# External Specifications for
# Open Data Distribution Platform Systems

**Version 2.0**

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# 1. Introduction

## 1.1. Background and purpose

With the advances of recent years in information and communication technology (ICT) and growth of the information infrastructure, ubiquitous networking is becoming a reality wherein anyone will be able to obtain support using ICT, anytime and anywhere. In addition to existing modes of communication that allow people to exchange information with each other through audio, text, and multimedia, data obtained by sensors and devices that are used in a variety of settings in society can now be connected to information and communications networks due to advances in areas such as the Internet of Things (IoT) and machine-to-machine technologies (M2M), making it possible to gather vast amounts of data that can be used to help society to operate with greater efficiency and convenience. We are coming closer to a future where everything and every place in society will be connected by information and communications networks, exchanging enormous amounts of data. There is a growing move toward public availability and distribution for data that in the past has been accessible only within specific companies, groups, industries, or government organizations. The purpose of these specifications is to define the methodology as a means of facilitating the construction of applications to register and use the various types of public data as well as servers to aggregate the information. An open data distribution platform (ODDP) (Fig. 1.1) is an environment of versatile technologies and operating rules for the purpose of promoting distribution and collaboration in relation to the construction of applications that register and use public data. This document specifies external technical standards concerning the data model and application programming interface (API) for constructing open data distribution platform systems.

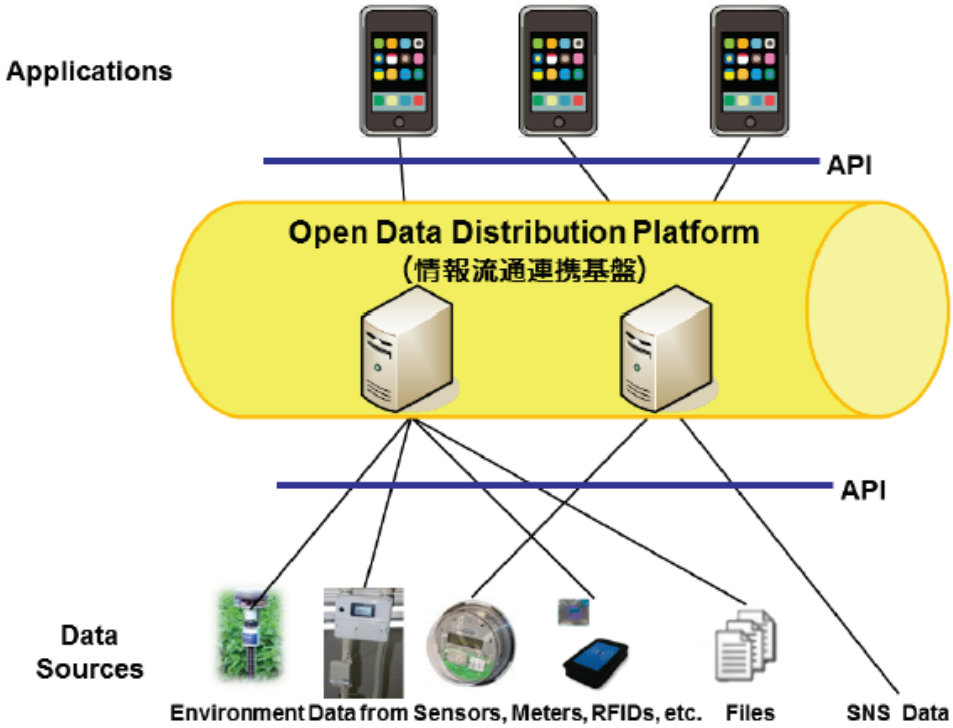



Fig. 1.1. Overview of the open data distribution platform (ODDP)

## 1.2. Scope of specification

The two areas below comprise the scope specified by this document.

1. Data standards (ODDP data standards)

   The ODDP data standards are technical standards concerning the data model, data representation formats, and vocabularies for construction of an open data distribution platform that supports distribution and collaboration with regard to public data across multiple industries.

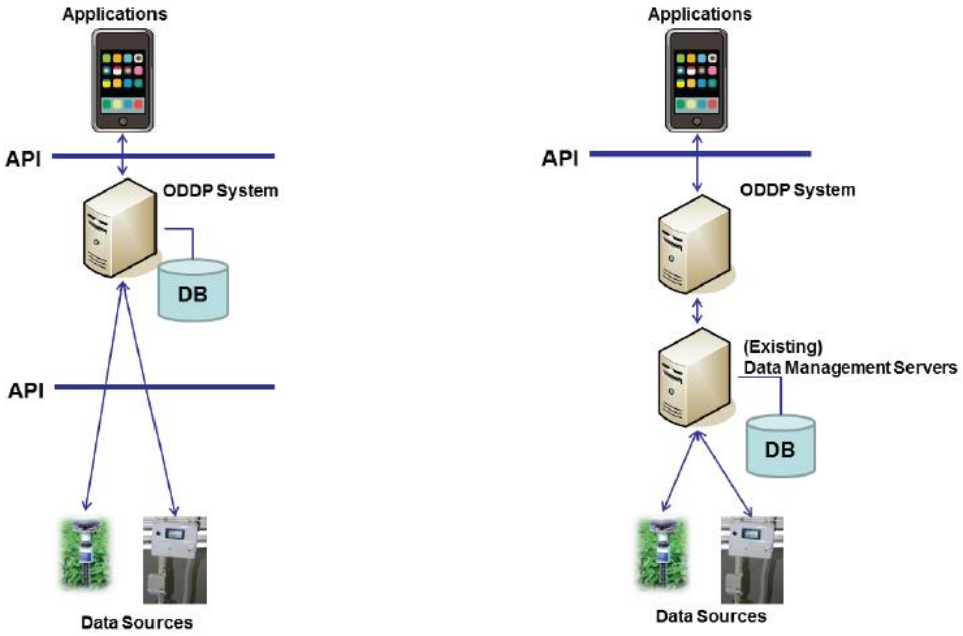
   Detailed information concerning these standards is presented in section 2 (ODDP data standards).

2. API standards (ODDP API standards)

   The ODDP API standards are technical standards concerning methods for the interchange of public data across multiple industries, including methods for operations such as retrieval, acquisition, and updating of data for open data distribution platform systems.

   Detailed information concerning these standards is presented in section 3 (Summary of ODDP API) and section 4 (Details of ODDP API).

These specifications do not cover other matters than ODDP data standards and ODDP API standards. For example, these specifications do not define standards concerning the construction of databases or servers. Therefore, as shown in Fig. 1.2 (b), a system could be constructed by overlaying the ODDP API on an interface for an existing data processing system.




(a) Data sources as well as applications are based on the ODDP API.

(b) The ODDP API is used with an existing data management system.

Fig. 1.2. Example configuration of open data distribution platform

## 1.3. Expressions concerning requirements, prohibitions, and permissions

Requirements, prohibitions, and permissions are expressed as follows in this document.

Requirements: "must," "should"
Prohibitions: "must not," "cannot"
Permissions: "may," "can"

## 1.4. Specification policies

This document specifies the following policies for ODDP data standards and ODDP API standards.

1. Compatibility with existing standards

   Many different standards for the exchange of data among applications and servers are already being used widely. These specifications were developed with consideration for maximal utilization of and interoperability with existing standards.

2. Identification targets and methods

   These specifications clarify the data and subject matter for identification and indicate methods for their identification. Identification methods are based on maximal utilization of existing identifiers, as in the preceding paragraph.

3. Selective use and expansion of specifications

   These specifications are designed to facilitate the construction of applications and servers by indicating methods for the construction of applications to register and use public data, as well as servers to aggregate information. Therefore, consideration is given to flexible application of these specifications when constructing applications and servers. In other words, selective use and expansion of these specifications is allowed. Important points for consideration concerning the selective use and expansion of these specifications will be discussed later.

Policies 1–3 are discussed below.

### 1.4.1. Compatibility and interoperability with existing standards

Several standards on data exchange between applications and servers have already been established, including RDF [37], HTTP [47], XML [52], JSON [23], Turtle [46], REST, Linked Data Platform [49], OAuth 2.0 [25], Dublin Core [22], DoI (Digital Object Identifiers) [34], UUID (Universally Unique Identifier) [32], ISBN (International Standard Book Number) [33], and ucode (Ubiquitous Code) [16].

These specifications give consideration to compatibility and interoperability with the existing standards listed above. The details are indicated below.

The existing standards referenced herein are as of the time of publication of these specifications. Future revisions in existing standards after the time of publication of these specifications will be addressed according to the maintenance schedule of these specifications. Therefore, there will be a time lag until future revisions in existing standards can be reflected.

#### 1.4.1.1. Data model and representation formats

The data handled by these specifications is based on the RDF data model [37]. RDF is a widely used data model for descriptions of data and metadata.

The applicable representation formats are widely used formats based on the RDF model, such as RDF/XML [1], N-Triples [29], Notation3 [4], Turtle [46], and JSON-LD [51].

#### 1.4.1.2. Communication and message formats and authentication methods

The communication and message formats and authentication methods are based on existing standards such as HTTP [47], XML [52], JSON [23], and Auth 2.0 [25] .

#### 1.4.1.3. Relation to existing APIs

The following describes the relationship between existing APIs and the ODP API.

1. SPARQL [18, 28, 30]

   The SPARQL-based commands (section 4.1) included in the ODDP API are based on SPARQL 1.1.

2. Linked Data Platform [49]

   Within the ODDP API, the Linked Data Platform is used for REST style APIs that are input-output interfaces for commands to input or output data based on the RDF model. Commands that are not specified by the Linked Data Platform are specified independently by the ODDP API. For example, under geographical data management commands, a command to search for location information (section 4.3.1) is not specified by the Linked Data Platform, so it is provided independently by these specifications. Meanwhile, since the response to this command is data based on the RDF model, the rules of the Linked Data Platform are followed with regard to the response format and the method for specifying the data representation format.

#### 1.4.1.4. Relevant vocabularies

The vocabularies for description of data based on the RDF model are widely used, including Dublin Core [22], DCMI [21], FoaF [8], and DCAT [39]. The vocabularies based on the ucode system include basic vocabulary [13] and spatial metadata vocabulary [12], and these can also be used as vocabularies based on ODDP data standards.

Please refer to Appendix C for a list of vocabularies for reference when describing data under these specifications.

### 1.4.2. Identification targets and methods

These specifications apply to the following data.

- Files containing data such as documents, tables, images, video, and audio
- Data created by interpreting the above and converting it into RDF format
- Data measured by sensors
- Data supplied by users of social networking services, etc.
- Data based on other applications
- Metadata concerning the data sets above

The data handled by these specifications should be uniquely identified to prevent confusion with other data. For example, public data subject to these specifications can indicate products in the distribution process in traceability applications, locations identified with geospatial applications, and organizations that created the files, so these also need to be identified. Therefore, unique identification is needed for things, organizations, places, etc. that are indicated by public data.

Also, because these specifications follow the RDF data model, identifiers for data handled by these specifications should be expressed in the URI (Uniform Resource Identifier) format, which the specified method for representation of RDF resources.

Concerning identifiers for data and its associated things, organizations, places, etc. in fields where identifiers meeting the above conditions already exist, those existing identifiers are used in accordance with the policies stated in the preceding section. For example, these include DoI (Digital Object Identifiers) [34], UUID (Universally Unique Identifier) [32], ISBN (International Standard Book Number) [33], and ucode [16]. Meanwhile, ucode, a technical standard based on ITU-T H.642.1 [35], may also be used in cases where there is no uniform method for identifying data or its associated things, organizations, places, etc., or it is not possible to represent their identifiers in the URI format.

### 1.4.3. Selective provision and expansion of functions

These specifications indicate an API consisting of eight functions, as well as the elements needed for vocabulary definitions. Examples of vocabulary definitions are given in an appendix. These are specified as matters needed for typical applications that register and use public data.

Servers that comply with these specifications do not necessarily have to provide all of the functions stated in this document. The functions needed for the envisioned services may be selected. However, at least one of the functions stated in this document should be provided.

It is also possible to independently expand or limit the functions to ensure usability and improve performance, depending on the services. However, we recommend that the input-output parameters of expanded API specifications should be as defined in these specifications. Server providers who limit or add to the supplied functions should provide specifications including the following information to application developers.

- The referenced version of this document and the source where it was obtained.
- A list of the functions under these specifications which are provided by the server.
- The functions subject to limitations.
  For example, "___ function is not provided," "XML responses are not supported," or "___ parameter cannot be used."
- The expanded functions.
  Concerning expanded API functions, we recommend stating the following items of information, similar to the descriptions of API specifications in this document.
  Function overview, method, URL path, constrained conditions, parameters, required HTTP headers, status codes, response, and API usage examples

## 1.5 Terminology definitions

Table 1.5.1 shows definitions of terms used in this document. Two of these terms, RDF and ucode, are also explained in appendices at the end of this document.

Table 1.5.1. Terminology definitions

| Word or phrase | Meaning |
|---|---|
| Public data | Data made available for use by many persons, companies, and organizations. In addition to data in documentary or tabular form and data contained in databases, public data includes real-time data obtained from network-connected devices such as sensors, as well as data supplied by users of social networking services (SNS) and the like. Public data also includes data where uses such as access, editing, and diversion are only permitted under certain conditions. |
| Open data | Public data that is supplied in a machine-readable data format under rules of use (licensing) that allow secondary uses, including commercial uses. |
| Open data distribution platform | An environment of versatile technologies and operating rules, etc. that enables collaboration and sharing with regard to information, knowledge, and services, as a common basis for the distribution and utilization of information without being limited to a certain entity, field, or sector. |
| Metadata | Highly abstract supplementary data that accompanies an item of data. For example, metadata may include the time and place where some data was created, its author and title, and comments. |
| Open data distribution platform system | An actual implementation of an open data distribution platform, realized by a software system built on a cloud server by way of a wide-area digital network such as the Internet. |
| User program | A program that obtains and registers public data and is connected to an open data distribution platform system. |
| ucode [16] | A number identifying an object, place, or concept in units of 128-bit values. |
| ucode tag | Media used to store ucodes. |
| RDF [37] | Resource Description Framework, a framework for the description of a "web resource" (item that is referred to). The RDF data model describes a resource in terms of three elements: a subject, a predicate, and an object. |
| URI [3] | Uniform Resource Identifier, an identifier of a web resource. The subject and predicate of an RDF statement are URIs. The object is either a URI or a string of characters. |
| Vocabulary | A set of semantic definitions concerning the attributes and types to be understood in common within a certain field in order to describe objects and data belonging to that field. A vocabulary serves as a dictionary for use in describing public data. |
| Term | A semantic definition concerning a specific attribute or type. Terms are the component elements of a vocabulary. |
| REST | Representational State Transfer. Here, this refers to a query method that uses the HTTP commands GET, POST, PUT, and DELETE to perform the operations of acquiring, creating, updating, and deleting data. |
| ucode issuing | Generating a ucode value that has never been used before. |

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## 1.7. Revision history

Table 1.7.1. Revision history

| Revision date | Version | Changes |
|---|---|---|
| 3/25/2013 | 1.0 | • Created initial version. |
| 9/10/2013 | 1.1 | • Revised introduction to clarify the purpose and scope of these specifications.<br>• Specified the RDF/XML or RDF/JSON standards for notification query formats.<br>• Added explanations to API usage examples.<br>• Added explanations of RDF and ucode as appendices.<br>• Corrected inconsistencies in notation and layout. |
| 6/XX/2014 | 2.0 draft | • Revised security management commands.<br>• Added function of specifying null value to request automatic ucode issuing.<br>• Eliminated APIs with very low frequency of use (triple operation API of SPARQL, map operation API, and user group operation API)<br>• Changed the JSON response format of REST-based API from RDF/JSON to JSON-LD.<br>• Changed RDF data exchanging API parameters and search API responses for consistency with the rules of Linked Data Platform [49].<br>• Moved portions concerning specific vocabularies to appendices for improved maintainability.<br>• Added vocabulary for access control description and pharmaceutical vocabulary.<br>• Revised geospatial object vocabulary. |

## 2. ODDP data standards

The data standards for open data distribution platform systems (hereinafter "ODDP data standards") are common standards concerning the data model, data representation formats, and vocabularies for distribution and linking of public data across multiple industries using open data distribution platform systems. The ODDP data standards cover the areas below.

