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Information technology — Sensor Networks: Sensor Network Reference Architecture (SNRA) — Part 6: Application Profile

1 Scope

This international standard specifies the application profile for Sensor Networks Reference Architecture (SNRA) and covers the following clauses.

• Classification of service model

• Application profile requirements

• Profile description

• Device specifications

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/IEC 29182, Information technology – Sensor Network: Sensor Network Reference Architecture (SNRA) – Part 2: Vocabulary/Terminology

3 Terms and definitions

For the purposes of this document, refer to the terms and definitions from SGSN-N149-Technical Document Ver.3.

4 Overview of sensor network application profile

There are many kinds of legacy sensor network applications such as industrial automation, various types of monitoring and control applications, civil engineering, intelligent building, home automation. And these applications usually operate in a mutually exclusive manner. Technologically evolving capabilities and application of sensor networks enables business partnerships whose business areas have been mutually exclusive, e.g., auto industry and private safety/emergency monitoring services industry. Thus, for certain business cases, the sensor network capabilities and functions should be developed benefiting multiple business partnerships. Another general example is that a sensor network service provider may need to interoperate with other sensor network service providers to obtain sensor data, processed results, or information to improve the service quality. The purpose of this document is given the guidance to sensor network provider, business partnerships and etc how to make and / or choose and / or define the application service base on the common application profile which educe from various types of application service. The categories of the application are shown as below. [ISO/IEC 29182]

5 Requirements of sensor network applications and services

Sensor network applications and services have specific characteristics with different service requirements and functional requirements from each other. However characteristics of sensor network applications and services can be distinguished into basic service model and advanced service model from the way of application model, operation process, operation domain and type of user. [ISO/IEC 29182]

5.1 Classification of service model [ISO/IEC 29182]

5.1.1 Basic service model

A basic service model has following characteristics:

Table 1 — Features of basic service model

Features	Type	Description
Application model	Pre-defined	specific and static purposes such as structures monitoring, street light control, agriculture monitoring and management, surveillance, facilities management, etc.
Operation Process	Straightforward	Straight forward process progresses into sensing, transmitting, processing and provisioning. Sensor nodes and resulting sensor networks detect physical status; they transmit sensor data to backend application systems; the application systems collect sensor data and perform data processing functions; and the application systems produce value-added information contents and services.
Operation domain	Single	Sensor data are captured, transmitted, processed and delivered within a single operation domain.
Type of user	Dedicated	Value-added data are provided to dedicated users: owner and partners.

5.1.2 Advanced service model

An advances service model can be considered as a service infrastructure and has following characteristics:

Table 2 — Features of advanced service model

Features	Type	Description
Application model	Dynamic	Services depend on the usage of users who anybody can be. It is very difficult to fix application features and relevant functions statically in advance. For weather information services as an example: – Fishermen may request on-demand and periodic weather information for fishing; – Tourists may request periodic and alarming information of the nature condition for a week, a few days, or a month by a service subscription; – National disaster center may request the whole weather information to observe the natural phenomena of an area and detect emergency situations; etc.
Operation Process	Elaborated	Transmitting, processing and provisioning step have additional functions as follows: – Various sensor networks may be integrated and sensor data may be acquired via other sensor networks by business contracts; – Due to dynamic service models, a variety of application

		functions have to be involved such as filtering, analyzing, context processing, data mining, decision making, forecasting, integration, exporting, etc.; and – Since anybody can be information user and information contents cannot be pre-defined, sensor data may be delivered in different forms such as text, audio, voice, image, etc. according to information users.
Operation domain	Multiple	Multiple business domains are incorporated by business partnerships.
Type of user	Dedicated and arbitray	Services are provided to consumers as well as business partners: – Pre-defined users by contracts or agreements result in B2B-type sensor network services; and – Consumers by service subscription result in B2C-type sensor network services.

6 Application profile requirements

The Application profile is divided into 3 categories as service requirements, environmental requirements and Technical requirements as below.

6.1 Service profile requirements

Service requirements should be define purpose, classification of the sensor network base on above table 1 and table 2 as application model, operation process, operation domain and type of user. The detail examples are shown as below.

6.1.1 Collecting and analyzing of the raw data

Middleware installed on the server store the each sensing data though the gateway received data from the sensor nodes. Check regularly the status of receiving condition of each sensor.

6.1.2 Real time information service

In total monitoring system should be inquired the position of each sensor location-specific, sensing information base on real-time.

6.2 Environmental profile requirements

Environmental requirements should be define 2 type of environmental condition on sensor network

6.2.1 Physical environmental condition

Each specification application sensor network has required physical environmental condition such as temperature, humidity, vibration and etc.

6.2.2 Network environmental condition

Each specification application sensor network has required minimum network environmental condition such as number of node, GW, Server and etc.

6.3 Technical profile requirements

The technical requirements should be define system configuration, device description and etc.

Device	Requirements
Sensor Node	● RF : IEEE 802.15.4 PHY ● 1-axis sensor

	• Battery (primary battery), Alarm service for battery changing • Chip antenna
Actuator	• RF : IEEE 802.15.4 PHY • 2.4GHz External antenna • Control camera and electronic operation • Re-programming • Power supply (external power supply)
Sink node	• RF : IEEE 802.15.4 PHY • Power supply (external power supply/Battery, Solar Cell(Optional) • Transmit between sensor node and GW

7 Device Specifications

This chapter will be define from other SNRA GW.

Annex