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SERIES F: NON-TELEPHONE TELECOMMUNICATION
SERVICES

Audiovisual services

Requirements and functional architecture for the open ubiquitous sensor network service platform

Recommendation ITU-T F.747.4

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Recommendation ITU-T F.747.4

Requirements and functional architecture for the open ubiquitous sensor network service platform

Summary

Recommendation ITU-T F.747.4 defines the requirements and functional architecture for the open ubiquitous sensor network (USN) service platform.

History

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* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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Introduction

There is a large number of middleware available for sensor networks and different kinds of ubiquitous sensor network (USN) middleware that may be deployed. Furthermore, USN services may utilize widely distributed sensors or sensor networks through different USN middleware. In a widely distributed environment, USN applications need to know of the various USN middleware, sensors and sensor networks used. For example, if an application wants to get the current temperature in Geneva, the application should have information specifying which USN middleware and which sensors or sensor networks can provide the data requested and how they can provide the data.

The open USN service platform aims to provide unified access to USN resources and sensed data/semantic data through heterogeneous USN middleware, thereby enabling USN applications to take full advantage of the USN capabilities. It allows providers, users and application developers to provide USN resources, use USN services, or develop USN applications without needing to have specific knowledge about the USN middleware and sensors, or how to access specific sensor networks. The main purpose of the open USN service platform defined in this Recommendation is to provide:

- easy access to and use of the global USN resources and sensed data/semantic data;
- easy connection of USN resources; and
- easy development and distribution of various applications.

Recommendation ITU-T F.747.4

Requirements and functional architecture for the open ubiquitous sensor network service platform

1 Scope

The objective of this Recommendation is to define the open ubiquitous sensor network (USN) service platform and provide requirements and functional architecture for the open USN service platform.

The scope of this Recommendation includes:

- concept of the open USN service platform;
- requirements for the open USN service platform;
- functional architecture of the open USN service platform;
- functional entities of the open USN service platform.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T F.744] Recommendation ITU-T F.744 (2009), *Service description and requirements for ubiquitous sensor network middleware*.
- [ITU-T Y.2201] Recommendation ITU-T Y.2201 (2009), *Requirements and capabilities for ITU-T NGN*.
- [ITU-T Y.2221] Recommendation ITU-T Y.2221 (2010), *Requirements for support of ubiquitous sensor network (USN) applications and services in the NGN environment*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

- 3.1.1 context awareness** [ITU-T Y.2201]: A capability to determine or influence a next action in telecommunication or process by referring to the status of relevant entities, which form a coherent environment as a context.
- 3.1.2 sensor** [ITU-T Y.2221]: An electronic device that senses a physical condition or chemical compound and delivers an electronic signal proportional to the observed characteristic.
- 3.1.3 sensor network** [ITU-T Y.2221]: A network comprised of interconnected sensor nodes exchanging sensed data by wired or wireless communication.
- 3.1.4 sensor node** [ITU-T Y.2221]: A device consisting of sensor(s) and optional actuator(s) with capabilities of sensed data processing and networking.

3.1.5 sensed data [ITU-T F.744]: Data sensed by a sensor that is attached to a specific sensor node.

NOTE – The sensed data are collected from USN resources via USN middleware and stored in a sensed data repository.

3.1.6 ubiquitous sensor network (USN) [ITU-T Y.2221]: A conceptual network built over existing physical networks which makes use of sensed data and provides knowledge services to anyone, anywhere and at anytime, and where the information is generated by using context awareness.

3.1.7 USN middleware [ITU-T Y.2221]: A set of logical functions to support USN applications and services.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 metadata: Description of USN resources which include types of operations supported, attributes for those operations, etc.

3.2.2 open USN service: USN service which provides unified access to USN resources and sensed data/semantic data through heterogeneous USN middleware.

3.2.3 semantic data: Data translated into resource description framework (RDF) [b-RDF] form from metadata of USN resources and sensed data, and data processed by the Semantic inference functional entity (FE) from data represented in RDF form. These data are stored in a Semantic data repository.

3.2.4 USN resource: An entity that provides a USN service including sensor, actuator, sensor node, sensor network and gateway.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

API	Application Programming Interface
FE	Functional Entity
LOD	Linked Open Data
RDF	Resource Description Framework
REST	Representational State Transfer
SPARQL	SPARQL Protocol and RDF Query Language
URI	Uniform Resource Identifier
USN	Ubiquitous Sensor Network

5 Conventions

None.

6 Open USN service description and characteristics

USN services require USN applications to have knowledge of USN middleware and sensors or sensor networks in order to access USN resources. For example, heterogeneous USN middleware is not easily accessed by applications since each USN middleware may have proprietary application programming interfaces (APIs) which may hinder access to various USN resources attached to the USN middleware.