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Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) —

Part 6: Applications

Technologies de l'information — Réseaux de capteurs: Architecture de référence pour réseaux de capteurs —

Partie 6: Applications

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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 document 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).

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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

ISO/IEC 29182 consists of the following parts, under the general title *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA)*:

— *Part 1: General overview and requirements*

— *Part 2: Vocabulary and terminology*

— *Part 3: Reference architecture views*

— *Part 4: Entity models*

— *Part 5: Interface definitions*

— *Part 6: Applications*

— *Part 7: Interoperability guidelines*

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Introduction

A wide range of applications has been proposed for sensor networks. In practice however, sensor networks have been built and deployed for a relatively small number of applications. This is partly due to the lack of a business case for certain applications and partly due to technical challenges in building a non-trivial sensor network of reasonable complexity. The main reason for this impediment is that multidisciplinary expertise, such as sensors, communications and networking, signal processing, electronics, computing, and cyber security is required to design a sensor network. Presently, the design process is so complex that one can leverage little from one sensor network design to another. It appears as if one has to start from almost scratch every time one wishes to design and deploy a sensor network. Yet, upon closer inspection, there are many commonalities in instantiations of sensor networks that realize various applications. These commonalities include similarities in the choice of network architecture, and the entities/functional blocks that are used in the architecture.

The purpose of the ISO/IEC 29182 series is to

— provide guidance to facilitate the design and development of sensor networks,

— improve interoperability of sensor networks, and

— make sensor networks plug-and-play, so that it becomes fairly easy to add/remove sensor nodes to/from an existing sensor network.

The ISO/IEC 29182 series can be used by sensor network designers, software developers, and service providers to meet customer requirements, including any applicable interoperability requirements.

The ISO/IEC 29182 series comprises seven parts. Brief descriptions of these parts are given next.

ISO/IEC 29182-1 provides a general overview and the requirements for the sensor network reference architecture.

ISO/IEC 29182-2 provides definitions for the terminology and vocabulary used in the reference architecture.

ISO/IEC 29182-3 presents the reference architecture from various viewpoints, such as business, operational, system, technical, functional, and logical views.

ISO/IEC 29182-4 categorizes the entities comprising the reference architecture into two classes of physical and functional entities and presents models for the entities. ISO/IEC 29182-5 provides detailed information on the interfaces among various entities in the reference architecture.

This part of ISO/IEC 29182 provides detailed information on the development of International Standardized Profiles.

ISO/IEC 29182-7 provides design principles for the reference architecture that take the interoperability requirements into account.

There are no requirements for compliance in ISO/IEC 29182-1 to ISO/IEC 29182-7. Users should ensure that the sensor nodes and the related sensor network are compliant with the application or deployment governing body.

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Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) —

Part 6: Applications

1 Scope

This part of the ISO/IEC 29182 series, describes and provides

— a compilation of sensor network applications for which International Standardized Profiles (ISPs) are needed,

— guidelines for the structured description of sensor network applications, and

— examples for structured sensor network applications.

This part of ISO/IEC 29182 does not cover ISPs for which drafting rules are described in ISO/IEC TR 10000. Due to the generic character of ISO/IEC 29182 fully developed ISPs will not be included in this International Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 29182-1, *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 1: General overview and requirements*

ISO/IEC 29182-2, *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 2: Vocabulary and terminology*

ISO/IEC 29182-3, *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 3: Reference architecture views*

ISO/IEC 29182-4, *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 4: Entity models*

ISO/IEC 29182-5, *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 5: Interface definitions*

ISO/IEC 29182-7, *Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 7: Interoperability guidelines*

ISO/IEC TR 10000-1, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 1: General principles and documentation framework*

ISO/IEC TR 10000-2, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 2: Principles and Taxonomy for OSI Profiles*

ISO/IEC TR 10000-3, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 3: Principles and Taxonomy for Open System Environment Profiles*

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3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO/IEC 29182-2 apply.

4 Symbols and abbreviated terms

ISP International Standardized Profile

5 An overview of sensor network applications

Sensor network market segments and applications are vast and diverse covering both horizontal and vertical markets. The sensor network potential market segments and their current and future applications that employ wired/wireless sensor networks are listed in the following table.

Table 1 — Examples of sensor network market segments and applications

Market segments	Sensor network applications
Logistics and supply chain management	— Cold chain monitoring — Monitoring of hazardous goods and chemicals — Theft prevention in distribution systems for high value goods — Container monitoring in global supply chains — Monitoring of electronically sealed freight containers — Decentralized control of material flow systems
Energy & utility distribution industry	— Smart grid systems — Automated meter reading
Automation, monitoring, and control of industrial production processes	— Automation of manufacturing processes — Quality control of production processes — Machine condition monitoring — Inventory tracking and surveillance — Personnel tracking at production sites — Control of manufacturing robots
Health care and medical applications at home and in hospitals	— Monitoring of vital physiological parameters — Position and posture monitoring — Hospital personnel and patient tracking
Care for elderly and/or disabled people	— Monitoring of activity patterns for early detection and prevention of hazardous conditions — Fall prevention and detection — Body position and posture monitoring — Remote monitoring and adaptation of habitat conditions (temperature, humidity, etc.) — Remote monitoring of water consumption — Remote monitoring of emotions — Automation of medication management — Nutrition monitoring — Early warning systems for the prevention and detection of emerging chronical conditions like Alzheimer and Parkinson

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