The Building Topology Ontology (BOT)

Metadata

IRI

https://w3id.org/bot#

Title

The Building Topology Ontology (BOT)

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Version Iri

https://w3id.org/bot-0.3.2

Version Info

0.3.2

Prior Version

https://w3id.org/bot-0.3.1

Preferred Namespace Prefix

bot

Preferred Namespace Uri

The Building Topology Ontology (BOT)

Description

The Building Topology Ontology (BOT) is a simple ontology defining the core concepts of a building. It is a simple, easy to extend ontology for the construction industry to document and exchange building data on the web. Changes since version 0.2.0 of the ontology are documented in: https://w3id.org/bot/bot.html#changes The version 0.2.0 of the ontology is documented in: Mads Holten Rasmussen, Pieter Pauwels, Maxime Lefrançois, Georg Ferdinand Schneider, Christian Anker Hviid and Jan Karlshøj (2017) Recent changes in the Building Topology Ontology, 5th Linked Data in Architecture and Construction Workshop (LDAC2017), November 13-15, 2017, Dijon, France, https://www.researchgate.net/publication/320631574_Recent_changes_in_the_Building_Topology_Ontology The initial version 0.1.0 of the ontology was documented in: Mads Holten Rasmussen, Pieter Pauwels, Christian Anker Hviid and Jan Karlshøj (2017) Proposing a Central AEC Ontology That Allows for Domain Specific Extensions, Lean and Computing in Construction Congress (LC3): Volume I – Proceedings of the Joint Conference on Computing in Construction (JC3), July 4-7, 2017, Heraklion, Greece, pp. 237-244 https://doi.org/10.24928/JC3-2017/0153

Classes

Vocabulary [c]

IRI	`http://purl.org/vocommons/voaf#Vocabulary`
Named Individuals	The Building Topology Ontology (BOT) [ni]

Zone [c]

IRI	`https://w3id.org/bot#Zone`
Is Defined By	The Building Topology Ontology (BOT)
Description	A part of the physical world or a virtual world that is inherently both located in this world and has a 3D spatial extent; Sub-classes of bot:Zone include bot:Site, bot:Building, bot:Storey, or bot:Space. An instance of bot:Zone can contain other bot:Zone instances, making it possible to group or subdivide zones. An instance of bot:Zone can be adjacent to or intersecting other bot:Zone instances. Finally, a bot:Zone can instantiate three relations to bot:Element, which are either contained in (bot:containsElement), adjacent to it (bot:adjacentElement) or intersecting (bot:intersectingElement).
In Domain Of	adjacent zone [op] intersects zone [op] contains zone [op] has building [op] has storey [op] has space [op] has element [op]
In Domain Includes Of	has simple 3D model [dp] has 3D model [op]
In Range Of	adjacent zone [op] intersects zone [op] contains zone [op]
Super Class Of	Site [c] Building [c] Storey [c] Space [c]

Site [c]

IRI	`https://w3id.org/bot#Site`
Is Defined By	The Building Topology Ontology (BOT)
Description	A part of the physical world or a virtual world that is inherently both located in this world and having a 3D spatial extent. It is intended to contain or contains one or more buildings.
Sub Class Of	Zone [c]
In Domain Of	has zero point [op]
In Domain Includes Of	adjacent zone [op] intersects zone [op] contains zone [op] has building [op]
In Range Includes Of	adjacent zone [op] intersects zone [op] contains zone [op]

Building [c]

IRI	`https://w3id.org/bot#Building`
Is Defined By	The Building Topology Ontology (BOT)
Description	An independent unit of the built environment with a characteristic spatial structure, intended to serve at least one function or user activity [ISO 12006-2:2013]. A bot:Building is a part of the physical world or a virtual world that is inherently both located in this world and having a 3D spatial extent, is contained in a building site, and can contain one or more storeys that are vertically connected.
Sub Class Of	Zone [c]
In Domain Includes Of	adjacent zone [op] intersects zone [op] contains zone [op] has storey [op]
In Range Of	has building [op]
In Range Includes Of	adjacent zone [op] intersects zone [op] contains zone [op]

Storey[c]

IRI	https://w3id.org/bot#Storey
Is Defined By	The Building Topology Ontology (BOT)
Description	A part of the physical world or a virtual world that is inherently both located in this world and having a 3D spatial extent. A bot:Storey is contained in one or more buildings, and is intended to contain one or more spaces that are horizontally connected. Storeys of a building are connected by means of vertical connections such as elevators and stairs. A bot:Storey encompasses both zones above and below ground, for example, a building with 21 floors above ground, one ground floor and 3 basements is equal to the sentence: A building has 25 instances of bot:Storey.
Sub Class Of	Zone[c]
In Domain Includes Of	adjacent zone[op] intersects zone[op] contains zone[op] has space[op]
In Range Of	has storey[op]
In Range Includes Of	adjacent zone[op] intersects zone[op] contains zone[op]