### 2.1. Data model

A data model is a model for simple and expandable descriptions of public data. The data model under these specifications is as follows.

- The model used is RDF [37].
- Ucode [16] is used for identifiers of public data and the objects, organizations, places, etc. referred to by the data.
  - Several identifier systems are in place at present, including ISBN, ISSN, and Digital Object Identifiers (DOI). In cases where those can be represented using Uniform Resource Identifiers (URI), that system is used.
  - To maintain consistency with the RDF model, ucode is represented in the URN format [36].

### 2.2. Data representation formats

A data representation format is a machine-readable format for the representation of public data based on the RDF model. The data representation formats under these specifications are as follows.

- RDF/XML [1]
- Turtle RDF-turtle
- N-Triples [29]
- Notation3 [4]
- JSON-LD [51]

### 2.3. Vocabulary

A vocabulary is information corresponding to a dictionary for the sake of a common understanding of the meaning of data. The individual elements comprising a vocabulary are called "terms." A term that is generally used as a predicate is called a "property," while a term that is generally used as an object is called a "class" if it represents a group of referents, or an "instance" if it represents a member of a class.

Individual identification of vocabulary items is made possible by assigning ucodes.

Vocabulary items can be added as needed, and the relationships among them can be described.

The metadata needed for vocabulary definitions is specified by DCMI Metadata Terms [20]. In these specifications, we recommend including the following metadata in vocabulary definitions, based on that resource.

- Strongly recommended metadata

  - Name: A token appended to the URI of a DCMI namespace to create the URI of the term.
  - Label: The human-readable label assigned to the term.
  - URI: The Uniform Resource Identifier used to uniquely identify a term.
  - Definition: A statement that represents the concept and essential nature of the term.
  - Type of Term: The type of term as described in the DCMI Abstract Model

- Recommended metadata

  - Comment: Additional information about the term or its application.
  - See: Authoritative documentation related to the term.
  - References: A resource referenced in the Definition or Comment.
  - Refines: A Property of which the described term is a Sub-Property.
  - Broader Than: A Class of which the described term is a Super-Class.
  - Narrower Than: A Class of which the described term is a Sub-Class.
  - Has Domain: A Class of which a resource described by the term is an Instance.
  - Has Range: A Class of which a value described by the term is an Instance.
  - Member Of: An enumerated set of resources (Vocabulary Encoding Scheme) of which the term is a Member.
  - Instance Of: A Class of which the described term is an instance.
  - Version: A specific historical description of a term.
  - Equivalent Property: A Property to which the described term is equivalent

A list of vocabulary for reference when describing data under these specifications is provided in Appendix C.

## 3. Overview of ODDP API

The API for open data distribution platform systems (hereinafter "ODDP API") consists of the following eight functions. These are shown in Fig. 3.1. The first function consists of commands based on the SPARQL [18, 28, 30] specifications, and the other seven functions are commands based on REST.

1. SPARQL-based commands
   Commands based on the SPARQL protocol [18, 28, 30].

2. Traceability and real-time data management commands
   Commands for implementation of public data operations that involve time-series data processing, such as traceability information, event logs, and real-time data, by user programs.

3. Geographic data management commands
   Commands for implementation of public data operations that involve geographic data processing by user programs.

4. Security management commands
   Commands for implementation of security operations, such as user management and access control, by user programs.

5. Vocabulary management commands
   Commands for implementation of vocabulary management by user programs.

6. Notification management commands
   Commands for user programs to use functions that provide notifications to the user programs from ODDP systems in response to registration and updating of public data.

7. Triple management commands
   Commands for simplified operations with RDF triples by user programs, for the sake of efficiency in user programs based on small devices such as sensors and smart meters.

8. Identification resolution commands
   Commands for user programs to use functions to resolve the storage location of public data from ucode by user programs.

Below, this chapter discusses common specifications related to the ODDP API.

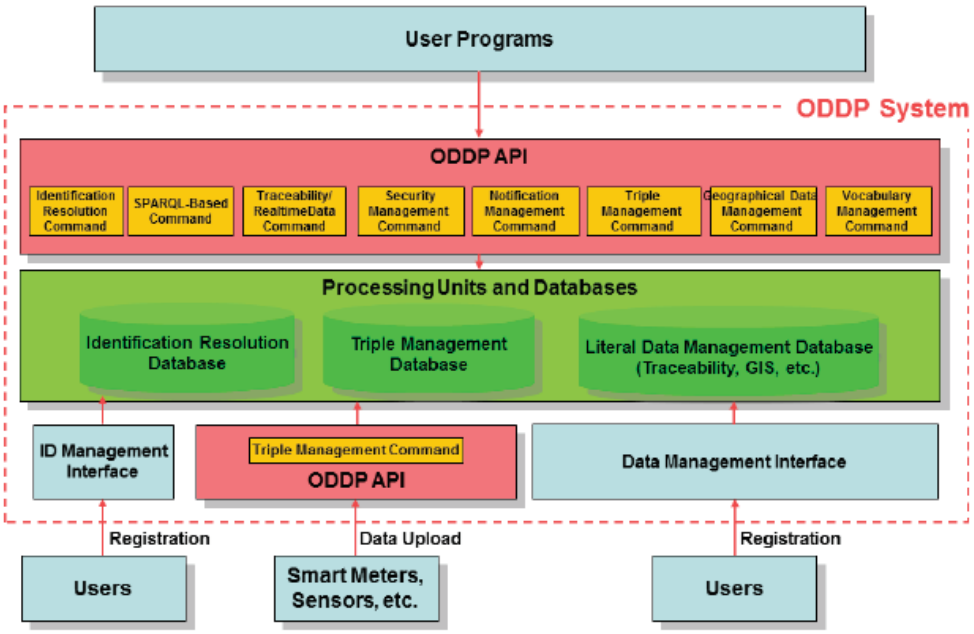



Fig. 3.1. Configuration of open data distribution platform systems

## 3.1. rotocol

The ODDP API is defined under the HTTP/1.1 [47] protocol.

## 3.2. unctions corresponding to HTTP methods

In general, the correspondence between functions and HTTP method names in the ODDP API is basically according to RESTful APIs, as indicated in Table 3.2.1.

Table 3.2.1. elationship between functions and HTTP methods

| HTTP method | Function |
|---|---|
| GET | Retrieval or searching |
| POST | New object registration |
| PUT | Updating data |
| DELETE | Deletion of data |

## 3.3. TTP status codes

Table 3.3.1 shows the status codes returned by an open data distribution platform system using the ODDP API.

Table 3.3.1. tatus codes of ODDP API

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 201 | Created | A new resource has been created successfully. |
| 204 | No Content | Completed successfully (if there is no response message). |
| 400 | Bad Request | Parameter error. |
| 401 | Not Authenticated | Unauthenticated status, or authentication failed. |
| 403 | Forbidden | Authorization error. |
| 404 | Not Found | The requested resource does not exist, or the function is not defined in these specifications. |
| 409 | Conflict | Registration failed because of an overlap with data that has already been registered. |
| 413 | Request Entity Too Large | The request exceeds the limits of the system. |
| 500 | Internal Error | An internal error of the system. |
| 501 | Not Implemented | The requested function is not supported. (This code is returned if a requested command is included in these specifications but has not been implemented.) |

## 3.4. Request and response formats

The following matters are specified with regard to messages exchanged between user programs and open data distribution platform systems.

- Format of message body and method of specification
- Request success or failure and content of message body
- Response paging method
- Rules on URI expressions

Matters based on SPARQL standards should conform to the SPARQL 1.1 standards [30], and RDF data sending and receiving and response paging methods should conform to Linked Data Platform [49], Linked Data Platform Paging [50], etc.

The details are discussed below.

### 3.4.1. Format of message body

The data format of the message body portion of a request and response should be as follows.

- When sending and receiving RDF data
  The format is Turtle [46], RDF/XML [1], JSON-LD [51], N-Triples [29], or Notation3 [46].

- Otherwise
  The format is JSON [23] or XML [5].

To identify the RDF data format when a user program or open data distribution platform system sends a query or response with a message body consisting of RDF data, the HTTP header should include a Content-Type header having values as shown in Table 3.4.1.

The methods for specifying the data format for the response that the user program obtains from the open data distribution platform system are as follows.

- When SPARQL-based commands are used (section 4.1)
  Specified under section 4.1 (SPARQL-based commands).

- When RDF data format is specified
  Any of the following. We recommend the first option. The default response format is Turtle.

  – Include an Accept header having any of the values shown in Table 3.4.1 in the HTTP header.
  – Add .json or .xml at the end of the requested URL. Adding .json means that the JSON-LD format is specified, and adding .xml means that the RDF/XML format is specified.
  – Add format=json or format=xml to the requested URL query string. Adding format=json means that the JSON-LD format is specified, and adding format=xml means that the RDF/XML format is specified.

- Otherwise
  Any of the following. We recommend the first option. The default response format is JSON.

  – Add .json or .xml at the end of the requested URL.
  – Add format=json or format=xml to the requested URL query string.

Table 3.4.1. Header values indicating RDF graph expression format

| Header value | Explanation |
|---|---|
| application/rdf + xml | RDF/XML [1] |
| application/json | JSON-LD [51] |
| text/plain | N-Triples [29] |
| text/rdf + n3 | Notation3 [46] |
| text/turtle | Turtle |

When sending structured data that is not in RDF data format by the POST or PUT method, the user program should use the same format as the requested response format. For example, when requesting a response in XML format, the structured data should also be written in XML.

### 3.4.2. Request success or failure and message body content

When the open data distribution platform system has processed a received request correctly, the status code returned is 200, 201, or 204. If there is a response message,

it is contained in the message body as a string of characters in JSON or XML. If it is provided in XML format, the root element of the data is <api_response>.

When the open data distribution platform system has been unable to process a received request correctly, the returned status code is not of the 200 series. In this case, the message body contains a message having the parameter shown in Table 3.4.2. If it is provided in XML format, the root element of the error message is <error_response>.

Table 3.4.2. Error message parameters

| Parameter name | Format | Parameter value |
|---|---|---|
| msg | xsd:string | Error message |

### 3.4.3. Rules on response paging

Upon receiving a request for a search, the open data distribution platform system can divide the response (paging) according to the system's processing capabilities. However, under the Linked Data Platform Paging [50] conventions, the HTTP header should include a Link header and state the URL of the divided response destination.

The Link header should have the following values. Parameter <P> is the URL of the divided response destination, and <r> has one of the values shown in Table 3.4.3.

Link < *P* >; rel='< *r* >'

Table 3.4.3. Parameters of error messages for paging

| Value of <r> | Meaning | Required? |
|---|---|---|
| first | First page of paging | |
| next | Next page of paging | Yes |
| prev | Previous page of paging | |
| last | Last page of paging | |

### 3.4.4. Rules on URI notation

The following applies to URI notation used in requests and responses.

- In places where a format based on standards such as SPARQL 1.1, RDF/XML, or JSON-LD is specified, the URI notation method required under those standards should be used.

- In other places, a URI should be enclosed in angle brackets (< >). However, except in the case of SPARQL-based commands (section 4.1), the following alternate notation may be used to avoid URL encoding if the request includes a well-known URI; and in such cases, the URI in alternate notation must not be enclosed in angle brackets.

– If the URI is ucode URN, a string of characters with the added prefix "ucode_" may be used as alternate notation for the ucode value. For example, instead of "urn:ucode:_00001C0000000000001000000010000", the notation "ucode_00001C0000000000001000000010000" may be used.

– If the URI is vocabulary indicated in section 2.3 (Vocabulary), a string of characters connected with an underscore ( _ ) may be written in place of the local name and Qname indicated in the alias URI space. For example, instead of "http://purl.org/dc/elements/1.1/title", the notation "dc_title" may be used.

## 3.5. Data formats

In these specifications, the data formats listed in Table 3.5.1 are used in addition to the data formats provided in XML Schema [52].

Table 3.5.1. Data formats defined in these specifications

| Name of format | Explanation |
|---|---|
| hash | hash (associative array) |
| RDF | RDF/XML or JSON-LD |
| <format name> [ ] | <format name> list (array) |

When specifying a list with parameter values of the GET method, the items should be separated by commas.

In XML representation of hash data, the key is the tag name, and the value is the tag value. List values for a certain key are represented by repetition of the tag name indicating that key. For example, the following are representations of data of the same structure in XML and JSON.

XML representation

```
<params>
  <key1>value1</key1>
  <key2>value2</key2>
</params>
<params>
  <key1>value3</key1>
  <key2>value4</key2>
</params>
```

JSON representation

```
{"params": [
  {"key1": "value1", "key2": "value2"},
  {"key1": "value3", "key2": "value4"}
  ]
}
```

## 3.6. RDF expressions requesting automatic ucode issuing

In the commands of sections 4.3.2 (4.3.2 (Registering new place information), 4.4.2 (Registering new roles), 4.6.2 (Creating new terms), and 4.7.2 (Creating new public data), a request for automatic ucode issuing for RDF/XML or JSON-LD resources

contained in the message body can be sent to the open data distribution platform system if the following URI or null value is specified (empty string if RDF/XML, or null if JSON-LD). Note that <val> is an alphanumeric string that begins with alphabetic characters.

urn:ucode:_?<val>

The open data distribution platform system performs the following actions upon receiving this request.

- If a URI of the form urn:ucode:_?<val> is specified
  A ucode is issued for each of the specified variables, and RDF data is registered with the corresponding portion converted into URI notation of the ucode. The result is a hash value having the variable name specified by <val> as key and the corresponding ucode as its value.

- If a null value is specified
  A ucode of null value quantity is issued, and RDF data is registered with the corresponding portion converted into URI notation of the ucode. The result is the issued ucode array.

It is not permissible to mix a URI of the form urn:ucode:_?<val> and a null value within the same command. The open data distribution platform system cannot accept a request that mixes both of these, and status code 400 is returned.

### 3.7. Streams API

When the parameter "stream" is specified in search and view commands under section 4.2 (Traceability and real-time data commands) or section 4.7 (Triple management commands), the connection is continued and results are returned as each value is updated, based on Streams API [41]. If the value of the stream parameter is 0, the maximum allowed time of the server is specified. The maximum time for continuing the connection under Streams API is implementation-dependent.

### 3.8. Other common provisions

In addition to the above, these specifications include the following common provisions.

- The method for approval of applications is based on OAuth 2.0 [25].
- Authentication is performed using an authentication key issued under a separately specified method.
- The necessary encoding for conventions such as HTTP and URL is performed as needed.
- If data including multi-byte characters is returned in JSON format, this should be encoded according to JSON specifications.

# 4. Details of ODDP API

This chapter provides details of the ODDP API.

## 4.1. SPARQL-based commands

SPARQL-based commands provide the functions of registering, updating, deleting, viewing, and searching for public data, based on the SPARQL 1.1. protocol [18, [28], [30]. These commands are listed in Table 4.1.1. Details concerning each command are provided below.

Table 4.1.1. List of SPARQL-based commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/sparq1 | GET | Issuing a query under SPARQL 1.1 |
| /api/v1/sparq1 | POST | Issuing a query under SPARQL 1.1 |
| /api/v1/rdf-graph-store | GET | Viewing an RDF graph |
| /api/v1/rdf-graph-store | POST | Adding an RDF graph |
| /api/v1/rdf-graph-store | PUT | Updating an RDF graph |
| /api/v1/rdf-graph-store | DELETE | Deleting an RDF graph |

An API where the URL path is /api/v1/rdf-graph-store is an API according to the SPARQL 1.1 Graph Store HTTP Protocol [43]. However, because this type of API supports only operations in RDF graph units, APIs that can operate in units of RDF data triples (or partial graphs that are sets of triples) are added. The URL path of the latter is /api/v1/rawdata.

When using named graphs, the RDF graphs are identified using the API graph parameters stated in this section. When not using named graphs, either graph parameters are not used, or default parameters are used.

Ucodes cannot be automatically issued when using APIs under this section.

### 4.1.1. Issuing queries based on SPARQL 1.1: GET method

Functional summary:
The HTTP GET method is used to issue queries based on SPARQL 1.1.

Method:
GET

URL path:
/api/v1/sparql

Restrictions:
None. Anyone can make a request.

Parameters:
As shown in Table 4.1.2.

