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SERIES F: NON-TELEPHONE TELECOMMUNICATION
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Capabilities of ubiquitous sensor networks for supporting the requirements of smart metering services

Recommendation ITU-T F.747.1



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Recommendation ITU-T F.747.1

Capabilities of ubiquitous sensor networks for supporting the requirements of smart metering services

Summary

Recommendation ITU-T F.747.1 identifies the capabilities of ubiquitous sensor networks (USNs) for supporting the requirements of smart metering services. To this end, an overview of smart metering is described, with a clarification between smart grids and smart metering provided. This Recommendation takes into account a few typical use case scenarios of smart metering and identifies the general requirements and USN-based smart metering services to support these use cases. Finally this Recommendation defines USN capabilities based on identified requirements for providing smart metering services.

History

Edition	Recommendation	Approval	Study Group
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Smart grid, smart metering, USN.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Capabilities of ubiquitous sensor networks for supporting the requirements of smart metering services

1 Scope

The main purpose of this Recommendation is to identify the capabilities of ubiquitous sensor networks (USNs) which support the requirements of smart metering services. The scope of this Recommendation covers the following:

- overview of smart metering
- smart metering use case scenarios
- requirements of smart metering services
- USN capabilities for supporting the requirements of smart metering services.

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.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 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.

3.1.2 sensor network [ITU-T Y.2221]: A network comprised of inter-connected sensor nodes exchanging sensed data by wired or wireless communication.

3.1.3 sensor node [ITU-T Y.2221]: A device consisting of sensor(s) and optional actuator(s) with the capabilities of sensed data processing and networking.

3.1.4 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 any time, and where the information is generated by using context awareness.

3.1.5 USN gateway [ITU-T Y.2221]: A node which interconnects sensor networks with other networks.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 demand response: A smart metering feature that allows consumers to reduce or change their use patterns of electricity, gas and water during peak demand usually in exchange for a financial incentive.

3.2.2 sensor network gateway: A sensor network element that connects a sensor network to another network with different architecture or protocols, permitting information exchange between them. See also USN gateway.

NOTE – Sensor network gateway functionalities may include either address or protocol translation or both.

3.2.3 smart grid: An electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.

3.2.4 smart meter: A device in a user's premises for monitoring and controlling electrical power, gas and water usage of home appliances based on demand response information from home appliances.

3.2.5 smart metering: An operation to provide information to consumers and smart metering operators about energy consumption. The information includes how much energy the consumers are using or generating and how much it costs.

3.2.6 smart metering gateway: See USN gateway.

3.2.7 utility: An entity providing services such electricity, gas, water and heating to the general public and/or to industrial and commercial entities.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

USN Ubiquitous Sensor Network

5 Conventions

None.

6 Overview of smart metering

Smart meters are utility meters, for example electricity, gas, water and other meters, which may bring about the end of estimated bills and meter readings, and provide customers and energy distributors and suppliers with accurate information on the amount of a utility that is being used.

Smart metering provides:

- customers with the information they require to become energy savvy and make smarter decisions about their energy usage;
- energy suppliers with the means to better understand and service their customers;
- distributors with an effective tool to better monitor and manage their networks.

In addition, smart metering enables those customers who choose to generate their own electricity (micro-generators) to be financially rewarded for their contribution to the national grid, and for distributors to better manage this contribution [b-ETSI TR 102 691].

Smart metering may be regarded as one of the key technologies for smart grid systems.