

# SVENSK STANDARD

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**Geografisk information – Lägesbaserade tjänster för ruttplanering vid användning av olika transportmedel (ISO 19134:2007)**

**Geographic information – Location-based services – Multimodal routing and navigation (ISO 19134:2007)**



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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 19134**

August 2008

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English Version

**Geographic information - Location-based services - Multimodal  
routing and navigation (ISO 19134:2007)**

Information géographique - Services basés sur la  
localisation - Routage et navigation multimodaux (ISO  
19134:2007)

Geoinformation - Standortbezogene Dienste - Multimodale  
Routenplanung und Navigation (ISO 19134:2007)

This European Standard was approved by CEN on 18 July 2008.

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## Foreword

The text of ISO 19134:2007 has been prepared by Technical Committee ISO/TC 211 “Geographic information/Geomatics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 19134:2008 by Technical Committee CEN/TC 287 “Geographic Information” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2009, and conflicting national standards shall be withdrawn at the latest by February 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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### Endorsement notice

The text of ISO 19134:2007 has been approved by CEN as a EN ISO 19134:2008 without any modification.

## Introduction

In everyday life in metropolitan areas in the world, a typical traveller is involved in using various modes of transportation for daily activities: e.g. walking, driving, park-and-ride, mass transit and taxi. The traveller frequently faces the problem of finding the optimal or best route combining several modes, from the origin to the destination, passing through the locations (waypoints) where the traveller might want to engage in activities such as shopping and meeting people, possibly satisfying a set of constraints such as the sequence constraints like “activity 1 before activity 2”, “location 1 before location 2”, etc. A typical intercity traveller faces situations requiring decisions to be made such as which station (junction) and by which mode to travel in order to take which system among the available transportation modes between an origin and a destination. The decision will depend on the overall cost that includes the line-haul, parking, routing, stopping at stations (junctions), stopping at intermediate places, etc.

This International Standard provides a conceptual schema for describing the data and services needed to support routing and navigation application for mobile clients who intend to reach a target position using two or more modes of transportation. This conceptual schema is a standard schema such as the spatial schema (ISO 19107) or the temporal schema (ISO 19108). This International Standard provides a description of a service type to support routing and navigation for a mode that operates either on a fixed route or with a fixed schedule, a description of data type for transfers, and a description of data type for schedule information and route information of a mode with a fixed route and/or schedule.

Based upon ISO 19133:2005, this International Standard specifies additional classes as well as extensions to existing classes to be used for multimodal routing and navigation. As in ISO 19133:2005, this International Standard assumes that all requests for services will be encapsulated in a request/response pair between the mobile client and the client application or its on-web proxy application. Therefore, this International Standard describes service operation types and a set of request/response data types associated with some operations which are necessary for multimodal routing and navigation.

By way of adding and/or expanding ISO 19133:2005, standardized conceptual schemas for multimodal routing and navigation of mobile clients will increase the ability to share geographic information among multimodal location-based service applications. These schemas will be used by multimodal location-based service applications, mostly in metropolitan areas, and in all intercity travelling environments to provide consistently understandable spatial data structures.



# Geographic information — Location-based services — Multimodal routing and navigation

## 1 Scope

This International Standard specifies the data types and their associated operations for the implementation of multimodal location-based services for routing and navigation. It is designed to specify web services that may be made available to wireless devices through web-resident proxy applications, but is not limited to that environment.

## 2 Conformance

Conformance to this International Standard depends on the type of entity declaring conformance.

Mechanisms for the data exchanges are conformant to this International Standard if they contain record implementations of the object types described within this International Standard, as specified in A.2.

Web services for routing and navigation are conformant to this International Standard if their interfaces implement one or both of the subtypes of service defined in this International Standard, as specified in A.3.

Details of the conformance classes are given in the Abstract test suite in Annex A.

## 3 Normative references

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

ISO 19101, *Geographic information — Reference model*

ISO 19107, *Geographic information — Spatial schema*

ISO 19108, *Geographic information — Temporal schema*

ISO 19112, *Geographic information — Spatial referencing by geographic identifiers*

ISO 19133:2005, *Geographic information — Location-based services — Tracking and navigation*

## 4 Terms and definitions

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

### 4.1

#### **application**

manipulation and processing of data in support of user requirements

[ISO 19101]

**SS-EN ISO 19134:2008 (E)****4.2****application schema**

conceptual schema for data required by one or more **applications**

[ISO 19101]

**4.3****cost function**

function that associates a measure (cost) to a **route**

[ISO 19133:2005]

**NOTE** The normal mechanism is to apply a cost to each part of a route, and to define the total route cost as the sum of the cost of the parts. This is necessary for the operation of the most common navigation algorithms. The units of cost functions are not limited to monetary costs and values only, but include such measures as time, distance and possibly others. The only requirement is that the function be additive and at least non-negative. This latter criteria can be softened as long as it is not zero or less cost is associated to any loop in the network, as this will prevent the existence of a "minimal cost" route.

**4.4****junction**

single topological node in a **network** with its associated collection of **turns**, and incoming and outgoing **links**

[ISO 19133:2005]

**NOTE** Junction is an alias for node.

**4.5****link**

directed topological connection between two nodes (**junctions**), consisting of an edge and a direction

[ISO 19133:2005]

**NOTE** Link is an alias for directed edge.

**4.6****location**

identifiable geographic place

[ISO 19112]

**NOTE** A location is represented by one of a set of data types that describes a position, along with metadata about that data, including coordinates (from a coordinate reference system), a measure (from a linear referencing system), or an address (from an address system) [ISO 19133:2005].

**4.7****location-based service****LBS**

service whose return or other property is dependent on the **location** of the client requesting the service or of some other thing, object or person

[ISO 19133:2005]

**4.8****navigation**

combination of **routing**, route traversal and **tracking**

[ISO 19133:2005]

**NOTE** This is essentially the common term navigation, but the definition decomposes the process in terms used in the packages defined in this International Standard.

**4.9****network**

abstract structure consisting of a set of 0-dimensional objects called **junctions**, and a set of 1-dimensional objects called **links** that connect the **junctions**, each **link** being associated to a start (origin, source) **junction** and end (destination, sink) **junction**

[ISO 19133:2005]

NOTE The network is essentially the universe of discourse for the navigation problem. Networks are a variety of one-dimensional topological complexes. In this light, junction and topological nodes are synonyms, as are link and directed edges.

**4.10****position**

data type that describes a point or geometry potentially occupied by an object or person

[ISO 19133:2005]

NOTE A direct position is a semantic subtype of position. Direct position as described can only define a point and therefore not all positions can be represented by a direct position. That is consistent with the "is type of" relation. An ISO 19107 geometry is also a position, but not a direct position.

**4.11****route**

sequence of links, and/or partial links, that describe a path, usually between two positions, within a network

[ISO 19133:2005]

**4.12****routing**

finding of optimal (minimal **cost function**) **routes** between **locations** in a **network**

[ISO 19133:2005]

**4.13****tracking**

monitoring and reporting the **location** of a **vehicle**

[ISO 19133:2005]

**4.14****transportation mode**

means that travellers can choose for transportation

**4.15****turn**

part of a **route** or **network** consisting of a **junction** location and an entry and exit **link** for that **junction**

[ISO 19133:2005]

**4.16****traveller**

person subject to being navigated, or tracked

**cf. vehicle**

[ISO 19133:2005]