Table 4.1.2. Parameters for issuing queries based on SPARQL 1.1 (GET method)

| Parameter name | Format | Explanation |
|---|---|---|
| query | xsd:string | URL encoded SPARQL query |

Required HTTP headers:

The requested response format should be set as Accept. The parameters that may be specified when issuing SELECT operations under SPARQL 1.1 are stated in Table 4.1.3; the parameters that may be specified when issuing CONSTRUCT or DESCRIBE operations are stated in Table 4.1.4; and the parameters that may be specified when issuing ASK operations are stated in Table 4.1.5.

Table 4.1.3. Accept header values specifying response format for SELECT operations

| Accept header value | Explanation |
|---|---|
| appliction/sqarql-results+xml | Response based on SPARQL Query Results XML Format [2] |
| application/sparql-results+json | Response based on SPARQL Query Results JSON Format [48] |

Status codes:

As shown in Table 4.1.6.

Table 4.1.4. Accept header values specifying RDF graph format of response

| Accept header value | Explanation |
|---|---|
| application/rdf+xml | RDF/XML [1] |
| text/plain | N-Triples [29] |
| text/rdf+n3 | Notation3 [4] |
| text/turtle | Turtle [46] |

Table 4.1.5. Accept header values specifying binary value format of response

| Accept header value | Explanation |
|---|---|
| application/sparql-results+xml | Response based on SPARQL Query Results XML Format [2] |
| text/boolean | Text expression (true/false) |

Responses:

The responses are as follows.

- Responses to SELECT operations are either of the following, based on the Accept header value.
  - Response based on SPARQL Query Results JSON Format [48]
  - Response based on SPARQL Query Results XML Format [2]
- Responses to CONSTRUCT and DESCRIBE operations are RDF graph data. The format is as specified by the Accept header value.

- Responses to ASK operations are either of the following, based on the Accept header value.

  – Response based on SPARQL Query Results XML Format [2]
  – Text expression, true or false

Table 4.1.6. Status codes when issuing queries based on SPARQL 1.1 (GET method)

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | Incorrect query. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request issuing a SPARQL query to obtain the identifier of a book along with its author's name, and the response. The GET method query parameter value is URL encoding of the following SPARQL query.

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?book ?name WHERE {
    ?book dc:creator ?who .
    ?who foaf:name ?name . }
```

Request

```
GET /api/v1/sparql/?query=PREFIX%20dc%3A%20%3chttp%3A%2F%2Fpurl%2Eorg%2Fdc
%2Felements%2F1%2E1%2F%3E%0D%0APREFIX%20foaf%3A%20%3chttp%3A%2F%2Fxmlns%2E
com%2Ffoaf%2F0%2E1%2F%3E%0D%0ASELECT%20%3Fbook%20%3Fname%20WHERE%20%7B%0D
%0A%20%20%3Fbook%20dc%3Acreator%20%3Fwho%20%2E%0D%0A%20%20%3Fwho%20%20foaf
%3Aname%20%20%3Fname%20%2E%20%7D
Host: www.example.org
Accept: application/sparql-results+xml
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Content-Type: application/sparql-results+xml

<?xml version="1.0"?>
<sparql xmlns="http://www.w3.org/2005/sparql-results#">

 <head>
   <variable name="book"/>
   <variable name="name"/>
 </head>
 <results>
   <result>
     <binding name="book">
       <uri>http://www.example.org/book/book5</uri>
     </binding>
     <binding name="name">
       <literal>Alice</literal>
     </binding>
   </result>
...
</sparql>
```

### 4.1.2. Issuing queries based on SPARQL 1.1: POST method

Functional summary:
The HTTP POST method is used to issue queries under SPARQL 1.1.

Method:
POST

URL path:
/api/v1/sparql

Restrictions:
None. Anyone can make a request.

Parameters:
The parameters shown in Table 4.1.7 are included in the message body.

Table 4.1.7. Parameters for issuing queries based on SPARQL 1.1 (POST method)

| Parameter name | Format | Explanation |
|---|---|---|
| query | xsd:string | URL encoded SPARQL query |

Required HTTP headers:

The requested response format should be specified in the Accept header. The method is the same as stated in section 4.1.1 (Issuing queries based on SPARQL 1.1: GET method). (See Tables 4.1.3, 4.1.4, and 4.1.5.)

Status codes:

As shown in Table 4.1.8.

Table 4.1.8. Status codes when issuing queries based on SPARQL 1.1 (POST method)

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | Incorrect query. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The responses are as follows.

- Responses to SELECT operations are either of the following, based on the Accept header value.
  - Response based on SPARQL Query Results JSON Format [48]
  - Response based on SPARQL Query Results XML Format [2]
- Responses to CONSTRUCT and DESCRIBE operations are RDF graph data. The format is as specified by the Accept header value.
- Responses to ASK operations are either of the following, based on the Accept header value.
  - Response based on SPARQL Query Results XML Format [2]
  - Text expression, true or false

API usage example

The following is an example of a request issuing a SPARQL query to obtain the identifier of a book along with its author's name, and the response. Here, URL encoding of the request is omitted for the sake of readability.

Request

```
POST /api/v1/sparql HTTP/1.1
Host: www.example.org
Accept: application/sparql-results+xml
Content-Type: application/x-www-form-urlencoded
Content-Length: xxx

query=PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?book ?name WHERE {
   ?book dc:creator ?who .
   ?who  foaf:name  ?name . }
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Content-Type: application/sparql-results+xml

<?xml version="1.0"?>
<sparql xmlns="http://www.w3.org/2005/sparql-results#">

 <head>
  <variable name="book"/>
  <variable name="name"/>
 </head>
 <results>
  <result>
   <binding name="book">
     <uri>http://www.example.org/book/book5</uri>
   </binding>
   <binding name="name">
     <literal>Alice</literal>
   </binding>
  </result>
...
 </results>
</sparql>
```

### 4.1.3. Viewing RDF graphs

Functional summary:

Viewing of RDF graphs.

Method:
GET

URL paths:
/api/v1/rdf-graph-store?graph=<graph>
/api/v1/rdf-graph-store?default

Restrictions:
None. Anyone can make a request.

Parameters:
The parameters are as shown in Table 4.1.9.

Table 4.1.9. RDF graph viewing parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| graph | (?default specified) | URI identifying the RDF graph to be viewed. Based on the rules of [43], the URI is not enclosed in angle brackets. |

Required HTTP headers:
The response format should be specified in the Accept header. The method is the same as CONSTRUCT operations under section 4.1.1 (Issuing queries based on SPARQL 1.1: GET method). (See Table 4.1.4.)

Status codes:
As shown in Table 4.1.10.

Responses:
Representation of the RDF graph encoded in the format specified in the Accept header.

Table 4.1.10. Status codes when viewing RDF graphs

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example
The following is an example of a request to view a currently registered RDF graph, along with the response.

Request

```
GET /api/v1/rdf-graph-store?default HTTP/1.1
Host: www.example.org
Accept: application/rdf+xml
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/rdf+xml; charset=utf-8

<?xml version="1.0"?>
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:books="http://www.example.org/book/"
    xmlns:dc="http://purl.org/dc/elements/1.1/" >
  <rdf:Description rdf:about="http://www.example.org/book/book6">
    <dc:title>Example Book #6</dc:title>
  </rdf:Description>
</rdf:RDF>
```

### 4.1.4. Adding RDF graphs

Functional summary:
Adding of RDF graphs.

Method:
POST

URL paths:
/api/v1/rdf-graph-store?graph=<graph>
/api/v1/rdf-graph-store?default

Restrictions:
Users having update authority for any RDF graph can make a request.

Parameters:
The parameters shown in Table 4.1.11 are given as POST method query strings. The RDF graph to be added is contained in the message body.

Table 4.1.11. RDF graph viewing parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| graph | (?default specified) | URI identifying the RDF graph to be added. Based on the rules of [43], the URI is not enclosed in angle brackets. |

Required HTTP headers:

The format of the RDF graph to be added should be specified in the Content-type header. For the parameter values that can be specified and their meanings, refer to Table 4.1.4 in section 4.1.1 (Issuing queries based on SPARQL 1.1: GET method).

Status codes:

As shown in Table 4.1.12.

Responses:

If successful, the response body is empty.

Table 4.1.12. Status codes when adding RDF graphs

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to add an RDF graph, where Example Book #6 is the name (dc:title) of a book indicated by the URI http://www.example.org/book/book6, and the response.

Request

```
POST /api/v1/rdf-graph-store?default HTTP/1.1
Host: www.example.org
Accept: application/rdf+xml

<?xml version="1.0"?>
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:books="http://www.example.org/book/"
    xmlns:dc="http://purl.org/dc/elements/1.1/" >
  <rdf:Description rdf:about="http://www.example.org/book/book6">
    <dc:title>Example Book #6</dc:title>
  </rdf:Description>
</rdf:RDF>
```

Response

```
HTTP/1.1 204 No Content
```

### 4.1.5. Updating RDF graphs

Functional summary:

Updating of RDF graphs. The RDF graph that is registered after completion of the request operation is the graph specified by the request. RDF graphs that are not contained in the request are deleted.

Method:

PUT

URL paths:

/api/v1/rdf-graph-store?graph=<graph>
/api/v1/rdf-graph-store?default

Restrictions:

Users having update authority for any RDF graph can make a request.

Parameters:

The parameters shown in Table 4.1.13 are given as PUT method query strings. The RDF graph to be updated is contained in the message body.

Table 4.1.13. RDF graph viewing parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| graph | (?default specified) | URI identifying the RDF graph to be updated. Based on the rules of [43], the URI is not enclosed in angle brackets. |

Required HTTP headers:

The format of the RDF graph to be updated is specified in the Content-type header. For the parameter values that can be specified and their meanings, refer to Table 4.1.4 in section 4.1.1 (Issuing queries based on SPARQL 1.1: GET method).

Status codes:

As shown in Table 4.1.14.

Responses:

If successful, the response body is empty.

Table 4.1.14. Status codes when updating RDF graphs

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the content of an RDF graph with the information that Example Book #6 is the name (dc:title) of a book indicated by the URI

http://www.example.org/book/book6, and the response. Any other information in that RDF graph is deleted.

Request

```
PUT /api/v1/rdf-graph-store?default HTTP/1.1
Host: www.example.org
Accept: application/rdf+xml

<?xml version="1.0"?>
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:books="http://www.example.org/book/"
    xmlns:dc="http://purl.org/dc/elements/1.1/" >
  <rdf:Description rdf:about="http://www.example.org/book/book6">
    <dc:title>Example Book #6</dc:title>
  </rdf:Description>
</rdf:RDF>
```

Response

```
HTTP/1.1 204 No Content
```

### 4.1.6. Deleting RDF graphs

Functional summary:

Deletion of RDF graphs. After implementation of this type of request, the RDF graph is empty.

Method:

DELETE

URL paths:

/api/v1/rdf-graph-store?graph=<graph>
/api/v1/rdf-graph-store?default

Restrictions:

Users having update authority for any RDF graph can make a request.

Parameters:

The parameters shown in Table 4.1.15 are given as query strings.

Table 4.1.15. RDF graph deletion parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| graph | (?default specified) | URI identifying the RDF graph to be deleted. Based on the rules of [43], the URI is not enclosed in angle brackets. |

Required HTTP headers:
None.

Status codes:
As shown in Table 4.1.16.

Table 4.1.16. Status codes when deleting RDF graphs

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to completely delete an RDF graph, along with the response.

Request

```
DELETE /api/v1/rdf-graph-store?default HTTP/1.1
```

Response

```
HTTP/1.1 204 No Content
```

## 4.2. Traceability and real-time data management commands

Traceability and real-time data management commands provide functions needed for event management, such as traceability.

The matters subject to traceability management are called "events," and they are basically identified with ucodes. Event types such as split, integrated, and transferred events are identified by assigning ucodes as indicated in section C.18 (Event vocabulary). Similarly, attributes related to events are managed using the vocabulary indicated in section C.18 (Event vocabulary).

These commands are listed in Table 4.2.1. Details concerning each command are provided below.

Table 4.2.1. List of traceability and real-time data management commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/events | GET | Searching for an event |
| /api/v1/events | POST | Registering an event |
| /api/v1/events/<targets> | GET | Viewing an event |
| /api/v1/events/<targets>/<properties> | GET | Viewing an event |
| /api/v1/events/<target> | PUT | Updating an event |
| /api/v1/events/<target>/<property> | PUt | Updating an event |
| /api/v1/events/<target> | DELETE | Deleting an event |
| /api/v1/events/<target>/<property> | DELETE | Deleting an event |
| /api/v1/trace/<target> | GET | Tracing forward or backward |

### 4.2.1. Searching for events

Functional summary:
Searching for an event.

Method:
GET

URL path:
/api/v1/events

Restrictions:
None. Anyone can make a request.

Parameters:
The parameters are as shown in Table 4.2.2. They are given in the form of <$param_N$> = <$value_N$>. If multiple parameters are specified, this is an AND search.

Table 4.2.2. Event search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | (not specified) | Name of parameter for searching |
| $value_N$ | (not specified) | Value of parameter for searching |

At least one pair of <$param_N$>, <$value_N$> should be specified.

<$param_N$> is a property URI indicating the public data attributes of the event source, or a parameter under Table 4.2.3. Commas included in the URI value should be URL encoded. If there are multiple parameter values, they should be separated by commas.

The meaning of a request specifying an offset and limit is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number when search results are ordered by time of event occurrence from newest to oldest (ev:date).

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.2.4.

Table 4.2.3. Event search parameters

| Parameter name | Format | Explanation |
|---|---|---|
| target | xsd:anyURI[] | Event target identifier (ev:target, ev:source, ev:destination) |
| source | xsd:anyURI[] | Identifier of the source of event occurrence (ev:source) |
| destination | xsd:anyURI[] | Identifier (ev:destination) generated as a result of event occurrence |
| owner | xsd:anyURI[] | Identifier of event originator (ev:owner, ev:startOwner, ev:endOwner) |
| after | xsd:datetime | Time of event occurrence (ev:date) is after this value. |
| before | xsd:datetime | Time of event occurrence (ev:date) is before this value. |
| place | xsd:anyURI[] | Identifier of the place of event occurrence (ev:place) |
| description | xsd:string | Text describing the event (ev:description/partial match retrieval) |
| stream | xsd:integer | If this parameter is specified, the connection based on Stream API is continued for the specified number of seconds. (See section 3.7, Streams API.) |
| offset | xsd:integer | Offset value for search results. If this parameter is omitted, the results returned will start with the first value. |
| limit | xsd:integer | Number of search results to be returned. If this parameter is omitted, the limit will be set by the ODDP system. |

Responses:

The response is RDF data of the event list, in the format specified by the Accept header.

If the response is divided (paging), a Link header should be added to the HTTP header, based on section 3.4.3 (Rules on response paging).

API usage example

The following is an example of a request to search for an event, where the source of event occurrence is an entity indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
GET /api/v1/events?source=ucode_00001C000000000000010000000100123 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Table 4.2.4. Status codes when searching for events

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <param$_1$>, <value$_1$> pair.<br>Incorrect <param$_N$>. |
| 404 | Not Found | No event meeting the search conditions has been registered in the ODDP system. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
    "ev:destination": { "@type": "@id" },
    "ev:source": { "@type": "@id" },
    "ev:place": { "@type": "@id" },
    "ev:type": { "@type": "@id" }
  },
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000001000000100800",
      "ev:date": "2012-03-07T12:00:00+0900",
      "ev:destination": "urn:ucode:_00001C000000000000001000000100125",
      "ev:place": "urn:ucode:_00001C000000000000001000000100A00",
      "ev:source": "ucode_00001C000000000000001000000100123",
      "ev:type": "urn:ucode:_0FFFDE000000000000000000001234567"
    },
    {
      "@id": "urn:ucode:_00001C000000000000001000000100801",
      "ev:date": "2012-03-07T13:00:00+0900",
      "ev:destination": [
        "urn:ucode:_00001C000000000000001000000100126",
        "urn:ucode:_00001C000000000000001000000100127"
      ],
      "ev:place": "urn:ucode:_00001C000000000000001000000100A01",
      "ev:source": "urn:ucode:_00001C000000000000001000000100123",
      "ev:type": "urn:ucode:_0FFFDE000000000000000000001234567"
    }
  ]
}
```

### 4.2.2. Registering new events

Functional summary:

Registration of new events. If the date and time of event occurrence is not specified, the current time is used.

