INTERNATIONAL **ISO**

First edition
2007-02-15

Intelligent transport systems — Reference model architecture(s) for the ITS sector —

Part 1:
ITS service domains, service groups and services

Systèmes intelligents de transport (ITS) — Architecture(s) de modèle de référence pour le secteur ITS

Partie 1: Domaines de service, groupes de service et services ITS

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14813-1 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

This first edition cancels and replaces Technical Report ISO/TR 14813-1:1999, which has been technically revised.

ISO 14813 consists of the following parts, under the general title *Intelligent transport systems — Reference model architecture(s) for the ITS sector*:

— *Part 1: ITS service domains, service groups and services*

— *Part 2: Core TICS reference architecture* [Technical Report]

— *Part 3: Example elaboration* [Technical Report]

— *Part 4: Reference model tutorial* [Technical Report]

— *Part 5: Requirements for architecture description in TICS standards* [Technical Report]

— *Part 6: Data presentation in ASN.1* [Technical Report]

Introduction

Originally referred to in ISO/TR 14813-1 as Fundamental Services, ITS service domains and groups reflect the evolution of technology-oriented transportation practices and applications. This has become of increasing importance and interest as the scope of Intelligent Transport Systems (ITS) expands beyond its original applications in road traffic management, traveller information and electronic payment systems. ITS is now also expected to address:

— Transport network operations and maintenance activities;

— Freight mobility and intermodal connectivity;

— Multi-modal travel including both pre-trip and on-trip information and journey planning;

— Variable road pricing strategies for freight and personal travel;

— Emergency and natural disaster-related response activities and coordination; and

— National security needs related to transportation infrastructure.

Additionally, ITS activities as described above will also interface with more generalized activities and environments outside the transport sector. For example, road pricing and revenue systems activities may interface with electronic commerce, or eCommerce activities, and may thus utilize standards and principles associated with the banking industry along with generally accepted accounting principles. The addressing of national security and coordination issues also requires addressing specific national standards related to civil defence, emergency communications and other procedures. These interfaces, while largely outside the scope of TC 204, are nevertheless critical external influences on the functionality of the various services supported by ITS service domains and groups.

The standards that have been developed within TC 204 may all be mapped to one or more of the ITS service groups defined in this part of ISO 14813. At the same time, the applications for these standards are becoming broader. Additionally, the development of a standard international data dictionary and registry for ITS requires the ability to address both current and emerging applications.

To this end, the ITS service domains and groups presented in this document serve as a framework for developing ITS-related concepts of operation, which in turn lead to the definition of the appropriate requirements and standards necessary to deploy specific ITS applications. As the definition of transportation activities that utilize ITS tools has broadened, the original Fundamental Services developed by TC 204 are now revised and expanded into ITS service domains and groups.

Figure 1 illustrates the hierarchy of functional definitions, and the basis upon which user-oriented architecture views (known as use cases) are derived (refer to the other parts of ISO 14813, which further define the ITS applications of Unified Modeling Language, including use cases, to document the architecture).

In order to develop a cohesive reference architecture, and in order to establish the relationship and interdependencies of the various ITS services, it is beneficial to first determine the underlying ITS services. Thus, the purpose of this International Standard is to identify the ITS service groups and the domains within which the service groups reside, within the current perception of the ITS sector.

