
**Electronic fee collection — Evaluation of
equipment for conformity to
ISO/TS 17575-2 —**

**Part 2:
Abstract test suite**

iTeh STANDARD PREVIEW
*Perception du télépéage — Évaluation de conformité de l'équipement à
l'ISO/TS 17575-2 —
(standards.iteh.ai)
Partie 2: Suite d'essai abstraite*

ISO/TS 16401-2:2012

<https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012>



iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/TS 16401-2:2012](https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012)
[https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-
bd7e286ef9ea/iso-ts-16401-2-2012](https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

| | |
|---|----|
| Foreword | iv |
| Introduction..... | v |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions | 1 |
| 4 Abbreviations..... | 2 |
| 5 Abstract Test Method (ATM)..... | 3 |
| 5.1 Implementations Under Tests | 3 |
| 5.1.1 Front-End (FE) | 3 |
| 5.1.2 Back-End (BE)..... | 3 |
| 5.2 Test architecture..... | 3 |
| 5.3 Protocol Implementation Extra Information for Testing (PIXIT) | 3 |
| 6 Untestable Test Purposes (TP) | 3 |
| 7 ATS data structures | 4 |
| 7.1 Implementation of proposed in 'annex D.2 API Definition in C' | 4 |
| 7.2 Common data types | 4 |
| 8 External functions | 4 |
| 9 Message filtering | 4 |
| 10 ATS naming conventions | 4 |
| 10.1 Definition naming conventions | 5 |
| 10.2 Test Case identifier | 6 |
| 10.3 TTCN-3 modules identifier..... | 6 |
| Annex A (informative) TTCN-3 Library modules for FE and BE | 7 |
| Annex B (informative) PIXIT Proforma for FE and BE | 8 |
| Bibliography..... | 10 |

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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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/TS 16401-2 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, in collaboration with Technical Committee CEN/TC 278, *Road transport and traffic telematics*.

ISO/TS 16401 consists of the following parts, under the general title *Electronic fee collection — Evaluation of equipment for conformity to ISO/TS 17575-2*:

- *Part 1: Test suite structure and test purposes*
- *Part 2: Abstract test suite*

Introduction

This part of ISO/TS 16401 is part of a set of standards that supports interoperability of autonomous EFC-systems, which includes ISO/TS 17575 parts 1 to 4 that define the EFC context data, their charge reports and their use of communication infrastructure.

Within the suite of EFC standards this conformance evaluation procedure defines the process and tests for conformity evaluation of Front End and Back End that comply with the requirements in ISO/TS 17575-2.

This part of ISO/TS 16401 is intended to

- assess Front End Communications API and Front End Application capabilities,
- assess Front End Communications API and Front End Application behaviour,
- serve as a guide for Front End Communications API and Front End Application conformance evaluation and type approval,
- achieve comparability between the results of the corresponding tests applied in different places at different times, and
- facilitate communications between parties.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This part of ISO/TS 16401 is based on [ISO/TS 16401-2:2012](https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012)

- ISO/TS 17575-2, and
- the ISO/IEC 9646 family of standards on conformance test methodology.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/TS 16401-2:2012](https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012)

<https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012>

Electronic fee collection — Evaluation of equipment for conformity to ISO/TS 17575-2 —

Part 2: Abstract test suite

1 Scope

This part of ISO/TS 16401 specifies the Abstract Test Suite (ATS) to evaluate the conformity of Front End Communications API and Front End Application to ISO/TS 17575-2.

The objective of the present document is to provide a basis for conformance tests for Front End Communications API and Front End Application in Electronic Fee Collection based on autonomous on-board equipment (OBE) to enable interoperability between different equipment supplied by different manufacturers.

The present abstract test suite is directly derived from ISO/TS 17575-2.

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/TS 17575-1, *Electronic fee collection — Application interface definition for autonomous systems — Part 1: Charging*

ISO/TS 17575-2, *Electronic fee collection — Application interface definition for autonomous systems — Part 2: Communication and connection to the lower layers*

ISO/TS 17575-3, *Electronic fee collection — Application interface definition for autonomous systems — Part 3: Context data*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 17575-1 and the following apply.

3.1

conformance testing

testing the extent to which an IUT is a conforming implementation

[ISO/IEC 9646-1, definition 3.3.23]

3.2

contract

expression of an agreement between two or more parties concerning the use of the road infrastructure

[ISO 14906:2011, definition 3.7]

NOTE A *contract* specifies obligations, permissions and prohibitions for the objects involved.

