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American National Standard

Geographic information — Location-based services — Reference model

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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.

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ISO 19132 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

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.

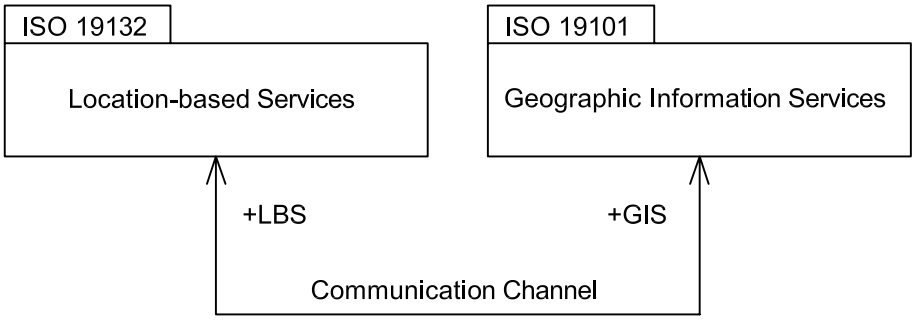

Figure 1 — Relation between LBS and GIS

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

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.