ITS service domains and groups, while they build upon existing US, European Union, Japanese, and other international and national taxonomies, or classification systems, can also provide a common descriptive basis for comparing these taxonomies, as well as others being developed throughout the world.
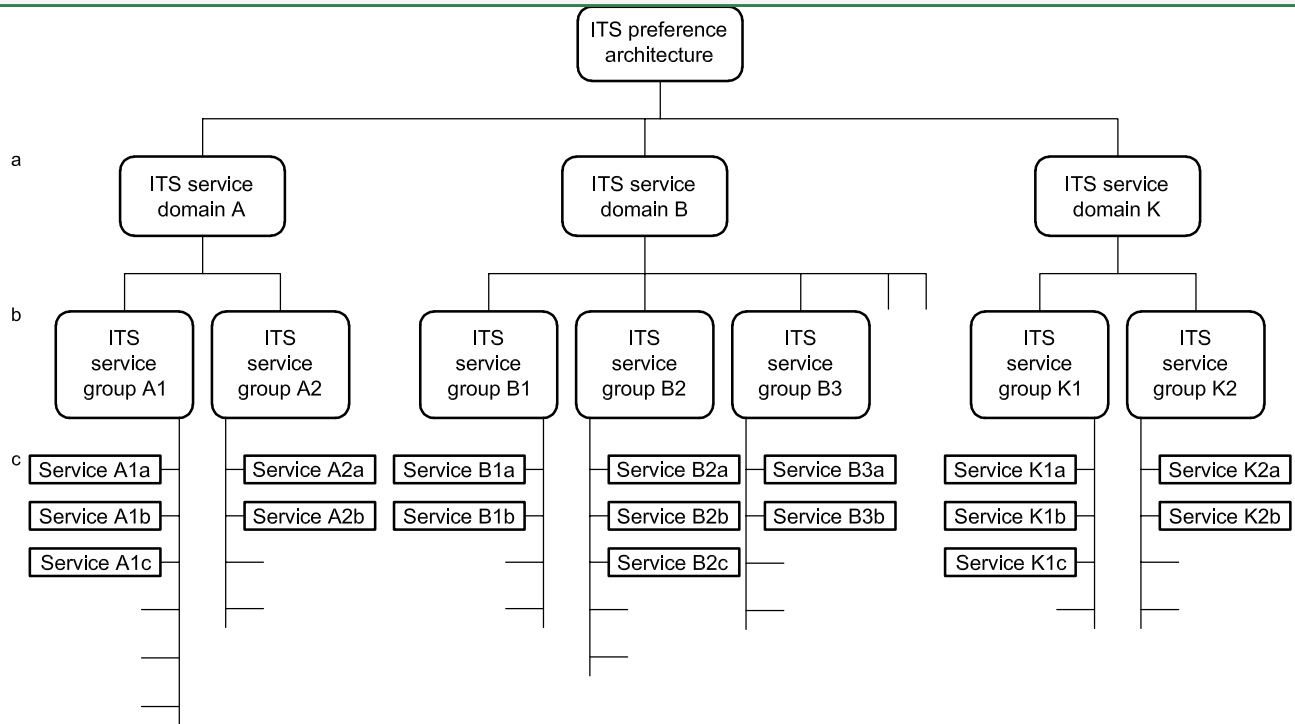
Key

a   Service domains (A, B, C, etc.) define the nature of the activities provided.

b   Service groups (N1, N2, N3, etc.) define more specific activities carried out in the service domain, but do not define the actors.

c   Services further define activity in terms of the actors involved (e.g. users, travel modes). They also serve as a basis for most elemental use cases (user view of architecture).

Figure 1 — ITS services hierarchy of definitions for ITS reference architecture

ISO TC 204 Working Group 1

ISO TC 204 WG 1's prime objectives are to provide services to ISO TC 204 and its working groups.

The specific mission of WG 1 is to:

> *"Provide ISO TC 204, its working groups, related bodies and those involved in the ITS sector, with a reference model of conceptual reference architecture(s) that show the structure and inter-relationships of the sector…"*

There are multiple instantiations of ITS architecture to be considered. This deliverable embraces architecture concepts from the following participants:

— Other TC 204 working groups,

— CEN TC 278 working groups,

— Japanese initiatives,

— European Union initiatives,

— US ITS program,

— Australian initiatives,

— Canadian initiatives,

— Korean initiatives,

— Chinese Taipei initiatives, and

— Other architecture international activities.

Full documentation of all possible architectural approaches is obviously not feasible given the high level of resources required to carry this out. Indeed, full documentation and description of all possible approaches is undesirable as an item for standardization.

A defined and consistent approach is, however, required to facilitate reuse and interoperability.

By combining the work of major contributions such as the definitions of user services in the United States, Japan, Chinese Taipei and Korea, along with the European Union definition of user needs, the working group has used the basic hypothesis that it is possible to define a set of ITS service domains and groups that can be used in a variety of combinations and configurations, to provide an outline description of the different ITS architecture approaches. It is assumed that the scope of the ITS sector will always have a definable boundary (which will change over time).