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Sistemas electrónicos para viviendas y edificios (HBES). Parte 6-2: Descripción del modelo de ontología semántica para internet de los objetos. (Ratificada por la Asociación Española de Normalización en enero de 2022.)

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Home and Building Electronic Systems (HBES)- Part 6-2 IoT Semantic Ontology model description (Endorsed by Asociación Española de Normalización in January of 2022.)

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) - Partie 6-2: Description du modèle ontologie sémantique loT (Entérinée par l'Asociación Española de Normalización en janvier 2022.)

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Home and Building Electronic Systems (HBES)- Part 6-2 IoT Semantic Ontology model description

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) - Partie 6-2: Description du modèle ontologie sémantique IoT

Elektrische Systemtechnik für Heim und Gebäude (ESHG) - Teil 6-2: Beschreibung des IoT semantischen Ontologiemodells

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European foreword

This document (EN 50090-6-2:2021) has been prepared by CLC/TC 205 “Home and Building Electronic Systems (HBES)”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2022-09-20
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2022-09-20

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1 Scope

This document defines the HBES Information Model and a corresponding data exchange format for the Home and Building HBES Open Communication System.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 50090-1:2011, *Home and Building Electronic Systems (HBES) - Part 1: Standardization structure*

EN 50090-3-3, *Home and Building Electronic Systems (HBES) - Part 3-3: Aspects of application - HBES Interworking model and common HBES data types*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50090-1:2011 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
actuator
point performing an *actuation* (executed by a specific *procedure,* with an expected *result*) that changes an Installation state during Runtime

Note 1 to entry:

— The term Actuator can be mapped to sosa:Actuator in the SSN Ontology.

— The subject *actuation* can be mapped to sosa:Actuation in the SSN Ontology.

— The subject *procedure* can be mapped to sosa:Procedure in the SSN Ontology.

— The subject *result* can be mapped to sosa:Result in the SSN Ontology.

3.1.2
Application Function
uses a set of Functions to achieve the desired behaviour of a technical system, typically using a combination of devices exchanging information via their input and output Datapoints

Note 1 to entry: An Application Function may be split into several Functional Blocks with their input and output Datapoints that are logically connected to each other. The Functional Blocks may be located in one or more devices.

EXAMPLE Application Functions examples are “direct electrical heating”, “electrical heating with accumulators”, “warm water heating”, “fan coil air-conditioning” …

Note 2 to entry: The Application Function and Application are meant to be the same. Reason to introduce an alias term is to use a clear (understandable) reference from Application/ Application Function to the corresponding KIM class :ApplicationFunction or to the Function in the Management Client.

3.1.3
aspect
generally, a specific perspective on a system that contains things with different properties; a referencing mechanism to organize KIM elements in a specific perspective

EXAMPLE A Function Point is an ex officio Aspect with an important specific perspective. It is a referencing mechanism to organize together all to a Function Point interoperating Points (all GOs linked to a GA).

3.1.4
BIM
Building Information Model, a digital process to describe and document a building in all its life cycle phases, from its planning, construction, operation up to its demolition

3.1.5
channel
collection of Datapoints of a device that are logically related to each other typically by association with a hardware feature or a specific function of that device

Note 1 to entry: These Datapoints may be derived from one or more defined Functional Blocks or may be an expansion above and beyond defined Functional Blocks or may be independent of a Functional Block if none is defined for the function associated with the Channel. The concept of a Channel is well-understood by the market participant, e.g. installers.

3.1.6
datapoint
represents a logical input entity of a device acting as recipient of Installation state data, whereas a logical output of a device acts as source of Installation state data

Note 1 to entry: In case of implementation as a Group Object, state data is communicated with the use of Function Points.

Note 2 to entry: The term Datapoint is the common term; to specifically denote a Datapoint available on an IoT 3rd Party API, the term IoT Datapoint is used.

3.1.7
device
physical element that is part of the network; it is a physical, concrete object that a customer can buy

3.1.8
endpoint
entry point to a service, a process, or a queue or topic destination in service-oriented architecture

3.1.9
Feature of Interest
abstraction of a real-world thing (phenomenon, equipment, person, event…) defined by its observable or actuatable properties

Note 1 to entry: In colloquial terms, a FOI is a property carrier.

Note 2 to entry: A Sensor operates on a FOI with observable properties, an Actuator with actuatable properties.

Note 3 to entry: A FOI is not a “classification/type” tag itself; the “classification/ type” is accomplished with the help of tags. Examples are defined in 4.5.1.4.

3.1.10
function
describes a part of the intended behaviour of a FB in a building context

3.1.11
Functional Block
consists of one or more Functions that belong together and that cannot be separated across two devices but big enough that a device with only one such Functional Block could be marketed

Note 1 to entry: A Functional Block has a well-defined black box behaviour.

3.1.12
Function Point
runtime system state information of a specific Application Function

Note 1 to entry: Shared by at least two Datapoints.

Note 2 to entry: Has a unique identifier that addresses a group of controlled objects. This identifier is called a Group Address.

