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Intelligent Transport Systems — Communications access for land mobiles (CALM) — 6LoWPAN networking

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Foreword

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ISO 19079 was prepared by Technical Committee ISO/TC 204, *Intelligent Transport Systems*, Subcommittee SC , .

This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

Introduction

The set of International Standards that collectively refer to CALM (Communications Access for Land Mobile) focus on the specification of open interfaces regarding the functionality required by all relevant layers and entities of a standard communication architecture for Intelligent Transport Systems (ITS). This communication is known as the ITS station reference architecture (International Standard ISO IS 21217).

These Standards are designed to allow interoperable instantiations of ITS stations (ITS-S), which are based on the concept of abstracting applications and services from the underlying communication layers. This abstraction makes the ITS station architecture ideally suited to the development and deployment of Cooperative ITS applications and services.

The set of ITS station standards include specifications for security in ITS communications, ITS-S management, distributed ITS-S implementations, legacy communication media interfaces, legacy application interfaces, and new communication interfaces specifically designed for ITS applications such as those targeted to safety of both life and property.

The fundamental advantage of the ITS station with respect to traditional systems is the ability to support vertical handovers between the various access technologies that can be included in an ITS station. Handover mechanisms are defined within the ITS station reference architecture, the ITS station medium service access points International Standard (ISO 21218) and the ITS station management International Standard (ISO 24102).

The ITS station IPv6 networking International Standard (ISO 21210) determines the network protocols to support reachability at a global IP address, continuous Internet connectivity, and the handover policies between session performed by infrastructure mobile routers (MR) using the same media or using different access technologies.

ITS station compliant internal networks (both in-vehicle and off-vehicle) are expected to interact with each other to seamlessly exchange information. This should be true also for information retrieved from Wireless Sensor Networks (WSN) to be dispatched to any ITS station. As WSNs are largely based on low-cost Component of The Shelf (COTS), IETF has promoted the standardization of a set of protocols at the network and facility layers suited for constrained devices (in terms of capability of processing, storage or communication) based on low-rate wireless personal area networks (LR-WPANs) technologies. An important candidate at network layer in this sense is the IETF IPv6 over Low power Wireless Personal Area Networks (6LoWPAN), an adaptation layer for IPv6 that addresses device limitations by means of header compression and protocol optimizations.

This Technical Specification identifies network protocols that are needed to support global reachability at a global IP address for Wireless Sensor Networks (WSNs) based on the IEEE 802.15.4 access medium; in particular, this Technical Specification states how to use the set of 6LoWPAN protocols specified by IETF in the context of ITS.

Intelligent Transport Systems — Communications access for land mobiles — 6LoWPAN networking

1 Scope

This Technical Specification describes the networking protocol functionality related to 6LoWPAN networking between two or more ITS stations communicating over the global Internet communication network.

It is assumed that the reader is familiar with IETF specifications found in "Request for Comments" (RFCs) 4944, 6282 and 2460 for 6LoWPAN and IPv6 protocols respective blocks used within this Technical Specification. This Technical Specification does not define a new protocol; neither does it define new abstraction for exchange of messages at the 6LoWPAN layer nor does it defines new data structures. It however, illustrates how the IETF protocols are combined to allow seamless communication among both heterogeneous and homogeneous ITS stations using 6LoWPAN. The 6LoWPAN family of protocols defined in this Technical Specification as the Internet of Things Management Service Entity (IoT MSE) is integrated within the ITS station reference architecture as a new protocol block of the ITS station Networking &Transport layer. The procedures defined to share information between the IoT MSE block of the ITS station networking & transport protocols and other components of the ITS station architecture will be defined in the ISO IS 24102 Standard. The ISO IS 24102 are specifications for ITS station management, which are standardized to be compliant with the ITS station reference architecture and related standards.

In addition to the requirements described within this Technical Specification, a number of notes and examples are provided to illustrate the IoT MSE block and its configuration.

2 Normative reference

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

ISO 21210:2012 Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking

ISO 21217:2014 Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture

ISO 21218:2014 Intelligent transport systems — Communications access for land mobiles (CALM) — Medium service access points

ISO 24102 (Part 3):2014Intelligent transport systems — Communications access for land mobiles (CALM) — Management- Part 3: Service access points

IETF RFC 2460 Internet Protocol Version 6

IETF RFC 4861 Neighbor Discovery for IP version 6 (IPv6)

IETF RFC 4301 Security Architecture for the Internet Protocol

IETF RFC 4302 IP Authentication Header