Method:

POST

URL path:

/api/v1/events

Restrictions:

Access by a user who is authorized to register events for the identifier of the source of event occurrence.

Parameters:

The event data in RDF format is contained in the message body.

Automatic ucode issuing can be requested by including a URI having the format of urn:ucode:_?<val>. (See section 3.6, RDF expressions requesting automatic ucode issuing.)

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.2.5.

Table 4.2.5. Status codes when registering new events

| Status code | Meaning | |
|---|---|---|
| 201 | Created | Completed successfully. |
| 400 | Bad Request | RDF is not specified by the parameters. |
| 409 | Conflict | The identifier of the specified event has already been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is the structured data shown in Table 4.2.6, represented in JSON or XML format.

Table 4.2.6. Response format for new event registration

| Parameter name | Format | Explanation |
|---|---|---|
| ucode | hash | Hash data where the key is the specified variable name, and the value is the issued ucode. |

API usage example

The following is an example of a request to register an event to the effect that "three items were generated from an entity represented by urn:ucode:_00001C000000000000010000000100124, at a place represented by the URI urn:ucode:_00001C000000000000010000000100A01, at 13:00 on March 7, 2012," and the response.

Here, in addition to the event ucode, the response returns ucodes that are provided for the three generated items.

Request

```
POST /api/v1/events HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
    "ev:destination": { "@type": "@id"  },
    "ev:source": { "@type": "@id" },
    "ev:place": { "@type": "@id" },
    "ev:type": { "@type": "@id" }
  },
  "@id": "urn:ucode:_?e",
  "ev:date": "2012-03-07T13:00:00+0900",
  "ev:destination": [
    "urn:ucode:_?d1",
    "urn:ucode:_?d2",
    "urn:ucode:_?d3"
  ],
  "ev:place": "urn:ucode:_00001C000000000000010000000100A01",
  "ev:source": "urn:ucode:_00001C000000000000010000000100124"
}
```

Response

```
HTTP/1.1 201 Created
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode": {
    "urn:ucode:_?e":"urn:ucode:_00001C0000000000000010000000100801",
    "urn:ucode:_?d1":"urn:ucode:_00001C0000000000000010000000100125",
    "urn:ucode:_?d2":"urn:ucode:_00001C0000000000000010000000100126",
    "urn:ucode:_?d3":"urn:ucode:_00001C0000000000000010000000100127"} }
```

### 4.2.3. Viewing events

Functional summary:
Viewing events.

Method:
GET

URL path:
/api/v1/events/<targets>

- <target>: Event identifier. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view information concerning the events specified by <targets>.

Parameters:
As shown in Table 4.2.7.

Table 4.2.7. Event viewing parameters

| Parameter name | Format | Explanation |
|---|---|---|
| stream | xsd:integer | If this parameter is specified, the connection based on Stream API is continued for the specified number of seconds. (See section 3.7, Streams API.) |

Required HTTP headers:
The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.2.8.

Responses:

The response is RDF data of the event list, in the format specified by the Accept header.

Table 4.2.8. Status codes when viewing events

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding event can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to view event information indicated by the URI urn:ucode:_00001C000000000000001000000100800, and the response.

Request

```
GET /api/v1/events/ucode_00001C000000000000001000000100800 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
    "ev:destination": { "@type": "@id" },
    "ev:source": { "@type": "@id" },
    "ev:place": { "@type": "@id" },
    "ev:type": { "@type": "@id" }
  },
  "@id": "urn:ucode:_00001C000000000000001000000100800",
  "ev:date": "2012-03-07T12:00:00+0900",
  "ev:destination": "urn:ucode:_00001C000000000000001000000100125",
  "ev:place": "urn:ucode:_00001C000000000000001000000100A00",
  "ev:source": "urn:ucode:_00001C000000000000001000000100123",
  "ev:type": "urn:ucode:_0FFFDE000000000000000000001234567"
}
```

### 4.2.4. Viewing events: Specifying properties

Functional summary:
Specifying property values and viewing an event.

Method:
GET

URL path:
/api/v1/events/<targets>/<properties>

- <targets>: Event identifiers. (xsd:anyURI[ ] format)
- <properties>: Property identifiers. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view information concerning the events specified by <targets>.

Parameters:
As shown in Table 4.2.9.

Table 4.2.9. Parameters for event viewing when specifying properties

| Parameter name | Format | Explanation |
|---|---|---|
| stream | xsd:integer | If this parameter is specified, the connection based on Stream API is continued for the specified number of seconds. (See section 3.7, Streams API.) |

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.2.10.

Responses:
The response is RDF data of the event list, in the format specified by the Accept header.

Table 4.2.10. Status codes when viewing events and specifying properties

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding event can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example
The following is an example of a request to obtain the time of occurrence (ev:date) of an event indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
GET /api/v1/events/ucode_00001C000000000000001000000100800,
ucode_00001C000000000000001000000100801/ev_date HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
  },
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000001000000100800",
      "ev:date": "2012-03-07T12:00:00+0900"
    },
    {
      "@id": "urn:ucode:_00001C000000000000001000000100801",
      "ev:date": "2012-03-07T13:00:00+0900"
    }
  ]
}
```

### 4.2.5. Updating events

Functional summary:
Updating events.

Method:
PUT

URL path:
/api/v1/events/<target>

- <target>: Event identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update the event corresponding to <target>.

Parameters:

Event update information in RDF format is contained in the message body.

- The subject of the update information is consistent with <target>.
- After the command is completed, the values of predicates contained in the update information are completely consistent with the specified update information, including quantities.
- The values of predicates that are not included in the update information are not changed.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.2.11.

Responses:

If successful, the response body is empty.

Table 4.2.11. Status codes when updating events

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding event identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the place of occurrence (ev:place) of an event indicated by the URI urn:ucode:_00001C000000000000001000000100800 to the place indicated by the URI urn:ucode:_00001C00000000000001000000100A01, and the response.

Request

```
PUT /api/v1/events/ucode_00001C0000000000000001000000100800 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
    "ev:place": { "@type": "@id" },
  },
  "@id": "urn:ucode:_00001C0000000000000001000000100800",
  "ev:place": "urn:ucode:_00001C0000000000000001000000100A01"
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.2.6. Updating events: Specifying properties

Functional summary:
Specifying property values and updating events.

Method:
PUT

URL path:
/api/v1/events/<target>/<property>

- <target>: Event identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update the event corresponding to <target>.

Parameters:
The RDF data representing the event information to be updated (called the "update event data") is contained in the message body.

- The subject of the update event data is consistent with <targets>.
- After the command is completed, the property values specified by <properties> in the event information specified by <targets> will be completely consistent with the update event data. Property values not specified by <properties> are not changed, even if they are included in the update event data.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.2.12.

Responses:

If successful, the response body is empty.

Table 4.2.12. Status codes when updating events and specifying properties

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding event identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the place of occurrence (ev:place) of an event indicated by the URI urn:ucode:_00001C000000000000010000000100800 to the place indicated by the URI urn:ucode:_00001C000000000000010000000100A01, and the response.

Request

```
PUT /api/v1/events/ucode_00001C000000000000010000000100800/ev_place
 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
    "ev:place": { "type": "@id" }
  },
  "@id": "geo_event_example",
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000010000000100800",
      "ev:place": "urn:ucode:_00001C000000000000010000000100A01"
    }
  ]
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.2.7. Deleting events

Functional summary:
Deleting events.

Method:
DELETE

URL path:
/api/v1/events/<target>

- <target>: Event identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the event corresponding to <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.2.13.

Table 4.2.13. Status codes when deleting events

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding event identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete an event indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
DELETE /api/v1/events/ucode_00001C000000000000001000000100800 HTTP/1.1
Host: www.example.org
Content-Length: xxx
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.2.8. Deleting events: Specifying properties

Functional summary:
Specifying property values and deleting events. Event information other than the specified properties will remain.

Method:
DELETE

URL path:
/api/v1/events/<target>/<property>

- <target>: Event identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the event corresponding to <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.2.14.

Table 4.2.14. Status codes when deleting events and specifying properties

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding event identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example

The following is an example of a request to delete an event indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
DELETE /api/v1/events/ucode_00001C000000000000010000000100800/ev_date
 HTTP/1.1
Host: www.example.org
Content-Length: xxx
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.2.9. Performing traces

Functional summary:

Tracing forward or backward with the specified target as the starting point, and returning a list of events as a result.

A forward or backward trace is obtained by obtaining the properties of ev:source and ev:destination between identifiers.

Method:

GET

URL path:

/api/v1/trace/<target>

- <target>: Identifier of the event object or event which is the starting point of the trace. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to view information concerning the public data or event specified by <target>.

Parameters:

As shown in Table 4.2.15.

Table 4.2.15. Parameters for performing a trace

| Parameter name | Format | Explanation |
|---|---|---|
| direction | xsd:string | Trace parameter, taking the following values. If omitted, the default is forward.<br>• forward: Trace forward.<br>• back: Trace backward. |
| limit | xsd:integer | Number of layers to trace. If omitted, the default is 1 layer. |

Required HTTP headers:

The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.2.16.

Table 4.2.16. Status codes when performing a trace

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <target> is not specified. |
| 404 | Not Found | No corresponding public data or event can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the event list, in the format specified by the Accept header.

API usage example

The following is an example of a request to trace an event indicated by the URI urn:ucode:_00001C000000000000010000000100800 in the forward direction for up to two layers and output the relevant trace information, and the response.

Request

```
GET /api/v1/trace/ucode_00001C000000000000010000000100800?
direction=forward&limit=2 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ev": "http://uidcenter.org/ucr/vocab/event#",
    "ev:destination": { "@type": "@id" },
    "ev:source": { "@type": "@id" },
    "ev:place": { "@type": "@id" },
    "ev:type": { "@type": "@id" }
  },
  "@graph": [
    {
      "@id": "urn:ucode:_00001C0000000000000001000000100800",
      "ev:date": "2012-03-07T12:00:00+0900",
      "ev:destination": [
        "urn:ucode:_00001C0000000000000001000000100124",
        "urn:ucode:_00001C0000000000000001000000100125"
      ],
      "ev:place": "urn:ucode:_00001C0000000000000001000000100A00",
      "ev:source": "urn:ucode:_00001C0000000000000001000000100123",
      "ev:type": "urn:ucode:_0FFFDE0000000000000000000001234567"
    },
    {
      "@id": "urn:ucode:_00001C0000000000000001000000100801",
      "ev:date": "2012-03-07T13:00:00+0900",
      "ev:destination": [
        "urn:ucode:_00001C0000000000000001000000100126",
        "urn:ucode:_00001C0000000000000001000000100127"
      ],
      "ev:place": "urn:ucode:_00001C0000000000000001000000100A01",
      "ev:source": "urn:ucode:_00001C0000000000000001000000100125",
      "ev:type": "urn:ucode:_0FFFDE0000000000000000000001234567"
    }
  ]
}
```

## 4.3. Geographic data management commands

Geographic data management commands are commands to provide the functions needed for processing of geographic data such as GIS.

Places are basically identified by ucodes, and information on the attributes of places is managed using the vocabularies, etc. indicated in sections C.8 (GeoSPARQL vocabulary) and C.15 (Geospatial vocabulary).

The basic region indicating a place (geometric data) is represented by linking its identifying ucode with the property ug:region. This property can take the values indicated in Table 4.3.1. If the data type is omitted, the default is Well Known Text.

Table 4.3.1. Geometric data representation format

| Data type | Specified data type |
|---|---|
| Well Known Text [19] | ogc:wktLiteral |
| GML [45] | ogc:gmlLiteral |
| GeoJSON [9] | ug:GeoJSONLiteral |

For example, the following is a representation in Notation3 format (prefix declaration omitted) to the effect that the place specified by URI urn:ucode:_00001C000000000000010000000100800 is a point at latitude 35.67 degrees north, longitude 139.76 degrees east.

- If the Well Known Text format is used for geometric data:
  <urn:ucode: 00001C000000000000010000000100800> ug:region "<http://www.opengis.net/def/crs/OGC/1.3/CRS84> Point(35.67 139.76)"^^ogc:wktLiteral .

- If the GML format is used for geometric data:
  <urn:ucode: 00001C000000000000010000000100800> ug:region "<gml:Point srsName=\"http://www.opengis.net/def/crs/OGC/1.3/CRS84\"> <gml:coordinates>139.76 35.67</gml:coordinates> </gml:Point> \"^^ogc:gmlLiteral .

- If the GeoJSON format is used for geometric data:
  <urn:ucode: 00001C000000000000010000000100800> ug:region "{\"typen":\"Pointn", \"coordinatesn": \"[139.76 35.67]\" }"^^ug:geoJSONLiteral .

These commands are listed in Table 4.3.2. Details concerning each command are provided below.

Table 4.3.2. List of geographic data management commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/places | GET | Searching for place information |
| /api/v1/places | POST | Registering place information |
| /api/v1/places/<targets> | GET | Viewing place information |
| /api/v1/places/<targets>/<properties> | GET | Viewing place information |
| /api/v1/places/<target> | PUT | Updating place information |
| /api/v1/places/<target>/<property> | PUT | Updating place information |
| /api/v1/places/<target> | DELETE | Deleting place information |
| /api/v1/places/<target>/<property> | DELETE | Deleting place information |
| /api/v1/places/<target>/ug_consistsOf | PUT | Moving the inclusion relationships of place information |

### 4.3.1. Searching for place information

Functional summary:
Searching for place information.

Method:
GET

URL path:
/api/v1/places

Restrictions:
None. Anyone can make a request.

Parameters:
The parameters are as shown in Table 4.3.3. They are given in the form of <$param_N$> = <$value_N$>. If multiple parameters are specified, this is an AND search.

Table 4.3.3. Place information search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | (not specified) | Name of parameter for searching |
| $value_N$ | (not specified) | Value of parameter for searching |

At least one pair of <$param_N$>, <$value_N$> should be specified. <$param_N$> is any of the following. If multiple properties are specified, this is an AND search.

1. Target: An identifier of the searched place, its parameter value having the format of xsd:anyURI[ ]. Commas included in the URI value should be URL encoded. If there are multiple targets, they should be separated by commas.

2. Predicate: Used when specifying a predicate whose subject is a value of item 4 or item 5 below. Its parameter value has the format of xsd:anyURI[ ]. If omitted, the default is ug:region.

3. Offset, limit: The parameter value is xsd:integer. The meaning is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number. If parameters are set for item 4 below, this means a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number when search results are ordered by proximity to the specified point.

4. Used when a point and radius are specified and a search is performed for identifiers of places contained within that circle. The parameters are combinations of those in Table 4.3.4.

Table 4.3.4. Place information search parameters

| Parameter name | Format | Explanation |
|---|---|---|
| lat | xsd:double | Latitude in WGS84. Cannot be omitted. |
| lon | xsd:double | Longitude in WGS84. Cannot be omitted. |
| floor | xsd:double[] | Number of floors. Upper and lower limits are specified, separated with commas. If the upper and lower limits are equal, this is unspecified if omitted. (Either floor or alt is specified, but not both.) |
| alt | xsd:double[] | Height (m). Upper and lower limits are specified, separated with commas. Unspecified if omitted. (Either floor or alt is specified, but not both.) |
| radius | xsd:double | Search radius (m). Cannot be omitted. |

5. Used when a shape such as a polygon is specified and a search is performed for identifiers of contained, containing, or overlapping places. The parameter value is Well Known Text (WKT) as prescribed by the Open Geospatial Consortium.

Table 4.3.5. Place information search parameters

| Parameter name | Format | Explanation |
|---|---|---|
| intersect | xsd:string (WKT) | The parameter value overlaps with the specified region. |
| within | xsd:string (WKT) | The parameter value is completely contained within the specified region. |
| contains | xsd:string (WKT) | The parameter value completely contains the specified region. |

6. Geo_format: Specifies the data type of geometric data. If this parameter is omitted, the data type is ogc:wktLiteral (Well Known Text format).

7. Property URI indicating geospatial attributes.

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.3.6.

Responses:

The response is RDF data of the place list, in the format specified by the Accept header.

Table 4.3.6. Status codes when searching for place information

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <param$_1$>, <value$_1$> pair.<br>Incorrect <param$_N$>. |
| 404 | Not Found | No place information meeting the search conditions has been registered in the ODDP system. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

If the response is divided (paging), a Link header should be added to the HTTP header, based on section 3.4.3 (Rules on response paging).

API usage example

The following is an example of a request to search for place identifiers contained in a rectangle whose corners are the points (0,0), (2,0), (2,2), (0,2), and the response. For the sake of readability, the WKT expression of the request is not URL encoded.

Request

