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TECHNICAL REPORT

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Information technology – Internet of things (IOT) – IOT use cases



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Information technology – Internet of things (IOT) – IOT use cases

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INFORMATION TECHNOLOGY – INTERNET OF THINGS (IOT) – IOT USE CASES

FOREWORD

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The main task of the joint technical committee is to prepare International Standards. However, the joint technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

ISO/IEC TR 22417, which is a Technical Report, was prepared by subcommittee 41: Internet of Things and related technologies, of ISO/IEC joint technical committee 1: Information technology.

This Technical Report has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

This document captures the results of a use case input process that began with the call for contributions of IoT (Internet of Things) use cases in 2015-05. The current document reflects contributions and discussions by ISO/IEC JTC 1 experts and liaison members, JTC 1 national mirror committees, and user organizations. This document also contains material gathered from reports, IoT research projects and group output from the JTC 1 working group on the Internet of Things meetings in September 2015 (Ottawa), January 2016 (Shanghai) and May 2016 (Berlin).

In total 25 IoT use cases were submitted by the end of July 2016. To start the project, the working group members were requested to submit use cases using the provided template. The use case submissions consisted of the title of the use case, a description and the origin of the use case. Contributors did not always provide information for all the fields of the template and did not necessarily revise their input when a modified use case template was introduced.

The use case template helped to group and categorize the use cases according to the identified IoT requirements and experience of users. Understanding the application of IoT systems made it easier to identify categories and highlight use case commonalities. Where multiple use cases fall in the same category and had overlapping items, they were consolidated into one section or extended use case. All selected use cases have real-world validity. Gaps were filled by adding extra use cases and future developments were also considered. Functional requirements were extracted from the use cases and have assisted in the development of the IoT Reference Architecture. There is a natural mapping from the user experience based use cases to the clustered technical use cases, where specific technical and functional requirements are expressed. Collecting the use cases allowed the working group to assess the general applicability of the IoT reference architecture in ISO/IEC 30141 to current IoT applications.

Experts from the following national committees, liaison organizations and research projects contributed use cases on IoT: Canada, China, Japan, UK, JTC 1/SC 27, JTC 1/SC 29, ISO/TC 184, and the Vicinity Project.

Technological advances have enormous potential to make the society more efficient and digitally inclusive and IoT implementations are demonstrating convergence of information and communications technology and their widespread application.

The target audience for this document includes:

- IoT service users who can understand how their IoT requirements are considered by an IoT service provider;
- IoT service providers who can learn about users IoT needs, and can also learn how to operate active assisted living systems;
- IoT application developers who can develop IoT applications according to the needs of the IoT service users;
- controllable equipment and ICT device manufacturers who want to know what the IoT interface requirements are;
- administrations and government authorities that have to act as IoT service users and IoT regulators.

INFORMATION TECHNOLOGY – INTERNET OF THINGS (IOT) – IOT USE CASES

1 Scope

This document identifies IoT scenarios and use cases based on real-world applications and requirements. This document comprises 25 use cases for Internet of Things submitted to the ISO/IEC JTC 1 working group on the Internet of Things between June 2015 and July 2016. Use cases are a well-known tool for expressing requirements at a high level and demonstrating their real-life relevance. The use cases provide a practical context for considerations on interoperability and standards based on user experience. Use cases clarify where existing standards can be applied and highlight where standardization work is needed.

An objective of this document is to assist in the identification of potential areas for standardization in the IoT environment to ensure ease of operation and interoperability.

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:

- ISO Online browsing platform: available at http://www.iso.org/obp
- IEC Electropedia: available at http://www.electropedia.org/

3.1
actor
entity that communicates and interacts

Note 1 to entry: These actors can include IoT devices, actuators, sensors, users, software applications, systems, databases.

3.2
use case
specification of a sequence of actions, including variants, that a system (or other entity) can perform, interacting with actors of the system

[SOURCE: ISO 14813-5:2010, B.1.160]

3.3
IoT use case
description of a hypothetically possible situation where IoT concepts, products and services may be specified as a set of actions associated with actors in an IoT system, which yields an observable result that is, typically, of value for one or more actors or other stakeholders of the system

Note 1 to entry: The aim is to pictorially describe a field of problems in a way that the artificial situation makes IoT approaches to solutions evident in their temporal, spatial as well as technical dimension.

3.4
role
set of behaviours displayed by an actor in an interaction with the system under discussion

3.5
context of use
area of knowledge or activity characterized by a set of concepts and terminology understood by the practitioners in that area

3.6
use case diagram
diagram that shows relations between actors and use cases

[SOURCE: ISO 14813-5:2010, B.1.161, modified – The words "within a system" have been deleted from the end of the definition.]

3.7
data flow diagram
diagram that depicts data sources, data sinks, data storage, and processes performed on data as nodes, and logical flow of data as links between the nodes

[SOURCE: ISO/IEC 2382:2015]

3.8
network function virtualization
NFV
technology that enables the creation of logically isolated network partitions over shared physical networks so that heterogeneous collections of multiple virtual networks can simultaneously coexist over the shared networks

Note 1 to entry: This includes the aggregation of multiple resources in a provider and appearing as a single resource.

[SOURCE: ITU-T Y.3011, 3.2.4, modified – The source term is "network virtualization".]

3.9
software defined networking
SDN
set of techniques that enables to directly program, orchestrate, control and manage network resources, which facilitates the design, delivery and operation of network services in a dynamic and scalable manner

[SOURCE: ITU-T Y.3300, 3.2.1]

4 Abbreviated terms

AAL	Active Assisted Living
ASD	Application Service Domain
ASHRAE	American Society of Heating and Air-Conditioning Engineers
CCTV	Closed Circuit Television
CE	Controllable Equipment
CoAP	Constrained Application Protocol
DDoS	Distributed Denial of Service
DR	Demand Response
EEG	Electroencephalogram