Space[c]

IRI	https://w3id.org/bot#Space
Is Defined By	The Building Topology Ontology (BOT)
Description	A part of the physical world or a virtual world whose 3D spatial extent is bounded actually or theoretically, and provides for certain functions within the zone it is contained in.
Sub Class Of	Zone[c]
In Domain Includes Of	adjacent zone[op] intersects zone[op] contains zone[op]
In Range Of	has space[op]
In Range Includes Of	adjacent zone[op] intersects zone[op] contains zone[op]

Building element [c]

IRI	https://w3id.org/bot#Element
Is Defined By	The Building Topology Ontology (BOT)
Description	Constituent of a construction entity with a characteristic technical function, form or position [ISO 12006-2:2015, 3.4.7]
In Domain Of	has sub-element [op] hosts element [op]
In Domain Includes Of	has simple 3D model [dp] has 3D model [op]
In Range Of	has sub-element [op] has element [op] hosts element [op]

Interface [c]

IRI	https://w3id.org/bot#Interface
Is Defined By	The Building Topology Ontology (BOT)
Description	A generic concept to qualify the relationship of two or more things in the world, where at least one is a building element or zone. Examples: - Qualification of heat transmission between zones through one or more building elements. This includes one-dimensional (surface) heat losses from one zone to another through a single building element, a two dimensional (line) loss from one zone to another through the connection in which the two elements meet or a three dimensional (point) loss from one zone to another through the connection where three elements (typically two walls and a slab) meet. - Connection of an electric device to the electric system of a building. - A door between one room and another.
In Domain Of	interface of [op]

Object Properties

adjacent zone [op]

IRI	`https://w3id.org/bot#adjacentZone`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relationship between two zones that share a common interface, but do not intersect.
Domain	Zone [c]
Domainincludes	• Site [c] • Building [c] • Storey [c] • Space [c]
Range	Zone [c]
Rangeincludes	• Site [c] • Building [c] • Storey [c] • Space [c]

intersects zone [op]

IRI	`https://w3id.org/bot#intersectsZone`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relationship between two zones whose 3D extent intersect. For example, a stairwell intersects different storeys.
Domain	Zone [c]
Domainincludes	• Site [c] • Building [c] • Storey [c] • Space [c]
Range	Zone [c]
Rangeincludes	• Site [c] • Building [c] • Storey [c] • Space [c]

contains zone [op]

IRI	`https://w3id.org/bot#containsZone`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relationship to the subzones of a major zone. A space zone could for instance be contained in a storey zone which is further contained in a building zone. bot:containsZone is a transitive property. This implies that in the previous example a bot:containsZone relationship holds between the space zone and the building zone.
Super Property Of	• has building [op] • has storey [op] • has space [op]
Domain	Zone [c]
Domainincludes	• Site [c] • Building [c] • Storey [c] • Space [c]
Range	Zone [c]
Rangeincludes	• Site [c] • Building [c] • Storey [c] • Space [c]

has building [op]

IRI	`https://w3id.org/bot#hasBuilding`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation to buildings contained in a zone. The typical domains of bot:hasBuilding are instances of bot:Site.
Sub Property Of	contains zone [op]
Domain	Zone [c]
Domainincludes	Site [c]
Range	Building [c]

has storey [op]

IRI	https://w3id.org/bot#hasStorey
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation to storeys contained in a zone. The typical domains of bot:hasStorey are instances of bot:Building.
Sub Property Of	contains zone [op]
Domain	Zone [c]
Domainincludes	Building [c]
Range	Storey [c]

has space [op]

IRI	https://w3id.org/bot#hasSpace
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation to spaces contained in a zone. The typical domains of bot:hasSpace are instances of bot:Storey or bot:Building.
Sub Property Of	contains zone [op]
Domain	Zone [c]
Domainincludes	Storey [c]
Range	Space [c]

has sub-element [op]

IRI	https://w3id.org/bot#hasSubElement
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation between two building elements, either one element hosting another (e.g. a wall hosts a window) or a subcomposition of a building element into smaller parts (e.g. an air handling unit has as a part a fan).
Domain	Building element [c]
Range	Building element [c]

has element [op]

IRI	`https://w3id.org/bot#hasElement`
Is Defined By	The Building Topology Ontology (BOT)
Description	Links a Zone to an Element that is either contained in, adjacent to or intersecting with the Zone. The intended use of this relationship is not to be stated explicitly, but to be inferred from its sub-properties. It will, for example, allow one to query for all the doors of a building given that they have an adjacency to spaces of the building.
Super Property Of	• adjacent element [op] • contains element [op] • intersecting element [op]
Domain	Zone [c]
Range	Building element [c]

adjacent element [op]

