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Öffentlicher Verkehr - Planungs- und Steuerungssysteme für Straßenfahrzeuge - Teil 9: Zeitdienst

This Technical Specification (CEN/TS) was approved by CEN on 8 December 2019 for provisional application.

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European foreword

This document (CEN/TS 13149-9:2020) has been prepared by Technical Committee CEN/TC 278 "Intelligent transport systems", the secretariat of which is held by NEN.

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

This document is Part 9 of a series of European Standards and Technical Specifications that includes:

— CEN/TS 13149-7, *Public transport – Road vehicle scheduling and control systems – Part 7: System and network architecture*;

— CEN/TS 13149-8, *Public transport – Road vehicle scheduling and control systems – Part 8: Physical layer for IP communication*;

— CEN/TS 13149-9, *Public transport – Road vehicle scheduling and control systems – Part 9: Time service* [this document];

— CEN/TS 13149-10, *Public transport – Road vehicle scheduling and control systems – Part 10: Location service* [currently at voting stage];

— CEN/TS 13149-11, *Public transport – Road vehicle scheduling and control systems – Part 11: Vehicle platform interface service* [currently at voting stage].

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This Technical Specification is Part 9 of a series of European Standards and Technical Specifications. The scope of this series is on-board data communication systems on public transport vehicles.

Public Transport (PT) vehicles have an increasing array of information and communications systems, including ticket machines, Automated Vehicle Location (AVL) systems, destination displays, passenger announcement systems, vehicle monitoring systems, etc. Other systems are beginning to be included such as advertising screens, tourist guides, WiFi "hotspots" and infotainment.

In addition, equipped PT vehicle will usually have a communications facility to enable voice and data to be exchanged with the control centre, other PT vehicles, PT infrastructure and roadside devices for instance in requesting priority at traffic signals. Many types of communication channel are used including public and private wireless communication networks.

These systems may be provided by a number of different suppliers and may need to be integrated. For instance:

— a ticket machine may need location information to update fare stages;

— next-stop and destination information may be drawn from schedule information held in the ticket machine;

— vehicle location systems may be used to drive signal priority requests.

As data exchange between functional units becomes more widespread, a networked approach begins to become efficient. With standardized underlying technology, the PT vehicle begins to look like a local area network: making use of IEEE 802 communications and the Internet Protocol (IP) suite.

Without a clear technology framework, integrating these systems would require complex technical discussions every time a device is procured. The existing EN 13149 standards recognized this long ago in respect of the core vehicle systems, but these have not been adapted to IP networking.

Six historical parts of EN 13149, namely Parts 1 to 6, have now been withdrawn in favour of the new IP-based approach. The core of this new approach was specified in two Technical Specifications (TS):

— CEN/TS 13149-7 specifies the Network and System Architecture for on board equipment. It describes basic principles of communications including a general description of the network topology, addresses schematics, basic network services, a system overview and basic module architecture.

— CEN/TS 13149-8 specifies the Physical Layer for IP-communication networks on board PT vehicles. This part specifies the cables, connectors and other equipment including pin assignment and environmental requirements.

Building on this, a series of specific services are being specified:

— CEN/TS 13149-9, specifying the structure to be used by a service providing time data to the on-bus network;

— CEN/TS 13149-10, specifying the structure to be used by a service providing location data to the on-bus network, specifically relating to Global Navigational Satellite Systems (GNSS);

— CEN/TS 13149-11, specifying the structure to be used by a service providing data from the vehicle platform to the on-bus network, using the Fleet Management System (FMS) for source data.

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These documents draw on large scale trials undertaken within European projects such as EBSF (the "European Bus System of the Future" project) and its successors, together with technical developments which have since been adopted by programmes such as the German IBIS-IP platform [1] and, more recently, the European platform ITxPT [2]. This has ensured not only that the CEN specifications are robustly proved in practice, but also that they have the support of many key system developers and operators.

With these Technical Specifications, it will be easier to achieve:

— more efficient development of PT components;

— lower cost, lower risks and a smoother on board integration of PT equipment;

— more efficient operation and maintenance of on board PT equipment;

— high quality intermodal passenger services based on intermodal PT information;

— integration of new PT services.

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1 Scope

The CEN 13149 series of products concerns on-board data communication systems on public transport vehicles. This series provides for data services that enable open and managed sharing of relevant information.

This document, being Part 9 of the series, specifies a time publication, enabling all on-vehicle services to share a common understanding of current time, based on a suitable agreed master network clock. It covers:

— the functional scope, i.e. which data the service provides, why, when and how often.

— the transport protocol, i.e. how the data are transmitted.

— the service publication, i.e. how the service can be found by other modules or applications

— the structure of the data, i.e. how the data are structured and how the data elements are named.

This document implements the service framework described in CEN/TS 13149-7.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

CEN/TS 13149-7:2020, *Public transport – Road vehicle scheduling and control systems – Part 7: System and network architecture*

3 Terms and definitions

For the purposes of this document, the terms, definitions, symbols, and abbreviations given in CEN/TS 13149-7:2020 apply.

4 Time Service

4.1 Functional Scope / Description & Use-Cases

This service announces the time synchronization. For time synchronization the Simple Network Time Protocol (SNTP) shall be used. It is based on [2] and enhances mechanisms for the synchronization of server clients based on a server time.

UTC time shall be used to avoid any issue with time zone management.

4.2 Architecture & Transport Protocol

The service is usually provided by the module in a vehicle network that houses the Time server.

To receive Time data, a module shall access the Time Service in order to be able to connect to the Time server.

The Time Service will be accessed using an appropriate, defined, service protocol. The Time server itself shall be read using SNTP.

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