```
GET /api/v1/places?within=POLYGON((0 0, 2 0, 2 2, 0 2, 0 0)) HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ug": "http://uidcenter.org/ucr/vocab/ug#",
    "ug:type": { "@type": "@id" }
  },
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000010000000100800",
      "ug:region": "POINT(1 1) ",
      "ug:type": "urn:ucode:_0FFFDE000000000000000000001234567"
    },
    {
      "@id": "urn:ucode:_00001C000000000000010000000100801",
      "ug:region": "POINT(1.5 1.5) ",
      "ug:type": "urn:ucode:_0FFFDE000000000000000000001234567"
    }
  ]
}
```

### 4.3.2. Registering new place information

Functional summary:
Registration of new place information.

Method:
POST

URL path:
/api/v1/places

Restrictions:
Access by a user who is authorized to register new place information.

Parameters:
The place registration data in RDF format is contained in the message body.
Automatic ucode issuing can be requested by including a URI having the format of urn:ucode:_?<val> in the RDF data. (See section 3.6, RDF expressions requesting automatic ucode issuing.)

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.3.7.

Responses:

The response is the structured data shown in Table 4.3.8, represented in JSON or XML format.

API usage example

The following is an example of a request to register a point having the coordinates (1,1), and the response.

Table 4.3.7. Status codes when registering new place information

| Status code | Meaning | |
|---|---|---|
| 201 | Created | Completed successfully. |
| 400 | Bad Request | The parameters specify neither rdf nor params.<br>The parameters specify either rdf or params, target, num, but not both.<br>The key of <params> is incorrect.<br>The parameters specify both target and num. |
| 409 | Conflict | The identifier of the specified place information has already been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Table 4.3.8. Response format for new place information registration

| Parameter name | Format | Explanation |
|---|---|---|
| ucode | hash | Hash data where the key is the specified variable name, and the value is the URI representation of the issued ucode. |

Request

```
POST /api/v1/places HTTP/1.1
Content-Length: xxx
Content-Type: application/json; charset=utf-8
Host: www.example.org

{
  "@context": {
    "ug": "http://uidcenter.org/ucr/vocab/ug#",
  },
  "@id": "urn:ucode:_?x",
  "ug:region": "POINT(1 1)"}
}
```

Response

```
HTTP/1.1 201 Created
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode": {
  "ucode_?x": "urn:ucode:_00001C000000000000010000000100801" } }
```

### 4.3.3. Viewing place information

Functional summary:
Viewing place information.

Method:
GET

URL path:
/api/v1/places/<targets>
- <targets>: Event identifiers. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view the place information specified by <targets>.

Parameters:
None.

Required HTTP headers:

The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.3.9.

Table 4.3.9. Status codes when viewing place information

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding place information can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the place information list, in the format specified by the Accept header.

API usage example

The following is an example of a request to view the information of a place indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
GET /api/v1/places/ucode_00001C000000000000010000000100800 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ug": "http://uidcenter.org/ucr/vocab/ug#",
    "ug:type": { "@type": "@id" }
  },
  "@id": "urn:ucode:_00001C000000000000010000000100800",
  "ug:region": "POINT(1 1) ",
  "ug:type": "urn:ucode:_0FFFDE000000000000000000001234567"
}
```

### 4.3.4. Viewing place information: Specifying properties

Functional summary:
Specifying properties and viewing place information.

Method:
GET

URL path:
/api/v1/places/<targets>/<properties>
- <targets>: Place identifiers. (xsd:anyURI[ ] format)
- <properties>: Property identifiers. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view the place information specified by <targets>.

Parameters:
None.

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.3.10.

Table 4.3.10. Status codes when viewing place information and specifying properties

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> or <properties> are not specified. |
| 404 | Not Found | No corresponding place information can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is RDF data of the place information list, in the format specified by the Accept header.

API usage example
The following is an example of a request to view the location information (ug:region) of a place indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
GET /api/v1/places/ucode_00001C0000000000000001000000100800,
ucode_00001C0000000000000001000000100801/ug_region HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ug": "http://uidcenter.org/ucr/vocab/ug#",
  },
  "@graph": [
    {
      "@id": "urn:ucode:_00001C0000000000000001000000100800",
      "ug:region": "POINT(1 1) "
    },
    {
      "@id": "urn:ucode:_00001C0000000000000001000000100801",
      "ug:region": "POINT(1.5 1.5) "
    }
  ]
}
```

### 4.3.5. Updating place information

Functional summary:
Updating place information.

Method:
PUT

URL path:
/api/v1/places/<target>

- <target>: Place identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update the place information corresponding to <target>.

Parameters:

Place update information in RDF format is contained in the message body.

- The subject of the update information is consistent with <target>.
- The values of predicates contained in the update information are completely consistent with the specified update information, including quantities.
- The values of predicates that are not included in the update information are not changed.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.3.13.

Responses:

If successful, the response body is empty.

Table 4.3.11. Status codes when updating place information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding place information identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the location information (ug:region) of a place indicated by the URI urn:ucode:_00001C000000000000010000000100800 to (1,1), and the response.

Request

```
PUT /api/v1/places/ucode_00001C000000000000010000000100800 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{"rdf": {
  "@context": {
    "ug": "http://uidcenter.org/ucr/vocab/ug#",
  },
  "@id": "urn:ucode:_00001C000000000000010000000100800",
  "ug:region": "POINT(1 1)"
} }
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.3.6. Updating place information: Specifying properties

Functional summary:
Specifying properties and updating place information.

Method:
PUT

URL path:
/api/v1/places/<target>/<property>

- <target>: Place identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update the place information corresponding to <target>.

Parameters:
The RDF data representing the place information to be updated (called the "update place data") is contained in the message body.

- The subject of the update place data is consistent with <targets>.
- After the command is completed, properties specified by <properties> in the place information specified by <targets> will be completely consistent with the update place data. Property values not specified by <properties> are not changed, even if they are included in the update place data.

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.3.12.

Responses:
If successful, the response body is empty.

Table 4.3.12. Status codes when updating place information and specifying properties

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding place information identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the location information (ug:region) of a place indicated by the URI urn:ucode:_00001C000000000000010000000100800 to (1,1), and the response.

Request

```
PUT /api/v1/places/ucode_00001C000000000000010000000100800/ug_region
  HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "ug:region": "http://uidcenter.org/ucr/vocab/ug#region",
    }
  },
  "@id": "geo_create_example",
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000010000000100800",
      "ug:region": "POINT(1 1)"
    }
  ]
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
Content-Type: application/json; charset=utf-8
```

### 4.3.7. Deleting place information

Functional summary:
Deleting place information.

Method:
DELETE

URL path:
/api/v1/places/<target>
- <target>: Place identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the place information corresponding to <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.3.13.

Table 4.3.13. Status codes when deleting place information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding place information identifier has been registered in the ODDP system. |
| 409 | Conflict | Deletion is impossible because of other registered place information having a relationship of inclusion, equivalence, or adjacency, etc. with this place information. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete a place indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
DELETE /api/v1/places/ucode_00001C0000000000001000000100800 HTTP/1.1
Host: www.example.org
Content-Length: xxx
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.3.8. Deleting attributes of place information

Functional summary:

Specifying properties and deleting attributes of place information, or spatial metadata. Place information other than the specified properties will remain.

Method:

DELETE

URL path:

/api/v1/places/<target>/<property>

- <target>: Place identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to update the place information corresponding to <target>.

Parameters:

None.

Required HTTP headers:

None.

Status codes:

As shown in Table 4.3.14.

Table 4.3.14. Status codes when deleting attributes of place information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding place information identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete location information (ug:region) from a place indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
DELETE /api/v1/places/ucode_00001C000000000000010000000100800/ug_region
  HTTP/1.1
Host: www.example.org
Content-Length: xxx
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.3.9. Moving inclusion relationships of place information

Functional summary:
Moving the inclusion relationships of place information. This is a special case of section 4.3.6 (Updating place information: Specifying properties).

Method:
PUT

URL path:
/api/v1/places/<target>/ug consistsOf
- <target>: Place identifier. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to update the place information corresponding to <target>.

Parameters:
The values to be updated are contained in the message body as strings of characters in JSON or XML format.
After the command is completed, identifiers of places contained in <target> (having the relationship of ug:consistsOf) will be completely consistent with the values contained in the message body, including quantities.

Required HTTP headers:
None

Status codes:
As shown in Table 4.3.15.

Table 4.3.15. Status codes when moving inclusion relationships of place information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding place information identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

If successful, the response body is empty.

API usage example

The following is an example of a request to update a place identifier contained in the place indicated by the URI urn:ucode:_00001C000000000000001000000100800 to the following two, urn:ucode: _00001C000000000000001000000100900 and urn:ucode: _00001C000000000000001000000100901, and the response.

Request

```
PUT /api/v1/places/ucode_00001C000000000000001000000100800/ug_conconsistsOf
 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

[ "<urn:ucode:_00001C000000000000001000000100900>",
  "<urn:ucode:_00001C000000000000001000000100901>" ]
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

## 4.4. Security management commands

Security management commands are commands for role-based implementation of access control for the operations of registering, viewing, updating, and deleting data, or CRUD (Create, Read, Update, Delete).

The applications, data sets, and roles are defined below. The relationships between applications, data sets, and roles are shown in Fig. 4.1.

Application: Applications are entities that request operations on public data using standard APIs, identified with access tokens issued by Oauth 2.0 [25]. These access tokens serve as authentication keys when using security management commands and

access control functions provided by these functions. In general, this refers to an individual application.

Data set: Data sets are collections of one or more items of public data. They are identified with URIs.

Role: Roles are RDF graphs representing whether or not applications are permitted to perform CRUD operations with regard to data sets. They are identified with URIs.

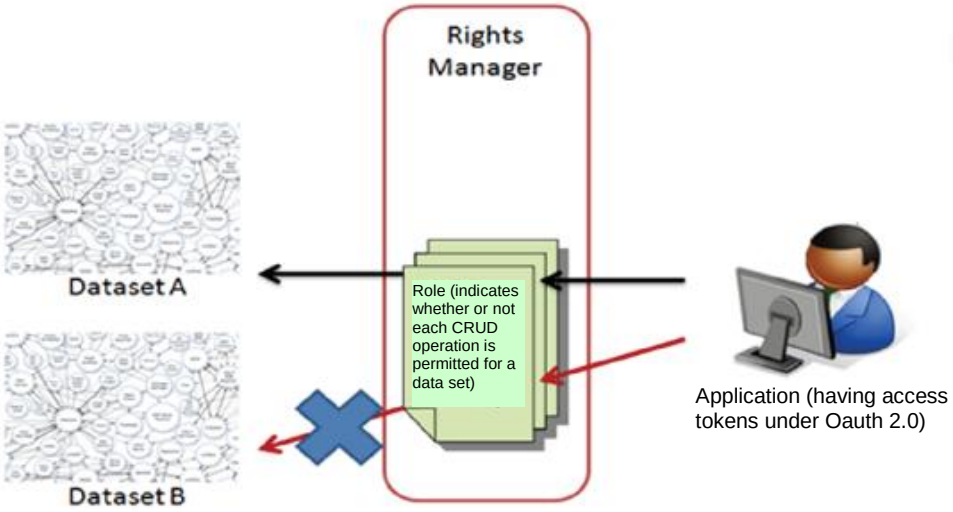



Fig. 4.1. Access control using security management commands

A role is written using the vocabulary in section C.14 (Access control vocabulary) to indicate whether or not CRUD operations are permitted for up to 1 application and 1 data set. Roles not included in the application in question are for all applications, and roles not included in the data set in question are for all data sets.

Roles should be evaluated according to the following sequence.

1. Roles where both the application and the data set are specified

2. Roles where only the application is specified

3. Roles where only the data set is specified

4. Roles where neither the application nor the data set is specified

For example, Fig. 4.2 illustrates the following access control rules.

- All applications may view Data #1, Data #2, and Data #3.
- Applications having ConsumerKey = Key1 may update and delete Data #1 and Data #2.
- Applications having ConsumerKey = Key2 may update Data #1, Data #2, and Data #3. No other access is permitted.

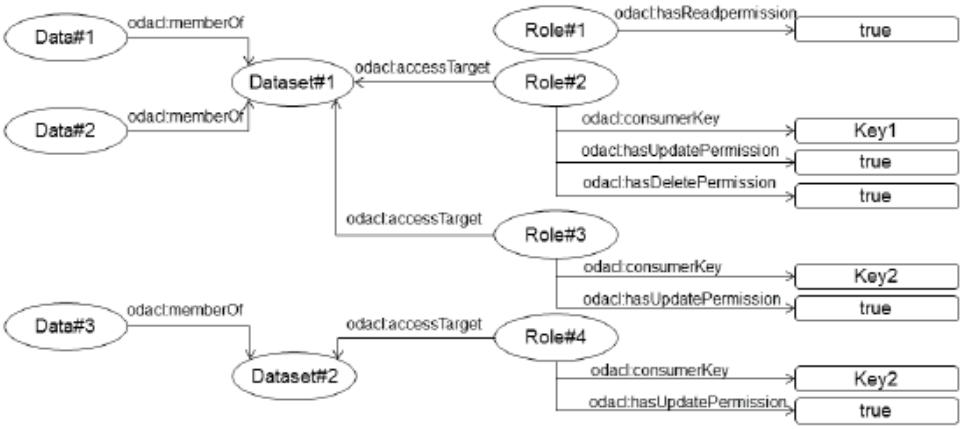



Fig. 4.2. Example of access control statements

These commands are listed in Table 4.4.1.

When using security management commands and access control functions that provide these functions, requests should be submitted by specifying the access token as the value of the access_token query parameter, or by presenting the Oauth 2.0 access token in the Authorization HTTP header.

The implementation method of OAuth 2.0 is not prescribed in these specifications. This is implementation-dependent. When providing these functions, the method for obtaining the Oauth 2.0 access token should be stated.

Details concerning each command are provided below.

Table 4.4.1. List of security management commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v2/roles | GET | Searching for a role |
| /api/v2/roles | POST | Registering a new role |
| /api/v2/roles/<targets> | GET | Viewing a role |
| /api/v2/roles/<targets>/<properties> | GET | Viewing a role |
| /api/v2/roles/<targets> | PUT | Updating a role |
| /api/v2/roles/<targets>/<properties> | PUT | Updating a role |
| /api/v2/roles/<targets> | DELETE | Deleting a role |
| /api/v2/roles/<targets>/<properties> | DELETE | Deleting a role |
| /api/v2/datasets | GET | Searching for a data set |

### 4.4.1. Searching for roles

Functional summary:

Searching for roles.

Method:

GET

URL path:

/api/v2/roles

Restrictions:

This only be performed by an application that is authorized to perform role searches, and it can only obtain the roles for which it has viewing rights.

Parameters:

The parameters are as shown in Table 4.4.2.

They are given in the form of <$param_N$> = <$value_N$>. If multiple parameters are specified, this is an AND search.

Table 4.4.2. Role search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | (not specified) | Name of parameter for searching |
| $value_N$ | (not specified) | Value of parameter for searching |

At least one pair of <$param_N$>, <$value_N$> should be specified.
<$param_N$> is any of the following.

- A property URI indicating a role attribute; for example, odacl:hasReadPermission.
- Target: An identifier of the searched role, its parameter value having the format of xsd:anyURI[ ]. Any commas included in the URI should be URL encoded. If there are multiple targets, they should be separated by commas.
- Offset, limit: The parameter value is xsd:integer. The meaning is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number.
- Property names in the role description.

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.4.3.

Table 4.4.3. Status codes when searching for roles

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <param$_1$>, <value$_1$> pair.<br>Incorrect <param$_N$>. |
| 404 | Not Found | No role meeting the search conditions has been registered in the ODDP system. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the role list, in the format specified by the Accept header.
If the response is divided (paging), a Link header should be added to the HTTP header, based on section 3.4.3 (Rules on response paging).

API usage example

The following is an example of a request to check whether the application whose acl:consumerKey is "01230123AAFF" has the authority to access the data set <http://example.org/target>, and the response.

Request

