiquitous computing technologies) require methods of handling geographic information in terms of both production and consumption. Beyond the previously limited public consumption of geographic information, ubiquitous computing technologies provide the infrastructure for the general public to produce, distribute, and consume geographic information. These concepts are manifested as “seamless access from anywhere and at any time to easy-to-use geographic information and services”. We refer to these concepts as Ubiquitous Public Access to geographic information.

The goal of ubiquitous public access to geographic information (UPA-to-GI) is to make the user experience of any “smart” device intuitive to understand, along with being easy to use. To achieve this goal, contextual information that is gathered from varied sources is managed efficiently within the UPA architecture. Therefore, systems or services for UPA to geographic information need to support a delivery mechanism of contextual information.

This International Standard defines the requirements of standardization for systems and services supporting ubiquitous public access to geographic information, and describes a comprehensive set of fundamental facets that specify an abstract description of the elements for UPA to geographic information.

This International Standard further establishes a series of models comprised as a conceptual framework that, when implemented, will support the development of a set of systems and services for enabling ubiquitous public access to geographic information. In a UPA environment, general users are no longer only passive consumers of geographic information, but rather active participants in several steps of the data and information management lifecycle such as collection, creation and capture, and/or use and dissemination.

Ubiquitous public access to geographic information might be thought of as a type of geographic information service. However, the currently available standards used in mobile environments are based on web technologies which are not efficient enough to handle the requirements of UPA. In order to provide relevant geographic information to users, the context of the users is described.

The reference model specified here defines a group of models which form a framework that supports methods of extracting geographically explicit context information from varied information sources, such as a lexicon, photos, videos, and others sources. Additional models in the framework specify how geographic data produced and distributed by the general public can be semantically linked to meet the user’s contextual requests, and how heterogeneous geographic content can be seamlessly accessed, integrated, and provided to a user regardless of the kind of device the user operates.

Australian Standard®

Geographic information—Ubiquitous public access—Reference model

1 Scope

This International Standard defines a reference model for ubiquitous public access (UPA) to geographic information. This reference model uses standard concepts from both the Open distributed processing — Reference model (RM-ODP) in ISO/IEC 10746-1 and ISO 19101.

The reference model specified in this International Standard defines the following:

— conceptual models for ubiquitous public access (UPA) to geographic information;

— a reference model and framework to support current and future specification development in this area;

— the semantics of information and processing within systems and services for the UPA of geographic information;

— the architectural relationship between this International Standard and other ISO geographic information standards.

This International Standard is applicable to location-based services (LBS), ubiquitous computing environments, linked open data, and other domains that require a seamless public access to geographic information.

Although structured in the context of information technology and information technology standards, this International Standard is independent of any application development method or technology implementation approach.

2 Conformance

General conformance and testing requirements are defined in ISO 19105. Conformance requirements are specified in Annex A.

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 19101-1:2014, *Geographic information — Reference model — Part 1: Fundamentals*

ISO/TS 19101-2:2008, *Geographic information — Reference model — Part 2: Imagery*

ISO 19103:—[1)], *Geographic information — Conceptual schema language*

ISO 19109:—[2)], *Geographic information — Rules for application schema*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1
ambient intelligence
convergence of ubiquitous computing, ubiquitous communication, and interfaces adapting to the user

1) To be published.

2) To be published.