AS/NZS ISO 19132:2011
ISO 19132:2007

AS/NZS ISO 19132:2011

Australian/New Zealand Standard™

Geographic information—Location-based services—Reference model

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee IT-004, Geographical Information/Geomatics. It was approved on behalf of the Council of Standards Australia on 15 November 2011 and on behalf of the Council of Standards New Zealand on 14 November 2011.
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The following are represented on Committee IT-004:

ANZLIC—The Spatial Information Council
Australasian Fire and Emergency Service Authorities Council
Australian Antarctic Division
Australian Hydrographic Office
Australian Map Circle
CSIRO Exploration and Mining
Department of Lands, NSW
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Geoscience Australia
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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 define a reference model and a conceptual framework for location-based services (LBS), and describe the basic principles by which LBS applications may interoperate.

This Standard is identical with, and has been reproduced from ISO 19132:2007, *Geographic information—Location-based services—Reference model*.

As this Standard is reproduced from an International Standard, the following applies:

(i) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(ii) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

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

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
ISO		AS/NZS ISO	
19107	Geographic information—Spatial schema	19107	Geographic information—Spatial schema
19109	Geographic information—Rules for application schema	19109	Geographic information—Rules for application schema
19110	Geographic information—Methodology for feature cataloguing	19110	Geographic information—Methodology for feature cataloguing
19112	Geographic information—Spatial referencing by geographic identifiers	19112	Geographic information—Spatial referencing by geographic identifiers
19133	Geographic information—Location-based services—Tracking and navigation	19133	Geographic information—Location-based services—Tracking and navigation
19136	Geographic information—Geography Markup Language (GML)	19136	Geographic information—Geography Markup Language (GML)

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.

CONTENTS

Page

Page

Page

Figures

Page

Tables

INTRODUCTION

This International Standard establishes a framework supporting the development of location-based services (LBS). LBS are software services whose request and response pattern or values depend upon the location of some number of things, either real or conceptual. For example, tracking and navigation as defined in ISO 19133 are both location-based. Emergency response services are location-based since the requested assistance is invariably for a location fairly near the requestor at the time of the request. Environmental monitoring and remediation is dependent on the location and motion or other continuous change of the polluting agents. Even yellow-page directory services are dependent on the location, or tentative future location, of the requestor in search of a convenient business location for the acquisition of specific goods or services, either near his current location or his planned route.

A reference model is a conceptual framework consisting of a set of system decisions, both architectural and policy, which construct the logical environment for a set of applications and processes within a specific domain. A framework contains or references a taxonomy of terms and an ontology that defines the target domain. A framework can contain or reference other frameworks for related application sets or design paradigms. An LBS framework may relate to a framework of geographic information services, since much of its activity is associated to manipulation of location representations and the use of location as a key to other services. Models for frameworks exist at a variety of levels of abstraction, each of which is a generalization of the more detailed model, and a specialization of the more general ones. At the highest level, the only entities are the frameworks representing their respective reference models. This is illustrated in Figure 1.

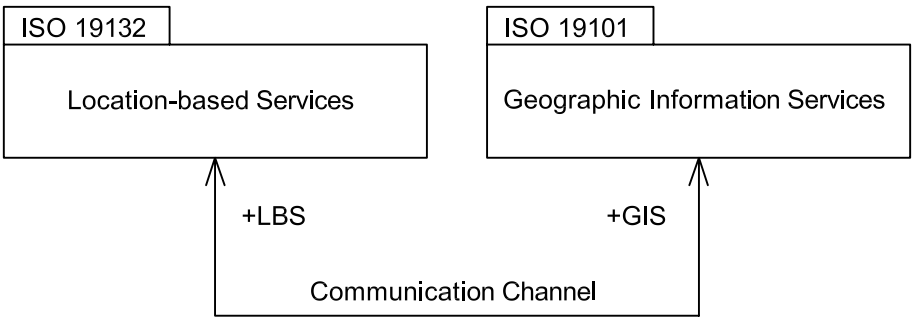

Figure 1 — Relation between LBS and GIS

What this says, in its simplest and most direct terms, is that the two frameworks are coupled and, depending on form more than on functionality, each will invoke services (functions) supplied by the other. This International Standard deals with the communication across the channel depicted in Figure 1. It does so by creating a reference model for the location-based services framework and linking it to the reference model defined in ISO 19101 and ISO/TS 19101-2.

A distinction between an LBS service [1)] and a GIS service [2)] is that LBS will normally have a larger granularity and significant non-spatial information component, and therefore is able to interact with both geographic data

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1) The term “LBS” includes the word “service”, and so the phrase “LBS service” is logically redundant. When discussing LBSs in relation to other software components, the phrase “LBS service” can be used to maintain symmetry of expression. While logically inconsistent, this is grammatically and poetically acceptable.

2) It would be useful to redefine GIS as “geographic information service”, but past attempts to override the definition of “geographic information system” with “geographic information science” have not proven very fruitful. In this International Standard, all software components are viewed as services, and so mentions of “GIS” will be taken as “service implementation of GIS functionality”.

frameworks and with general information frameworks containing non-spatial data. Such data may be spatially linked in manners not traditionally used in geographic systems, such as by postal address or telephone number. Another distinction is that LBS services have to deal with the delivery mechanism at a finer level than GIS frameworks. LBS clients are likely to include mobile devices on a multitude of network types, and with a wide variety of capabilities. Thus, an LBS framework supports the same services through a variety of different interface protocols, each tailored for a class of client needs and capabilities. While the details of each client device's interface protocols are beyond the scope of this International Standard, it does address the common semantics of all of the LBS client classes by defining a set of common patterns that provide extensible templates for applications within this domain.

Two of the annexes included in this International Standard are there to highlight the harmonization issue as the LBS domain develops. Organizations that develop standards in LBS need to be aware of other activities. Annex D lists some of the important standards development organizations. Annex E is a crosswalk between common terminology in the geographic information and the intelligent transport system domains. Crosswalks between common terminologies of differing domains are important for semantic interoperability. ITS is used only as an example of one crosswalk.

AUSTRALIAN/NEW ZEALAND STANDARD

Geographic information—Location-based services—Reference model

1 Scope

This International Standard defines a reference model and a conceptual framework for location-based services (LBS), and describes the basic principles by which LBS applications may interoperate. This framework references or contains an ontology, a taxonomy, a set of design patterns and a core set of LBS service abstract specifications in UML. This International Standard further specifies the framework's relationship to other frameworks, applications and services for geographic information and to client applications.

This International Standard addresses, for an LBS system, the first three basic viewpoints as defined in the Reference Model for Open Distributed Processing (RM-ODP, see ISO/IEC 10746-1). These viewpoints are the

a) Enterprise Viewpoint – detailing the purpose, scope, and policies of the system,

b) Information Viewpoint – detailing the semantics of information and processing within the system,

c) Computational Viewpoint – detailing the functional decomposition of the system.

The fourth and fifth viewpoints are addressed only in requirements or examples. These are the

d) Engineering Viewpoint – detailing the infrastructure for distribution,

e) Technology Viewpoint – detailing the technology for implementation.

Reference models and frameworks can be defined at a variety of levels, from conceptual design to software documentation. This International Standard

— defines the conceptual framework for, and the type of applications included within, LBS,

— establishes general principles for LBS for both mobile and fixed clients,

— specifies the interface for data access while roaming,

— defines the architectural relationship with other ISO geographic information standards,

— identifies areas in which further standards for LBS are required.

This International Standard does not address the following issues:

— rules by which LBS are developed;

— general principles for roaming agreements for mobile clients and tracking targets.