```
GET /api/v2/roles?acl_consumerKey=01230123AAFF&acl_accessTarget=http%3A%2F
%2Fexample.org%2Ftarget HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8
{
  "@context": {
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    "odacl:accessTarget":{
      "@id":"http://uidcenter.org/ucr/vocab/oddp-acl#accessTarget",
      "@type":"@id" }
    }
  },
  "@id": "role_search_response_example",
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000010000000100801",
      "@type": "odacl:RightsStatement",
      "odacl:accessTarget": "http://example.org/target",
      "odacl:accessToken": "01230123AAFF",
      "odacl:hasReadPermission": true,
      "odacl:isActive": true
    }
  ]
}
```

### 4.4.2. Registering new roles

Functional summary:
Registration of new roles.

Method:
POST

URL path:
/api/v2/roles

Restrictions:
This can only be performed by an application that is authorized to register new roles.

Parameters:
The role description in RDF format is contained in the message body.

Automatic ucode issuing can be requested by including a URI having the format of urn:ucode:_?<val> or an empty value URI in the RDF data. (See section 3.6, RDF expressions requesting automatic ucode issuing.)

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.4.4.

Table 4.4.4. Status codes when registering new roles

| Status code | Meaning | |
|---|---|---|
| 201 | Created | Completed successfully. |
| 400 | Bad Request | The role is incorrect. |
| 409 | Conflict | The identifier of the specified role has already been registered in the ODDP system, or the described role conflicts with a role description that has already been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is the structured data shown in Table 4.4.5, represented in JSON or XML format.

Table 4.4.5. Response format for new role registration

| Parameter name | Format | Explanation |
|---|---|---|
| ucode | hash | Hash data where the key is the specified variable name and the value is the URI representation of the issued ucode, in cases where a URI with a variable name was specified. |
| | xsd:anyURI[] | A string consisting of the URI representation of the issued ucode, in cases where an empty value URI was specified or automatic ucode issuing was not specified. |
| counts | xsd:integer | Quantity of registered roles. |
| total | xsd:integer | Total quantity of registered roles. |

API usage example

The following is an example of a request to authorize an application having the Oauth 2.0 access token "CCCCCCCC" to perform viewing, updating, and deletion with regard to a data set having the URI <http://example.org/sampleDataset>, and the response.

Request

```
POST /api/v2/roles HTTP/1.1
ontent-Length: xxx
Content-Type: application/json; charset=utf-8
Host: www.example.org

{
  "@context": {
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    "odacl:accessTarget":{
      "@id":"http://uidcenter.org/ucr/vocab/oddp-acl#accessTarget",
      "@type":"@id"
    }
  },
  "@id": "role_create_example",
  "@graph": [
    {
      "@id": "ucode:_?x",
      "@type": "odacl:RightsStatement",
      "odacl:accessTarget": "http://example.org/sampleDataset",
      "odacl:accessToken": "CCCCCCCC",
      "odacl:hasReadPermission": true,
      "odacl:hasUpdatePermission": true,
      "odacl:hasDeletePermission": true,
      "odacl:isActive": true
    }
  ]}
```

Response

```
HTTP/1.1 201 Created
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode":{"ucode:_?x":"urn:ucode:_00001C000000000000010000001008O1"},
 "counts": 1,
 "total": 1
}
```

### 4.4.3. Viewing roles

Functional summary:
Viewing role information.

Method:
GET

URL path:
/api/v2/roles/<targets>
- <targets>: Role identifiers. (xsd:anyURI[ ] format)

Restrictions:
This can only be performed by a user who is authorized to view the roles specified by <targets>.

Parameters:
None.

Required HTTP headers:
The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.4.6.

Table 4.4.6. Status codes when viewing roles

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding role can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is RDF data of the role list, in the format specified by the Accept header.

API usage example
The following is an example of a request to view the information of a role indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
GET /api/v2/roles/ucode_00001C000000000000010000000100800 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    "odacl:accessTarget":{
      "@id":"http://uidcenter.org/ucr/vocab/oddp-acl#accessTarget",
      "@type":"@id"
    }
  },
  "@id": "role_search_response_example",
  "@graph": [
    {
      "@id": "urn:ucode:_00001C000000000000010000000100800",
      "@type": "odacl:RightsStatement",
      "odacl:accessTarget": "http://example.org/sampleDataset",
      "odacl:accessToken": "CCCCCCCC",
      "odacl:hasReadPermission": true,
      "odacl:hasUpdatePermission": true,
      "odacl:hasDeletePermission": true,
      "odacl:isActive": true
    }
  ]
}
```

### 4.4.4. Viewing roles: Specifying properties

Functional summary:

Specifying properties and viewing roles.

Method:

GET

URL path:

/api/v2/roles/<targets>/<properties>

- <targets>: Role identifiers. (xsd:anyURI[ ] format)
- <properties>: Property identifiers. (xsd:anyURI[ ] format)

Restrictions:

This can only be performed by a user who is authorized to view the roles specified by <targets>.

Parameters:

None.

Status codes:

As shown in Table 4.4.7.

Table 4.4.7. Status codes when viewing roles and specifying properties

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding role can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the role list, in the format specified by the Accept header.

API usage example

The following is an example of a request to view the viewing authority under the role indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
GET /api/v2/roles/ucode_00001C000000000000010000000100800/odacl_
hasReadPermission HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    }
  },
  "@id": "role_search_response_example",
  "@graph": [
    {
      "@id": "urn:ucode:_00001C0000000000000010000000100800",
      "odacl:hasReadPermission": true,
    }
  ]
}
```

### 4.4.5. Updating roles

Functional summary:

Updating roles.

Method:

PUT

URL path:

/api/v2/roles/<targets>

- <targets>: Role identifiers. (xsd:anyURI[ ] format)

Restrictions:

This can only be performed by a user who is authorized to update the roles corresponding to <targets>.

Parameters:

The role description in RDF format ("update role data") is contained in the message body.

- The subject of the update role data is consistent with <targets>.
- After the command is completed, the role descriptions specified by <targets> will be completely consistent with the update role data. Data not stated in the update role data will be deleted from the roles specified by <targets>.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.4.8.

Responses:

If successful, the response body is empty.

API usage example

The following is an example of a request to update the role indicated by the URI urn:ucode:_00001C000000000000010000000100800 to allow only viewing, and the response.

Table 4.4.8. Status codes when updating roles

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding role identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Request

```
PUT /api/v2/roles/ucode_00001C0000000000000010000000100800 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    "odacl:accessTarget":{
      "@id":"http://uidcenter.org/ucr/vocab/oddp-acl#accessTarget",
      "@type":"@id"
    }
  },
  "@id": "role_create_example",
  "@graph": [
    {
      "@id": "urn:ucode:_EEEEEEEEEEEEEEEEEEEEEEEEEEEEEE",
      "@type": "odacl:RightsStatement",
      "odacl:accessTarget": "http://example.org/sampleDataset",
      "odacl:accessToken": "CCCCCCCC",
      "odacl:hasReadPermission": true,
      "odacl:isActive": true
    }
  ]
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
Content-Type: application/json; charset=utf-8
```

### 4.4.6. Updating roles: Specifying properties

Functional summary:

Specifying properties and updating roles.

Method:

PUT

URL path:

/api/v2/roles/<targets>/<properties>

- <targets>: Role identifiers. (xsd:anyURI format)
- <properties>: Property identifiers. (xsd:anyURI format)

Restrictions:

This can only be performed by a user who is authorized to update the roles corresponding to <target>.

Parameters:

The RDF data representing the roles ("update role data") is contained in the message body.

- The subject of the update role data is consistent with <targets>.
- After the command is completed, the values of properties specified by <properties> in the roles specified by <targets> will be completely consistent with the update role data. Property values not specified by <properties> are not changed, even if they are included in the update role data.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.4.9.

Responses:

If successful, the response body is empty.

Table 4.4.9. Status codes when updating roles and specifying properties

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values.<br>The subject of the update role data is not consistent with <targets>. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding role identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to prohibit viewing authorization of the role indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
PUT /api/v2/roles/ucode_00001C0000000000000010000000100800/
 odacl_hasReadPermission HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    }
  },
  "@id": "role_create_example",
  "@graph": [
    {
      "@id": "urn:ucode:_00001C0000000000000010000000100800",
      "@type": "odacl:RightsStatement",
      "odacl:hasReadPermission": false,
    }
  ]
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
Content-Type: application/json; charset=utf-8
```

### 4.4.7. Deleting roles

Functional summary:

Deleting roles.

Method:

DELETE

URL path:

/api/v2/roles/<targets>/<properties>

- <targets>: Role identifiers. (xsd:anyURI format)
- <properties>: Property identifiers. (xsd:anyURI format)

Restrictions:

This can only be performed by a user who is authorized to update the roles corresponding to <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.4.10.

Table 4.4.10. Status codes when deleting roles

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding role identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete a role indicated by the URI urn:ucode:_00001C000000000000001000000100800, and the response.

Request

```
DELETE /api/v2/roles/ucode_00001C000000000000001000000100800 HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.4.8. Deleting attributes of roles

Functional summary:
Specifying properties and deleting roles.

Method:
DELETE

URL path:
/api/v2/roles/<targets>
- <targets>: Role identifiers. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the roles corresponding to <targets>.

Parameters:

None.

Status codes:

As shown in Table 4.4.11.

Table 4.4.11. Status codes when deleting attributes of roles

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding role identifier has been registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

If successful, the response body is empty.

API usage example

The following is an example of a request to delete a role indicated by the URI urn:ucode:_00001C000000000000010000000100800, and the response.

Request

```
DELETE /api/v2/roles/ucode_00001C000000000000010000000100800 HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.4.9. Searching data sets

Functional summary:

Searching for metadata of data sets.

Method:

GET

URL path:

/api/v2/datasets

Restrictions:

This only be performed by an application that is authorized to perform data set searches, and it can only obtain the data sets for which it has viewing rights.

Parameters:

The parameters are as shown in Table 4.4.12. They are given in the form of <param$_N$> = <value$_N$>. If multiple parameters are specified, this is an AND search.

Table 4.4.12. Data set search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| param$_N$ | (not specified) | Name of property for searching |
| value$_N$ | (not specified) | Value of property for searching |

At least one pair of <param$_N$>, <value$_N$> should be specified. <param$_N$> is any of the following.

- A property URI indicating a data set attribute.
- Target: The URI of the searched data set, its parameter value having the format of xsd:anyURI[ ]. Any commas included in the URI should be URL encoded. If there are multiple targets, they should be separated by commas.
- Offset, limit: The parameter value is xsd:integer. The meaning is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number.
- Property names in the data set description.

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.4.13.

Table 4.4.13. Status codes when searching data sets

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <param$_1$>, <value$_1$> pair.<br>Incorrect <param$_N$>. |
| 404 | Not Found | No metadata meeting the search conditions has been registered in the ODDP system. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the role list, in the format specified by the Accept header.

If the response is divided (paging), a Link header should be added to the HTTP header, based on section 3.4.3 (Rules on response paging).

API usage example

The following is an example of a request to obtain a list of viewable data sets, and the response.

Request

```
GET /api/v2/datasets HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
    "odacl": "http://uidcenter.org/ucr/vocab/oddp-acl#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#"
  },
  "@id": "access_control_datadef.ttl",
  "@graph": [
    {
      "@id": "http://example.com/someCompany",
      "@type": "odacl:Dataset",
      "dc:title": "センサBのデータセット",
      "rdfs:comment": "センサBのデータセットです",
      "odacl:isActive": true,
    },
    {
      "@id": "ucode:_UCODE_DATASET_A",
      "@type": "odacl:Dataset",
      "dc:title": "センサAのデータセット",
      "rdfs:comment": "センサAのデータセットです",
      "odacl:isActive": true,
    },
  ]
}
```

## 4.5. Notification management commands

A notification is a callback mechanism to the user program in the event that the public data in question is updated and it meets the specified conditions. The callback destination is specified as a URL. If the callback URL includes "%U", the ODDP

system will replace this portion with the URI representation of the corresponding identifier.

The ODDP system manages notifications by assigning respective ucodes. Table 4.5.1 shows combinations of properties associated with ucode notifications and values (objects).

Table 4.5.1. Properties associated with notifications and their values (objects)

| Property | Object type | Value (object) |
|---|---|---|
| rdf:type | rdfs:Class | uc:Notification |
| dc:title | xsd:String | Name of notification |
| rdf:subject | rdfs:Class | URI(s) of subject(s) to be evaluated in the notification |
| rdf:predicate | rdf:Predicate | URI of predicate to be evaluated in the notification |
| uc:notificationCondition | xsd:String | Conditions of evaluation (See Table 4.5.2) |
| rdf:value | rdfs:Literal | Threshold (value of condition for evaluation) |
| uc:notificationURL | xsd:String | URL to be notified if conditions are met (literal value) |
| uc:isValid | xsd:boolean | True if subject is valid (sending a notification if the conditions are met); otherwise false |

Table 4.5.2. List of notification conditions

| Name of condition | Meaning |
|---|---|
| any | No conditions (callback always performed) |
| eq | Equal to the specified value |
| neq | Not equal to the specified value |
| gt | Greater than the specified value |
| gte | Greater than or equal to the specified value |
| lt | Lower than the specified value |
| lte | Lower than or equal to the specified value |

Notification management commands are commands for the implementation of this notification function. These commands are listed in Table 4.5.3. Details concerning each API are provided below.

Table 4.5.3. List of notification management commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/notifications | GET | Searching for a notification |
| /api/v1/notifications | POST | Registering a notification |
| /api/v1/notifications/<targets> | GET | Viewing notification information |
| /api/v1/notifications/<target> | PUT | Updating notification information |
| /api/v1/notifications/<target> | DELETE | Deleting notification information |
| /api/v1/notifications/<target>/run | PUT | Starting or resuming a notification |
| /api/v1/notifications/<target>/run | DELETE | Stopping a notification |

### 4.5.1. Searching for notifications

Functional summary:

Searching for notifications. Notification searches cannot be performed without viewing authorization.

Method:

GET

Restrictions:

None. Anyone can make a request.

URL path:

/api/v1/notifications

Parameters:

The parameters are as shown in Table 4.5.4. They are given in the form of <$param_N$> = <$value_N$>.

Table 4.5.4. Notification search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | (not specified) | Name of parameter for searching |
| $value_N$ | (not specified) | Value of parameter for searching |

At least one pair of <$param_N$>, <$value_N$> should be specified. <$param_N$> is an attribute indicated as a property of notifications in Table 4.5.1, or as follows.

- Offset, limit: The parameter value is xsd:integer. The meaning is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number.

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.5.5.

Table 4.5.5. Status codes when searching for notifications

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <$param_1$>, <$value_1$> pair.<br>Incorrect <$param_N$>. |
| 404 | Not Found | The searched notification cannot be found. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the notification list, in the format specified by the Accept header.

If the response is divided (paging), a Link header should be added to the HTTP header, based on section 3.4.3 (Rules on response paging).

API usage example

The following is an example of a request to search for the identifier of a notification whose name (dc:title) is NotificationA, and the response.

Request

```
GET /api/v1/notifications?dc_title=NotificationA HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "uc": "http://uidcenter.org/ucr/vocab/uc#",
    "rdf:subject": { "@type": "@id" },
    "rdf:predicate": { "@type": "@id" }
  },
  "@id": "urn:ucode:_00001C000000000000010000000100126",
  "dc:title": "NotificationA",
  "rdf:predicate": "uc:temperature",
  "rdf:subject": [
    "urn:ucode:_00001C000000000000010000000100123",
    "urn:ucode:_00001C000000000000010000000100124"
  ],
  "rdf:value": {
    "@value": "20",
    "@type": "rdf:integer"
  },
  "uc:isValid": {
    "@value": "true",
    "@type": "rdf:boolean"
  },
  "uc:notificationCondition": "gte",
  "uc:notificationURL": "http://www.example.org/?ucode=%U"
}
```

### 4.5.2. Creating new notifications

Functional summary:
Creation of new notifications.

