INTERNATIONAL STANDARD

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Intelligent transport systems — Communications access for land mobiles (CALM) — Application management —

Part 1: General requirements

Systèmes intelligents de transport — Accès des communications pour mobiles terrestres (CALM) — Gestion d'application — Partie 1: Exigences générales

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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 24101-1 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

ISO 24101 consists of the following parts, under the general title *Intelligent transport systems — Communications access for land mobiles (CALM) — Application management*:

— *Part 1: General requirements*

— *Part 2: Conformance test*

Introduction

This International Standard is part of a family of International Standards for CALM (Communications access for land mobiles) which determine a common architecture, network protocols and air interface definitions for wireless communications using Cellular 2nd Generation, Cellular 3rd Generation, 5 GHz, Millimeter, and Infrared communications. Other air interfaces may be added at a later date. Air interfaces included in the CALM standards provide facilities for broadcast, point-to-point, vehicle-to-vehicle, and vehicle-to-point communications in the ITS sector.

The purpose of this International Standard is to specify a standardized interface and the functionality necessary for interoperable installation and updating of ITS applications deployed within the CALM architecture in a reliable and secure manner. This International Standard addresses the following requirements:

a) installation of applications on CALM equipment after the equipment has been deployed,

b) updating of applications, including uninstalling, on OBE as well as WAE after the equipment has been deployed, and

c) providing a standardized interface and functionality so that application developers and system operators can successfully perform the functions in a) and b) in a reliable and secure manner.

Intelligent transport systems — Communications access for land mobiles (CALM) — Application management —

Part 1: General requirements

1 Scope

This International Standard specifies structures and methods for application management, including means for installing, uninstalling and updating applications on OBE and WAE deployed in a CALM network in a reliable and secure manner.

2 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/IEC 8824-1:2002, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation — Part 1*

ISO/IEC 9834-1, *Information technology — Open Systems Interconnection — Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the ASN.1 Object Identifier tree — Part 1*

ISO 21210, *Intelligent transport systems — Communications access for land mobiles (CALM) — Networking Protocols*

3 Terms and definitions

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

3.1
application
software instantiation of an ISO communication model layer 7 (application layer) element, the execution of which in equipment deployed within the CALM/ITS architecture implements services for users

3.2
application management entity
AME
software residing in OBE and/or WAE that manages installation, uninstallation and modification of resident applications

3.3
application management table
AMT
table in an AME that stores management related information for resident applications

3.4
authentication
process by which security credentials, for example a certificate, are verified by an approved process

NOTE The approved process used for verification is not defined in this International Standard.

3.5
certificate
security credential containing information used to verify the identity of the source of the credential, e.g. a manager certificate is sent by the manager of an application to the OBE/WAE and is used by the AME to authenticate the manager. Authentication of the manager is required for further access to the AME

3.6
common file
file containing information that is accessible to (and used by) more than one resident application

3.7
installer
means for installing, uninstalling and modifying applications in OBE or WAE

EXAMPLE Software on a server that is responsible for downloading applications from a (possibly different) remote server over an IP network to OBE or WAE which is connected to the network.

3.8
manager
entity that is responsible for the security management and operation of applications, common files and other entities such as OBE/WAE, installers and operators

3.9
on-board equipment
OBE
equipment installed in a vehicle that exchanges information via one or more radio communication interfaces with other OBE or WAE

3.10
operator
entity that manages and controls an installer at the direction of or the commission by a service provider

3.11
service provider
entity that provides ITS services to users

3.12
test equipment
entity used to verify that installation, uninstallation or modification of an application by an installer in OBE or WAE was performed successfully

NOTE This entity may reside within the installer entity.

3.13
user
entity that uses ITS services provided by a service provider

3.14
wireless access equipment
WAE
equipment installed at fixed locations that exchanges information via one or more radio communication interfaces with OBE and possibly other WAE, and which may have connection to a wide-area network