IRI	`https://w3id.org/bot#adjacentElement`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation between a zone and its adjacent building elements, bounding the zone.
Sub Property Of	has element [op]

contains element [op]

IRI	`https://w3id.org/bot#containsElement`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation to a building element contained in a zone.
Sub Property Of	has element [op]

intersecting element [op]

IRI	`https://w3id.org/bot#intersectingElement`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relation between a Zone and a building Element that intersects it.
Sub Property Of	has element [op]

interface of [op]

IRI	`https://w3id.org/bot#interfaceOf`
Is Defined By	The Building Topology Ontology (BOT)
Description	Relationship between an interface and another thing (building zone, element or owl:Thing)
Domain	Interface [c]

has zero point [op]

IRI	`https://w3id.org/bot#hasZeroPoint`
Is Defined By	The Building Topology Ontology (BOT)
Description	Links a bot:Site to an instance that encodes the latitude and longitude of the Zero Point of the building site. This could be an instance of a wgs84:Point. The definition of GIS and geometry is not within the scope of BOT and an appropriate ontology needs to be selected here by the user. The use of this property is potentially ambiguous and it might be removed or revised in future editions of the ontology.
Domain	Site [c]

has 3D model [op]

IRI	`https://w3id.org/bot#has3DModel`
Is Defined By	The Building Topology Ontology (BOT)
Description	Links any bot:Zone or bot:Element to a IRI that identifies its 3D Model. This 3D Model can then be described using some dedicated RDF vocabulary. Else, the 3D Model IRI could be dereferenceable, and when looking up the IRI one could retrieve a representation of the 3D Model with some existing data format for 3D models.
Domainincludes	• Building element [c] • Zone [c]

hosts element [op]

IRI	`https://w3id.org/bot#hostsElement`
Description	This property is DEPRECATED, use bot:hasSubElement instead // ORIGINAL definition: Relation between an element a) and another element b) hosted by element a). Example: inst:wall bot:hostsElement inst:window
Domain	Building element [c]
Range	Building element [c]

aggregates op

IRI `https://w3id.org/bot#aggregates`

Description

This property is DEPRECATED, use bot:hasSubElement instead // ORIGINAL definition: Links an aggregate (a cluster of elements that can be treated as a single unit) to its sub-elements. For example an Air Handling Unit aggregates, among other elements, a fan and a filter.

Example of how to use bot:aggregates in a product ontology:

```
product:Fan rdfs:subClassOf bot:Element . product:Filter rdfs:subClassOf bot:Element . product:hasFan rdfs:subPropertyOf bot:aggregates ; rdfs:range product:Fan . product:hasFilter rdfs:subPropertyOf product:aggregates ; rdfs:range product:Filter . product:AirHandlingUnit rdfs:subClassOf bot:Element ; rdfs:subClassOf [ owl:onProperty product:hasFan ; owl:someValuesFrom product:Fan ] ; rdfs:subClassOf [ owl:onProperty product:hasFilter ; owl:someValuesFrom product:Filter ] .
```

Datatype Properties

has simple 3D model dp

IRI `https://w3id.org/bot#hasSimple3DModel`

Is Defined By The Building Topology Ontology (BOT)

Description Links any bot:Zone or bot:Element to a 3D Model encoded as a literal.

Domainincludes

- Building element c
- Zone c

Annotation Properties

title ap

IRI `http://purl.org/dc/terms/title`

description ap

IRI `http://purl.org/dc/terms/description`

issued ap

IRI `http://purl.org/dc/terms/issued`

modified ap

IRI `http://purl.org/dc/terms/modified`

creator ap

IRI `http://purl.org/dc/terms/creator`

contributor ap

IRI http://purl.org/dc/terms/contributor

license ap

IRI http://purl.org/dc/terms/license

preferred namespace prefix ap

IRI http://purl.org/vocab/vann/preferredNamespacePrefix

preferred namespace uri ap

IRI http://purl.org/vocab/vann/preferredNamespaceUri

domain includes ap

IRI https://schema.org/domainIncludes

range includes ap

IRI https://schema.org/rangeIncludes

term_status ap

IRI http://www.w3.org/2003/06/sw-vocab-status/ns#term_status

fn ap

IRI http://www.w3.org/2006/vcard/ns#fn

name ap

IRI https://schema.org/name

Namespaces

bot
https://w3id.org/bot#

dcterms
http://purl.org/dc/terms/

owl
http://www.w3.org/2002/07/owl#

prov
http://www.w3.org/ns/prov#

rdf
http://www.w3.org/1999/02/22-rdf-syntax-ns#

rdfs

http://www.w3.org/2000/01/rdf-schema#

schema

https://schema.org/

vann

http://purl.org/vocab/vann/

vcard

http://www.w3.org/2006/vcard/ns#

voaf

http://purl.org/vocommons/voaf#

vs

http://www.w3.org/2003/06/sw-vocab-status/ns#

Legend