Method:
POST

URL path:
/api/v1/notifications

Restrictions:

Access by a user who is authorized to create new notifications.

Parameters:

The notification definition in RDF format is contained in the message body.

Automatic ucode issuing can be requested by including a URI having the format of urn:ucode:_?<val> in the RDF data. (See section 3.6, RDF expressions requesting automatic ucode issuing.)

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.5.6.

Table 4.5.6. Status codes when creating new notifications

| Status code | Meaning | |
|---|---|---|
| 201 | Created | Completed successfully. |
| 400 | Bad Request | <params> is empty.<br>The key of <params> is incorrect.<br>The parameters specify both target and num. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is the structured data shown in Table 4.5.7, represented in JSON or XML format.

Table 4.5.7. Response format for creation of new notifications

| Parameter name | Format | Explanation |
|---|---|---|
| ucode | hash | Hash data where the key is the specified variable name and the value is the URI representation of the issued ucode. |

API usage example

The following is an example of a request to register a notification having the following information, and the response.

- Name (dc:title): NotificationA
- Identifiers concerned (df:subject): urn:ucode:_00001C000000000000010000000100123 and urn:ucode-_00001C000000000000010000000100124
- Property concerned (rdf:predicate): Temperature (uc:temperature)
- Conditions (uc:notificationCondition, rdf:value): 20º or below
- URL to receive notification (uc:notificationURL): http://www.example.org/?ucode=%U
- Send notification when conditions are met (uc:isValid = true)

Request

```
POST /api/v1/notifications HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "uc": "http://uidcenter.org/ucr/vocab/uc#",
    "rdf:subject": { "@type": "@id" },
    "rdf:predicate": { "@type": "@id" }
  },
  "@id": "urn:ucode:_?x",
  "dc:title": "NotificationA",
  "rdf:predicate": "uc:temperature",
  "rdf:subject": [
    "urn:ucode:_00001C000000000000001000000100123",
    "urn:ucode:_00001C000000000000001000000100124"
  ],
  "rdf:value": {
    "@value": "20",
    "@type": "rdf:integer"
  },
  "uc:isValid": {
    "@value": "true",
    "@type": "rdf:boolean"
  },
  "uc:notificationCondition": "gte",
  "uc:notificationURL": "http://www.example.org/?ucode=%U"
}
```

Response

```
HTTP/1.1 201 Created
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode":{
  "ucode:_?x": "urn:ucode:_00001C000000000000001000000100126"}
```

### 4.5.3. Viewing notification information

Functional summary:
Viewing notification information.

Method:
GET

URL path:
/api/v1/notifications/<targets>
- <targets>: Notification identifiers. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view information on the notifications specified by <targets>.

Parameters:
None.

Required HTTP headers:
The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.5.8.

Table 4.5.8. Status codes when viewing notification information

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding notification can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is the structured data shown in Table 4.5.9, represented in JSON or XML format.

Table 4.5.9. Response format for viewing notification information

| Parameter name | Format | Explanation |
|---|---|---|
| notifications | RDF | List of specified data. If the specified response format is XML, each item of data is expressed in RDF/XML. If the specified response format is JSON, each item of data is expressed in RDF/JSON. |

API usage example
The following is an example of a request to view notification information indicated by the URI urn:ucode:_00001C000000000000010000000100126, and the response.

Request

```
GET /api/v1/notifications/ucode_00001C0000000000000010000000100126 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "dc": "http://purl.org/dc/elements/1.1/",
    "uc": "http://uidcenter.org/ucr/vocab/uc#",
    "ug": "http://uidcenter.org/ucr/vocab/ug#",
    "rdf:subject": { "@type": "@id" },
    "rdf:predicate": { "@type": "@id" }
  },
  "@id": "urn:ucode:_00001C0000000000000010000000100126",
  "dc:title": "NotificationA",
  "rdf:predicate": "uc:temperature",
  "rdf:subject": [
    "urn:ucode:_00001C0000000000000010000000100123",
    "urn:ucode:_00001C0000000000000010000000100124"
  ],
  "rdf:value": {
    "@value": "20",
    "@type": "rdf:integer"
  },
  "uc:isValid": {
    "@value": "true",
    "@type": "rdf:boolean"
  },
  "uc:notificationCondition": "gte",
  "uc:notificationURL": "http://www.example.org/?ucode=%U"
}
```

### 4.5.4. Updating notification information

Functional summary:
Updating notification information.

Method:
PUT

URL path:
/api/v1/notifications/<target>
- <target>: Notification identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update information on the notification specified by <target>.

Parameters:
The notification update information in RDF format is contained in the message body.
- The subject of the update information is consistent with <targets>.
- The values of predicates contained in the update information are completely consistent with the specified update information, including quantities.
- The values of predicates that are not included in the update information are not changed.

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.5.10.

Responses:
If successful, the response body is empty.

Table 4.5.10. Status codes when updating notification information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | There is no <$param_1$>, <$value_1$> pair.<br>Incorrect <$param_N$>. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched notification cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example
The following is an example of a request to update the name (dc:title) of the notification indicated by the URI urn:ucode:_00001C000000000000010000000100126 to NotificationA and stop sending notifications (uc:isValid = false), and the response.

Request

```
PUT /api/v1/notifications/ucode_00001C000000000000001000000100126 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "dc": "http://purl.org/dc/elements/1.1/",
    "uc": "http://uidcenter.org/ucr/vocab/uc#",
  },
  "@id": "urn:_ucode_00001C000000000000001000000100126",
  "dc:title": "NotificationA",
  "uc:isValid": {
    "@value": "false",
    "@type": "rdf:boolean"
  }
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.5.5. Deleting notifications

Functional summary:
Deleting notifications.

Method:
DELETE

URL path:
/api/v1/notifications/<target>

- <target>: Notification identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the notification specified by <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.5.11.

Table 4.5.11. Status codes when deleting notifications

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | <target> is unspecified or incorrect. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched notification cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete notification information indicated by the URI urn:ucode:_00001C000000000000010000000100126, and the response.

Request

```
DELETE /api/v1/notifications/ucode_00001C000000000000010000000100126
  HTTP/1.1
Host: www.example.org
Content-Length: 0
Content-Type: application/json; charset=utf-8
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.5.6. Starting or resuming notifications

Functional summary:
Starting or resuming notifications.

Method:
PUT

URL path:
/api/v1/notifications/<target>/run
- <target>: Identifier of the notification to be started or resumed. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update information on the notification specified by <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.5.12.

Table 4.5.12. Status codes when starting or resuming notifications

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | There is no <param$_1$>, <value$_1$> pair.<br>Incorrect <param$_N$>. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched notification cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to begin sending the notification indicated by the URI urn:ucode:_00001C000000000000010000000100126, and the response.

Request

```
PUT /api/v1/notifications/ucode_00001C000000000000010000000100126/run
  HTTP/1.1
Host: www.example.org
Content-Length: 0
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.5.7. Stopping notifications

Functional summary:
Stopping notifications.

Method:
DELETE

URL path:

/api/v1/notifications/<target>/run

- <target>: Identifier of the notification to be stopped. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to update information on the notification specified by <target>.

Parameters:

None.

Required HTTP headers:

None.

Status codes:

As shown in Table 4.5.13.

Table 4.5.13. Status codes when stopping notifications

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | <target> is unspecified or incorrect. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched notification cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

If successful, the response body is empty.

API usage example

The following is an example of a request to stop sending the notification indicated by the URI urn:ucode:_00001C000000000000010000000100126, and the response.

Request

```
DELETE /api/v1/notifications/ucode_00001C000000000000010000000100126/run
  HTTP/1.1
Host: www.example.org
Content-Length: 0
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

## 4.6. Vocabulary management commands

Vocabulary management commands are commands to provide vocabulary management functions. Vocabulary is input and output in accordance with the RDF Schema format.

These commands are listed in Table 4.6.1. Details concerning each API are provided below.

Table 4.6.1. List of vocabulary management commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/vocabularies | GET | Searching for terms |
| /api/v1/vocabularies | POST | Registering terms |
| /api/v1/vocabularies/<targets> | GET | Viewing terms |
| /api/v1/vocabularies/<targets>/<property> | GET | Viewing terms |
| /api/v1/vocabularies/<target> | PUT | Updating terms |
| /api/v1/vocabularies/<target>/<property> | PUT | Updating terms |
| /api/v1/vocabularies/<target> | DELETE | Deleting terms |
| /api/v1/vocabularies/<target>/synonyms | GET | Viewing synonyms |
| /api/v1/vocabularies/<target>/synonyms | PUT | Updating synonyms |
| /api/v1/vocabularies/<target>/parents | GET | Viewing parent terms |
| /api/v1/vocabularies/<target>/parents | PUT | Updating parent terms |
| /api/v1/vocabularies/<target>/children | GET | Viewing child terms |

### 4.6.1. Searching for terms

Functional summary:
Searching for terms.

Method:
GET

Restrictions:
None. Anyone can make a request.

URL path:
/api/v1/vocabularies

Parameters:
The parameters are as shown in Table 4.6.2.
They are given in the form of <$param_N$> = <$value_N$>.

Table 4.6.2. Term search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | (not specified) | Name of parameter for searching |
| $value_N$ | (not specified) | Value of parameter for searching |

At least one pair of <param$_N$>, <value$_N$> should be specified. <param$_N$> is any of the following.

- Property URI used in RDF Schema
- Target: An identifier of the searched term, having the format of xsd:anyURI[ ]. Any commas included in the URI value should be URL encoded. If there are multiple targets, they should be separated by commas.
- Offset, limit: The parameter value is xsd:integer. The meaning is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number.

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.6.3.

Table 4.6.3. Status codes when searching for terms

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <param$_1$>, <value$_1$> pair.<br>Incorrect <param$_N$>. |
| 404 | Not Found | The searched term cannot be found. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the term list, in the format specified by the Accept header.

If the response is divided (paging), a Link header should be added to the HTTP header, based on section 3.4.3 (Rules on response paging).

API usage example

The following is an example of a request to search for the identifier of a term whose name (rdfs:label) is Title, and the response.

Request

```
GET /api/v1/vocabularies?rdfs_label=Title HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"vocabularies": {
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",
    "owl": "http://www.w3.org/2002/07/owl#",
    "dc": "http://purl.org/dc/elements/1.1/",
    "dct": "http://purl.org/dc/terms/",
    "rdfs:isDefinedBy": { "@type": "@id" },
    "rdfs:range": { "@type": "@id" },
    "rdfs:subPropertyOf": { "@type": "@id" }
    "owl:sameAs": { "@type": "@id" }
  },
  "@id": "urn:ucode:_0FFFDE0000000000000000000038035",
  "@type": "rdf:Property",
  "dct:hasVersion": {
    "@id": "http://dublincore.org/usage/terms/history/#titleT-002"
  },
  "dct:issued": "2008-01-14",
  "dct:modified": "2010-10-11",
  "owl:sameAs": "dct:title",
  "rdfs:comment": {
    "@value": "A name given to the resource.",
    "@language": "en-us"
  },
  "rdfs:isDefinedBy": "http://purl.org/dc/terms/",
  "rdfs:label": {
    "@value": "Title",
    "@language": "en-us"
  },
  "rdfs:range": "rdfs:Literal",
  "rdfs:subPropertyOf": "dc:title" },
 "remains":false
 }
```

### 4.6.2. Creating new terms

Functional summary:
Creation of new terms.

Method:
POST

URL path:
/api/v1/vocabularies

Restrictions:
Access by a user who is authorized to create new terms.

Parameters:
The term definition information in RDF format is contained in the message body.
Automatic ucode issuing can be requested by including a URI having the format of urn:ucode:_?<val>. (See section 3.6, RDF expressions requesting automatic ucode issuing.)

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.6.4.

Table 4.6.4. Status codes when creating new terms

| Status code | Meaning | |
|---|---|---|
| 201 | Created | Completed successfully. |
| 400 | Bad Request | The parameters specify neither rdf nor params.<br>The parameters specify either rdf or params, target, num, but not both.<br>The key of <params> is incorrect.<br>The parameters specify both target and num. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is the structured data shown in Table 4.6.5, represented in JSON or XML format.

Table 4.6.5. Response format for creation of new terms

| Parameter name | Format | Explanation |
|---|---|---|
| ucode | hash | Hash data where the key is the specified variable name, and the value is the issued ucode. |

API usage example
The following is an example of a request to register the following new term, and the response.

- Synonymous term (owl:sameAs): dc:title
- Name (rdfs:label): Title
- Definition information (rdfs:IsDefinedBy): http://purl.org/dc/terms/
- Registration date (dcterms:Issued): 2008/01/14
- Date of last update (dcterms:modified): 2010/10/11
- Type (rdf:type): Property (rdf:Property)
- Version (dcterms:hasVersion): http://dublincore.org/usage/terms/history/#titleT-002
- Range (rdfs:range): String of characters (rdfs:Literal)
- Parent term (rdfs:subPropertyOf): dc:title

Request

```
POST /api/v1/vocabularies HTTP/1.1
ontent-Length: xxx
Content-Type: application/json; charset=utf-8
Host: www.example.org

{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",
    "owl": "http://www.w3.org/2002/07/owl#",
    "dc": "http://purl.org/dc/elements/1.1/",
    "dct": "http://purl.org/dc/terms/",
    "rdfs:isDefinedBy": { "@type": "@id" },
    "rdfs:range": { "@type": "@id" },
    "owl:sameAs": { "@type": "@id" },
  },
  "@id": "ucode?_x",
  "@type": "rdf:Property",
  "dct:hasVersion": {
    "@id": "http://dublincore.org/usage/terms/history/#titleT-002"
  },
  "dct:issued": "2008-01-14",
  "dct:modified": "2010-10-11",
  "owl:sameAs": "dct:title",
  "rdfs:comment": {
    "@value": "A name given to the resource.",
    "@language": "en-us"
  },
  "rdfs:isDefinedBy": "http://purl.org/dc/terms/",
  "rdfs:label": {
    "@value": "Title",
    "@language": "en-us"
  },
  "rdfs:range": "rdfs:Literal",
  "rdfs:subPropertyOf": "dc:title"
}
```

Response

```
HTTP/1.1 201 Created
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode":{
   "ucode_?x":"urn:ucode:_0FFFDE00000000000000000038035" } }
```

### 4.6.3. Viewing terms

Functional summary:
Viewing terms.

Method:
GET

URL path:
/api/v1/vocabularies/<targets>
- <targets>: Term identifiers. (xsd:anyURI[ ] format)

Restrictions:
None. Anyone can make a request.

Parameters:
None.

Required HTTP headers:
The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.6.6.

Table 4.6.6. Status codes when viewing terms

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding term can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is RDF data of the term definition list, in the format specified by the Accept header.

API usage example

The following is an example of a request to view information concerning the term indicated by the URI urn:ucode:_0FFFDE00000000000000000000038035, and the response.

Request

```
GET /api/v1/vocabularies/ucode_0FFFDE00000000000000000000038035 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",
    "owl": "http://www.w3.org/2002/07/owl#",
    "dc": "http://purl.org/dc/elements/1.1/",
    "dct": "http://purl.org/dc/terms/",
    "rdfs:isDefinedBy": { "@type": "@id" },
    "rdfs:range": { "@type": "@id" },
    "rdfs:subPropertyOf": { "@type": "@id" }
    "owl:sameAs": { "@type": "@id" }
  },
  "@id": "urn:ucode:_0FFFDE0000000000000000000038035",
  "@type": "rdf:Property",
  "dct:hasVersion": {
    "@id": "http://dublincore.org/usage/terms/history/#titleT-002"
  },
  "dct:issued": "2008-01-14",
  "dct:modified": "2010-10-11",
  "owl:sameAs": "dct:title",
  "rdfs:comment": {
    "@value": "A name given to the resource.",
    "@language": "en-us"
  },
  "rdfs:isDefinedBy": "http://purl.org/dc/terms/",
  "rdfs:label": {
    "@value": "Title",
    "@language": "en-us"
  },
  "rdfs:range": "rdfs:Literal",
  "rdfs:subPropertyOf": "dc:title"
}
```

### 4.6.4. Viewing term information: Specifying properties

Functional summary:
Specifying properties and viewing term information.