**3.3
Front End application**

part of the Front End above the API

[ISO/TS 16401-1:2011, definition 3.2]

**3.4
implementation under test
IUT**

implementation of one or more OS1 protocols in an adjacent user/provider relationship, being that part of a real open system which is to be studied by testing

[ISO/IEC 9646-1, definition 3.3.43]

**3.5
service provider**

operator that accepts the user's payment means and in return provides a *road-use* service to the user

NOTE Taken from ISO 14906:2004.

**3.6
system under test
SUT**

real open system in which the IUT resides

[ISO/IEC 9646-1, definition 3.3.103]

**3.7
test case**

an abstract or executable test case

[ISO/IEC 9646-1, definition 3.3.107]

ITEH STANDARD PREVIEW
(standards.iteh.ai)

[ISO/TS 16401-2:2012](https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012)

<https://standards.iteh.ai/catalog/standards/sist/6fa8115e-3f69-4913-b60f-bd7e286ef9ea/iso-ts-16401-2-2012>

**3.8
toll charger**

legal entity charging toll for vehicles in a *toll domain*

[ISO/TS 17574:2009, definition 3.27]

4 Abbreviations

For the purposes of this document, the abbreviations given in ISO/TS 16401-1 and the following apply.

- EUT Equipment Under Test
- IUT Implementation Under Test
- PIXIT Protocol Implementation Extra Information for Testing
- SCS Semiconductor Characterization System
- SUT System Under Test
- TC Test Case

5 Abstract Test Method (ATM)

This clause describes the ATM used to test the layers at the FE side and at the BE side.

5.1 Implementations Under Tests

5.1.1 Front-End (FE)

The part(s) of the toll system where usage data for an individual user are collected, processed and delivered to the Back End. The Front End comprises the on-board equipment and optionally a proxy.

5.1.2 Back-End (BE)

Generic name for the computing and communication facilities of the Service Provider and/or the Toll Charger.

5.2 Test architecture

The implementation under test is either the FE or the BE. The System under test comprises also the communication sub-layer, which is necessary to perform the IUT tests.

The tester executes the TTCN-3 test cases of the present Test Specification, running on an emulated communication sub-layer.

The figure below describes the test architecture.

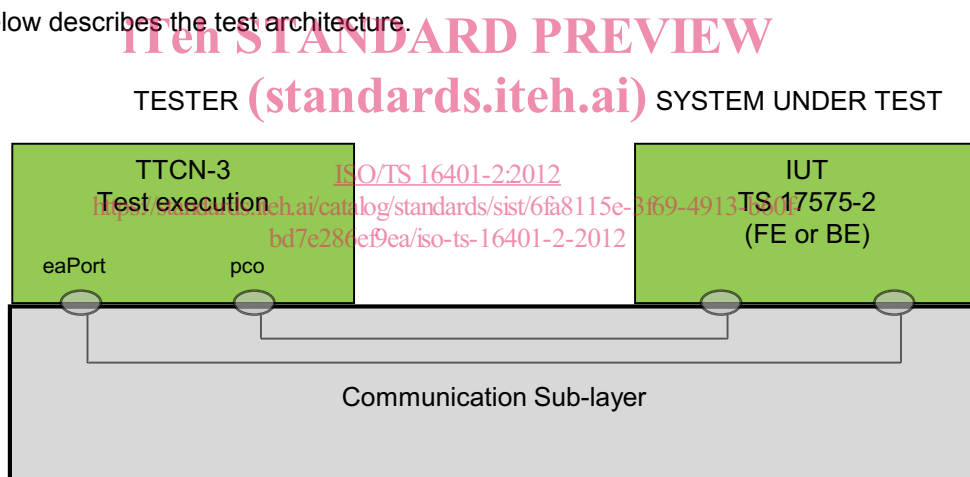


Figure 1 — Test system architecture

5.3 Protocol Implementation Extra Information for Testing (PIXIT)

The supplier of the Front End and Back End, respectively, is responsible for providing a Protocol Implementation Extra Information for Testing (PIXIT).

The supplier of the Front End and the Back End shall complete a PIXIT; see Annex B for the proforma.

6 Untestable Test Purposes (TP)

This clause gives a list of TPs which are not implemented in the Abstract Test Suite due to the chosen Abstract Test Method or other restrictions.