EXAMPLE < Light Switch > in living room on/off, whereas the < … > is the Function Point name

3.1.13
Group Address
numerical identifier of a Function Point

3.1.14
Group Communication
communication model in which one sender communicates information to one and typically more receivers

Note 1 to entry: In IoT, this can be realized by simple UDP communication or by using a message broker system or other.

3.1.15
Group Object
foreseen for Group Communication using Group Address(es), may be accessed via point-to-point communication without an assigned Group Address; with assigned Group Address, it becomes a member of that Function Point represented by the Group Address

3.1.16
HBES Information Model
ontology based model of HBES System relevant parts, including additional semantic (dictionary) information

Note 1 to entry: It is managed by the KNX Association, hence the abbreviation KIM.

3.1.17
Industry Foundation Classes
open standard to describe BIM data in a digital way

Note 1 to entry: IFC data and models are specified in ISO 16739-1.

3.1.18
installation
assembly of materials and components (devices) placed in position to provide a service

Note 1 to entry: An Installation is a deployed system (e.g. HVAC system or fire protection system) and consists of equipment and Functions that are used for a particular purpose.

Note 2 to entry: In relation to this term created data correlates to the installation model, described in 4.2.

[SOURCE: ISO 6707-1:2020, modified – added "(devices)" and Notes to entry.]

3.1.19
IoT Datapoint
represents an Endpoint at an IoT 3rd Party API that:

a) corresponds to one or more Function Points, such as a state data representation of a discrete state in a building context:

EXAMPLE 1 brightness → discrete state “brightness” is represented by the value 65 (percent)

b) is a fully qualified URL e.g. provided by an IoT 3rd Party Server

EXAMPLE 2 https://gateway.hbes.local/hbes/api/v1/datapoints/{Id}

3.1.20
IoT Function
represents a Function at an IoT 3rd Party API that:

— is as a collection of IoT Datapoints that fulfils a – by the user – intended behaviour

EXAMPLE “living room – rear light dimming”, “kitchen – floor heating”

Note 1 to entry: In a Mac, an IoT Function is instantiated data of a MaC Function in an Installation respectively MaC project. The MaC Function itself may base on an Application Function.

3.1.21
IoT 3rd Party API
set of requirements and regulations through which partial access to an Installation can be gained by offering a collection of Endpoints

3.1.22
IoT 3rd Party Client
device or service interacting with the Installation from outside using the IoT 3rd Party API

Note 1 to entry: The IoT 3rd Party Client connects to a single device that provides the IoT 3rd Party API and can use this single device to fully interact with the Installation, possibly depending on a specified authorization mechanism.

EXAMPLE 1 A mobile phone (from inside the network, or from an Internet connection) with typically short period connections.

EXAMPLE 2 A weather service permanently feeding in its weather information using the IoT 3rd Party API.

3.1.23
IoT 3rd Party Server
device that implements the IoT 3rd Party API

Note 1 to entry: This can be a dedicated device; this can be a function of a device that supports other HBES IoT and non HBES functionalities; it may be located within the local LAN of the IoT installation or outside.

3.1.24
MaC Catalog Entry
created management client data correlating to the product model, described in 4.2

3.1.25
MaC Function
Application Function created by the MaC and assigned to a building structure element, grouping several Group Addresses

3.1.26
MaC Project
project created by a MaC documenting the Configuration of an Installation

3.1.27
Management Client
means to configure and commission Devices as well as to plan, design and diagnose an entire Installation

Note 1 to entry: The MaC is used to configure and commission Devices, as well as to plan, design and diagnose an entire Installation. As a final step the MaC writes specific configuration data such as Device parameters to the Devices.

3.1.28
ontology
conceptual descriptions of things that have a real-world commonality sharing the knowledge of a domain, mainly expressed with OWL

Note 1 to entry: Ontologies are a structured way to describe the meaning of data in ontology classes and should not be mixed up with common data model structures.

3.1.29
Object Property
in OWL a built-in concept that **connects** pairs of individuals, an object property expression **represents** the (entire) relationship between the pairs of individuals

3.1.30
OWL
OWL 2 Web Ontology Language, informally OWL 2, specified by the World Wide Web Consortium (W3C), mainly serialized with XML syntax for RDF (RDF/XML)

Note 1 to entry: In this specification the abbreviation OWL is always an explicit reference to OWL 2.

3.1.31
point
represents an interface to data in the system

Note 1 to entry: This document uses the term Point as an umbrella for data that can be accessed from outside of the Device, for instance to interact with other Points from other Devices. Consequently, term Point is a generic superset of the term Datapoint (which describes more precisely the technics how the “data” in the system are structured and/or coded).

3.1.32
Point API
simple RESTful (CoAP or HTTP) application programming interface designed for, but not limited to, constrained class 2 devices [RFC7228] supporting device individualization, device linking and accessing device runtime data (e.g. Functional Block or Channel Datapoints)

3.1.33
Quality Kind
represents a certain combination of observable or actuatable properties, available as predefined parts of the Semantic Dictionary or created individually during Configuration; the latter is the case when a Quality Kind with the intended combination of properties respectively tags is not (yet) part of the dictionary

Note 1 to entry: A QK is not a “classification/type” tag itself; the “classification/ type” is accomplished with the help of tags. Examples are defined in 4.5.1.4.