INTERNATIONAL STANDARD

ISO/IEC 19637

First edition
2016-12-01

Information technology — Sensor network testing framework

Technologies de l'information — Cadre général pour les essais de réseaux de capteurs

Reference number
ISO/IEC 19637:2016(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Abbreviated terms ... **2**
5 Overview of a sensor network testing framework (SNTF) ... **2**
5.1 Testing requirements of sensor networks ... 2
5.2 Conceptual model of SNTF ... 3
5.3 Description of test manager (TMR) ... 4
5.4 Description of test agent (TA) ... 5
6 Testing services ... **5**
6.1 General ... 5
6.2 Module interactions through unified services ... 7
6.3 Test data services (TDSs) ... 8
6.3.1 General ... 8
6.3.2 EventReport service ... 9
6.3.3 EventAck service ... 10
6.3.4 Read service ... 11
6.3.5 Write service ... 13
6.3.6 StartTest service ... 15
6.3.7 StopTest service ... 17
6.3.8 StartDownAndUploading service ... 18
6.3.9 StopDownAndUploading service ... 20
6.3.10 DataUploading service ... 21
6.3.11 DataDownloading service ... 23
6.3.12 ExecuteTesting service ... 25
6.4 Testing management services ... 27
6.4.1 Overview ... 27
6.4.2 Associate service ... 27
6.4.3 Abort service ... 29
6.4.4 AddressAllocation service ... 30
6.4.5 Sync Service ... 32
6.4.6 DeviceStatus service ... 32
Annex A (informative) **Example of the testing platform for hybrid sensor networks based on IPv6** ... **34**
Bibliography ... **36**

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*.

Introduction

Sensor network is widely used around the world in multiple fields such as industrial automation, environment monitoring, smart home, intelligent health-care and smart grid. The applications can involve different devices supplied by different manufacturers, e.g. sensors, actuators, controllers, routers and gateways, etc. Data can be collected and processed by use of different wired/wireless communication technologies. Thus, various test systems should be employed to satisfy some specific requirements. The operations of test systems is a challenge to users, if without a uniform test platform.

When designing and developing a sensor network test system, the characteristics regarding the following aspects should be considered:

a) Sensor network heterogeneity. It is necessary to verify the interoperability of sensor networks based on different protocols prior to system application;

b) Diversity of sensor network applications.

However, an international test standard for sensor networks which can provide guidance to design and develop a uniform platform integrating different tests for sensor networks is still unavailable.

Information technology — Sensor network testing framework

1 Scope

This document specifies:

— testing framework for conformance test for heterogeneous sensor networks,

— generic services between test manager (TMR) and test agent (TA) in the testing framework, and

— guidance for creating testing platform and enabling the test of different sensor network protocols.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
analysis module
logical unit within a testing application process which is used to analyse the information from test agent and module-based test depending on a particular strategy

3.2
test agent
device designed for different sensor network protocols or various kinds of hardware that can communicate directly with the test manager and the systems under test

3.3
testing application process
software functional entity that performs the processing by combining test modules, analysis modules and report modules to fulfil test purposes

Note 1 to entry: It is an application platform that supervises various operational aspects of testing activities and entities, usually through interaction with test agents.

3.4
test module
logical unit within a testing application process that performs operations depending on a specified testing requirements

3.5
testing platform
testing entity that could integrate different test systems for different protocols and technologies

EXAMPLE A platform can provide IPv4 and IPv6 conformance testing systems.