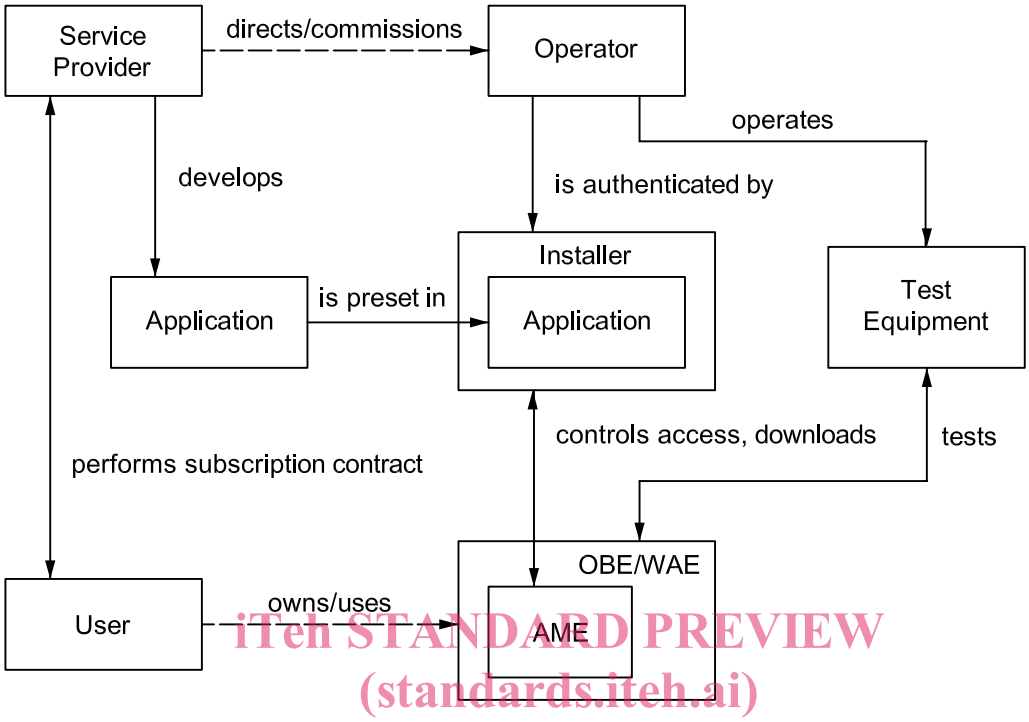
4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

AM	Application Management
AME	Application Management Entity
AMT	Application Management Table
API	Application Programming Interface
BER	Bit Error Rate
CALM	Communications Access for Land Mobiles
CME	CALM System Management Entity
CPU	Central Processing Unit
DSRC	Dedicated Short Range Communication
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
IP	Internet Protocol
ITS	Intelligent Transport Systems
OBE	On-Board Equipment
OS	Operating System
PER	Packet Error Rate
RSSI	Received Signal Strength Indication
SP	Service Provider
VM	Virtual Machine
WAE	Wireless Access Equipment

5 General structure

The general architecture of the Application Management system is shown in Figure 1.



NOTE 1 In WAE, no user entity exists.

NOTE 2 Service aggregator, who has a role of aggregating application clusters that are provided by different SPs, is not included in this International Standard.

Figure 1 — General architecture of the Application Management system

6 Application installation, uninstallation and modification

The following provide the functionality required for the reliable and secure management of applications in OBE and/or WAE:

a) Application Management Entity (AME) which controls installation, uninstallation and modification of resident applications;

b) Application Management Table (AMT) which contains the management state information for each application;

c) means for communicating between the OBE/WAE and an external installer for the purposes of exchanging information and downloading applications as required.

These elements are shown in Figure 2.

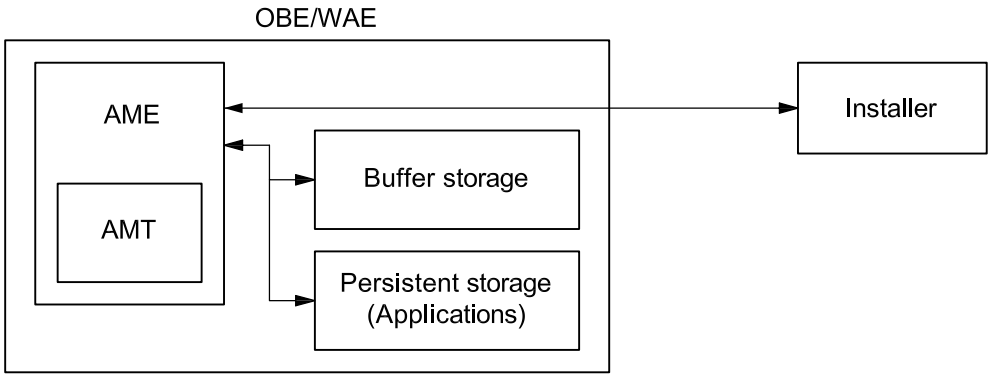


Figure 2 — OBE/WAE resident Application Management elements

6.1 Application Management Entity (AME)

An AME generally consists of the following:

a) an Application Management Table (AMT) in which the status of each resident application is stored (e.g. revision number, date of last modification);

b) means for authentication (e.g. verifying installer certificates) to control access to resident applications;

c) means for transferring the application between the installer and the OBE/WAE;

d) functions for installing, uninstalling and modifying applications;

e) means for ensuring that applications are in an appropriate state before attempting any modification thereto (e.g. ensuring that modification to an application is not attempted while the application is running).

Procedures for installing, uninstalling and modifying applications in an AME are described in 6.4.

6.2 Application Management Table (AMT)

An Application Management Table (AMT) is a table that contains information used in the management of applications. The following information associated with applications is generally useful:

a) application name (file name);

b) date and time of installation or modification;

c) file size;

d) access control information:

   1) keys for verifying manager certificates,

   2) other security related information;

e) additional information:

   1) program version number;

f) other application parameters.