Method:
GET

URL path:
/api/v1/vocabularies/<targets>/<properties>
- <targets>: Term identifiers. (xsd:anyURI[ ] format)
- <properties>: Property identifiers. (xsd:anyURI[ ] format)

Restrictions:
None. Anyone can make a request.

Parameters:
None.

Required HTTP headers:
The requested of RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.6.7.

Table 4.6.7. Status codes when viewing term information and specifying properties

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> or <properties> are not specified. |
| 404 | Not Found | No corresponding term can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is RDF data of the term definition list, in the format specified by the Accept header.

API usage example
The following is an example of a request to obtain the name (rdfs:label) of the terms indicated by the URIs urn:ucode:_0FFFDE0000000000000000000038035 and urn:ucode:_0FFFDE0000000000000000000038036, and the response.

Request

```
GET /api/v1/vocabularies/ucode_0FFFDE0000000000000000000038035,
ucode_0FFFDE0000000000000000000038036/rdfs_label HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@graph": [
    {
      "@id": "urn:ucode_0FFFDE0000000000000000000038035",
      "rdfs:label": "Title"
    },
    {
      "@id": "urn:ucode_0FFFDE0000000000000000000038036",
      "rdfs:label": "Type"
    }
  ]
}
```

### 4.6.5. Updating term information

Functional summary:
Updating term information.

Method:
PUT

URL path:
/api/v1/vocabularies/<target>

- <target>: Term identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update information on the term indicated by <target>.

Parameters:

Term definition information in RDF format is contained in the message body.

- The subject of the update information is consistent with <target>.
- After the command is completed, the values of predicates contained in the update information are completely consistent with the specified update information, including quantities.
- The values of predicates that are not included in the update information are not changed.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.6.8.

Responses:

If successful, the response body is empty.

Table 4.6.8. Status codes when updating term information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameters. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding term can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to obtain the version (dct:hasVersion) of a term indicated by the URI urn:ucode:_0FFFDE0000000000000000000038035 to http://dublincore.org/usage/terms/history/#titleT-002, and the response.

Request

```
PUT /api/v1/vocabularies/ucode_0FFFDE00000000000000000000038035 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dct": "http://purl.org/dc/terms/",
  },
  "@id": "urn:ucode:_0FFFDE00000000000000000000038035",
  "dct:hasVersion": {
    "@id": "http://dublincore.org/usage/terms/history/#titleT-002"
  }
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.6.6. Updating term information: Specifying properties

Functional summary:

Specifying properties and updating term information.

Method:

PUT

URL path:

/api/v1/vocabularies/<target>/<property>

- <target>: Term identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to update information on the term indicated by <target>.

Parameters:

The RDF data representing the term definition update information is contained in the message body.

- The subject of the update information is consistent with <targets>.
- After the command is completed, the property values specified by <properties> in the term information specified by <targets> will be completely consistent with the update

information. Property values not specified by <properties> are not changed, even if they are included in the update information.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.6.9.

Responses:

If successful, the response body is empty.

Table 4.6.9. Status codes when updating term information and specifying properties

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | <target> or <property> is incorrect. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the name (rdfs:label) of the term indicated by the URI urn:ucode:_0FFFDE0000000000000000000038035 to Title, and the response.

Request

```
PUT /api/v1/vocabularies/ucode_0FFFDE0000000000000000000038035/rdfs_label
  HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#"
  },
  "@id": "urn:ucode:_0FFFDE0000000000000000000038035",
  "rdfs:label": "title"
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.6.7. Deleting terms

Functional summary:
Deleting terms.

Method:
DELETE

URL path:
/api/v1/vocabularies/<target>
- <target>: Term identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the term indicated by <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.6.10.

Table 4.6.10. Status codes when deleting terms

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | <target> is unspecified or incorrect. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete the term indicated by the URI urn:ucode:_0FFFDE0000000000000000000038035, and the response.

Request

```
DELETE /api/v1/vocabularies/ucode_0FFFDE0000000000000000000038035
 HTTP/1.1
Host: www.example.org
Content-Length: 0
```

Response

```
HTTP/1.1 204 No Content
Content-Length: 0
Connection: close
```

### 4.6.8. Searching for synonyms

Functional summary:
Searching for synonyms of the specified term (terms linked by owl:sameAs).

Method:
GET

URL path:
/api/v1/vocabularies/<target>/synonyms
- <target>: Term identifier. (xsd:anyURI format)

Restrictions:
None. Anyone can make a request.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.6.11.

Table 4.6.11. Status codes when searching for synonyms

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <target> is not specified. |
| 404 | Not Found | No corresponding term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is the structured data shown in Table 4.6.12, represented in JSON or XML format.

Table 4.6.12. Response format for synonym searches

| Parameter name | Format | Explanation |
|---|---|---|
| vocabularies | xsd:anyURI[] | List of synonyms of the specified term. |

API usage example

The following is an example of a request to search for synonyms of the term indicated by the URI urn:ucode:_0FFFDE000000000000000000000038035, and the response.

Request

```
GET /api/v1/vocabularies/ucode_0FFFDE000000000000000000000038035/synonyms
  HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"vocabularies":["<urn:ucode:_0FFFDE000000000000000000002800E>"]}
```

### 4.6.9. Updating synonym information

Functional summary:

Updating the synonym information of a term.

Method:

PUT

URL path:

/api/v1/vocabularies/<target>/synonyms

- <target>: Term identifier. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to update information on the term indicated by <target>.

Parameters:

A string of characters in JSON or XML format, having the parameters shown in Table 4.6.13, is contained in the message body.

Required HTTP headers:

None.

Table 4.6.13. Parameters for updating synonym information

| Parameter name | Format | Explanation |
|---|---|---|
| synonyms | xsd:anyURI[] | List of synonym ucodes of the specified term. |

After the command is completed, the synonyms of the updated term will be only those values specified in the message body.

Status codes:

As shown in Table 4.6.14.

Responses:

If successful, the response body is empty.

Table 4.6.14. Status codes when updating synonym information

| Status code | Meaning | |
|---|---|---|
| 200 | No Content | Completed successfully. |
| 400 | Bad Request | There are no <synonyms>.<br><synonyms> are incorrect. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to search for synonyms of a term indicated by the URI urn:ucode:_0FFFDE000000000000000000000038035, and the response.

Request

```
PUT /api/v1/vocabularies/ucode_0FFFDE000000000000000000000038035/synonyms
  HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{"synonyms":["<urn:ucode:_0FFFDE000000000000000000000002800E>"]}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.6.10. Searching for parent terms

Functional summary:

Searching for parent terms (resources ahead of rdfs:subPropertyOf, rdfs:subClassOf) of the specified term.

Method:

GET

URL path:

/api/v1/vocabularies/<target>/parents

- <target>: Term identifier. (xsd:anyURI format)

Restrictions:

None. Anyone can make a request.

Parameters:

None.

Required HTTP headers:

None.

Status codes:

As shown in Table 4.6.15.

Table 4.6.15. Status codes when searching for parent terms

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <target> is not specified. |
| 404 | Not Found | No corresponding term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is the structured data shown in Table 4.6.16, represented in JSON or XML format.

Table 4.6.16. Response format for parent term searches

| Parameter name | Format | Explanation |
|---|---|---|
| vocabularies | xsd:anyURI[] | List of parent terms of the specified term. |

API usage example

The following is an example of a request to obtain parent terms of the term indicated by the URI urn:ucode:_0FFFDE00000000000000000000038035, and the response.

Request

```
GET /api/v1/vocabularies/ucode_0FFFDE00000000000000000000038035/parents
  HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"vocabularies":["<urn:ucode:_0FFFDE000000000000000000002800E>"]}
```

### 4.6.11. Updating parent term information

Functional summary:

Updating parent terms (resources ahead of rdfs:subPropertyOf, rdfs:subClassOf) of the specified term.

Method:

PUT

URL path:

/api/v1/vocabularies/<target>/parents

- <target>: Term identifier. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to update information on the term indicated by <target>.

Parameters:

The identifier of the parent term to be updated is contained in the message body in JSON or XML format.

After the command is completed, the parent terms of the updated term will be only those values specified in the message body.

Required HTTP headers:

None.

Status codes:

As shown in Table 4.6.17.

Table 4.6.17. Status codes when updating parent term information

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameters. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

If successful, the response body is empty.

API usage example

The following is an example of a request to update the parent term of a term indicated by the URI urn:ucode:_0FFFDE00000000000000000000038035 to urn:ucode:_0FFFDE00000000000000000000002800E, and the response.

Request

```
PUT /api/v1/vocabularies/ucode_0FFFDE00000000000000000000038035/parents
  HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

["<urn:ucode:_0FFFDE00000000000000000000002800E>"]
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.6.12. Searching for child terms

Functional summary:

Searching for child terms (resources before rdfs:subPropertyOf, rdfs:subClassOf) of the specified term.

Method:

GET

URL path:

/api/v1/vocabularies/<target>/children

- <target>: Term identifier. (xsd:anyURI format)

Restrictions:

None. Anyone can make a request.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.6.18.

Table 4.6.18. Status codes when searching for child terms

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <target> is not specified. |
| 404 | Not Found | No corresponding term cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
The response is the structured data shown in Table 4.6.19, represented in JSON or XML format.

Table 4.6.19. Response format for child term searches

| Parameter name | Format | Explanation |
|---|---|---|
| vocabularies | xsd:anyURI[] | List of child terms of the specified term. |

API usage example
The following is an example of a request to obtain child terms of the term indicated by the URI urn:ucode:_0FFFDE00000000000000000000002800E, and the response.

Request

```
GET /api/v1/vocabularies/ucode_0FFFDE00000000000000000000002800E/children
  HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"vocabularies":["<urn:ucode:_0FFFDE00000000000000000000038035>"]}
```

## 4.7. Triple management commands

Triple management commands are commands that enable user programs to perform public data operations with simplified standards for standardized data so that small devices such as sensors and smart meters can efficiently handle the registration and utilization of triples consisting of a subject, predicate, and object under the RDF model.

These commands are listed in Table 4.7.1. Details concerning each API are provided below.

Table 4.7.1. List of triple management commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/datapoints | GET | Searching for public data |
| /api/v1/datapoints | POST | Registering public data |
| /api/v1/datapoints/<targets> | GET | Viewing public data |
| /api/v1/datapoints/<targets>/<properties> | GET | Viewing public data |
| /api/v1/datapoints/<target> | PUT | Updating public data |
| /api/v1/datapoints/<target>/<property> | PUT | Updating public data |
| /api/v1/datapoints/<target> | DELETE | Deleting public data |
| /api/v1/datapoints/<target>/<property> | DELETE | Deleting attribute values of public data |

### 4.7.1. Searching for public data

Functional summary:
Searching for public data.

Method:
GET

Restrictions:
None. Anyone can make a request.

URL path:
/api/v1/datapoints

Parameters:
The parameters are as shown in Table 4.7.2.
They are given in the form of <$param_N$> = <$value_N$>.

Table 4.7.2. Public data search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | (not specified) | Name of parameter for searching |
| $value_N$ | (not specified) | Value of parameter for searching |

At least one pair of <$param_N$>, <$value_N$> should be specified. <$param_N$> is any of the following.

- A property URI indicating a public data attribute.
- Target: An identifier of the searched public data, its parameter value having the format of xsd:anyURI[ ]. Any commas included in the URI should be URL encoded. If there are multiple targets, they should be separated by commas.
- Stream: A connection based on Stream API is continued for the number of seconds specified in the parameter values. (See section 3.7, Streams API.)
- Offset, limit: The parameter value is xsd:integer. The meaning is a request for the limit quantity of search results, starting from the search result whose position corresponds to the offset number.

Required HTTP headers:

The requested RDF format should be specified in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.7.3.

Table 4.7.3. Status codes when searching for public data

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | There is no <$param_1$>, <$value_1$> pair.<br>Incorrect <$param_N$>. |
| 404 | Not Found | The searched public data cannot be found. |
| 413 | Request Entity Too Large | The limit value is too high. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

The response is RDF data of the public data list, in the format specified by the Accept header.

API usage example

The following is an example of a request to search for information concerning the public data whose name (dc:title) is ABC, and the response.

Request

```
GET /api/v1/datapoints?dc_title=ABC%20meter HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@id": "urn:ucode:_00001C000000000000010000000100124",
  "dc:title": "ABC Meter"
}
```

### 4.7.2. Creating new public data

Functional summary:
Creation of new public data.

Method:
POST

URL path:
/api/v1/datapoints

Restrictions:
Access by a user who is authorized to create new public data.

Parameters:
The public data in RDF format is contained in the message body.
Automatic ucode issuing can be requested by including a URI having the format of urn:ucode:_?<val> in the RDF data. (See section 3.6, RDF expressions requesting automatic ucode issuing.)

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.7.4.

Responses:
The response is the structured data shown in Table 4.7.5, represented in JSON or XML format.

API usage example

The following is an example of a request to create public data whose name (dc:title) is ABC Meter and obtain its identifier, and the response.

Table 4.7.4. Status codes when creating new public data

| Status code | Meaning | |
|---|---|---|
| 201 | Created | Completed successfully. |
| 400 | Bad Request | The parameters specify neither rdf nor params.<br>The parameters specify either rdf or params, target, num, but not both.<br>The key of <params> is incorrect.<br>The parameters specify both target and num. |
| 409 | Conflict | The identifier of the specified public data is already registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Table 4.7.5. Response format for new public data creation

| Parameter name | Format | Explanation |
|---|---|---|
| ucode | hash | Hash data where the key is the specified variable name and the value is the URI representation of the issued ucode |

Request

```
POST /api/v1/datapoints HTTP/1.1
ontent-Length: xxx
Content-Type: application/json; charset=utf-8
Host: www.example.org

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@id": "urn:ucode:_?x",
  "dc:title": "ABC Meter"
}
```

Response

```
HTTP/1.1 201 Created
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode":{
  "urn:ucode:_?x": "urn:ucode:_00001C000000000000010000000100125"}
```

### 4.7.3. Viewing public data

Functional summary:
Viewing public data.

Method:
GET

URL path:
/api/v1/datapoints/<targets>
- <targets>: Public data identifiers. (xsd:anyURI[ ] format)
- <properties>: Property identifiers. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view information on the public data specified by <targets>.

Parameters:
As shown in Table 4.7.6.

Table 4.7.6. Parameters for viewing public data

| Parameter name | Format | Explanation |
|---|---|---|
| stream | xsd:integer | If this parameter is specified, the connection based on Stream API is continued for the specified number of seconds. (See section 3.7, Streams API.) |

Status codes:
As shown in Table 4.7.7.

Required HTTP headers:
The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Responses:
The response is RDF data of the public data list, in the format specified by the Accept header.

Table 4.7.7. Status codes when viewing public data

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> are not specified. |
| 404 | Not Found | No corresponding public data can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example
The following is an example of a request to view public data indicated by the URI urn:ucode:_00001C000000000000010000000100124, and the response.

Request

```
GET /api/v1/datapoints/ucode_00001C0000000000000010000000100124 HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@id": "urn:ucode:_00001C0000000000000010000000100124",
  "dc:title": "ABC Meter"
}
```

### 4.7.4. Viewing public data: Specifying properties

Functional summary:
Specifying properties and viewing public data.

Method:
GET

URL path:
/api/v1/datapoints/<targets>/<properties>

- <targets>: Public data identifiers. (xsd:anyURI[ ] format)
- <properties>: Property identifiers. (xsd:anyURI[ ] format)

Restrictions:
Access by a user who is authorized to view information on the public data specified by <targets>.

Parameters:
As shown in Table 4.7.8.

Table 4.7.8. Parameters for viewing public data and specifying properties

| Parameter name | Format | Explanation |
|---|---|---|
| stream | xsd:integer | If this parameter is specified, the connection based on Stream API is continued for the specified number of seconds. (See section 3.7, Streams API.) |

Required HTTP headers:

The requested RDF format should be stated in the Accept header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.7.9.

Responses:

The response is RDF data of the public data list, in the format specified by the Accept header.

Table 4.7.9. Status codes when viewing public data and specifying properties

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <targets> or <properties> are not specified. |
| 404 | Not Found | No corresponding public data can be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to view the names (dc:title) of public data indicated by the URIs urn:ucode:_00001C000000000000010000000100124 and urn:ucode:_00001C000000000000010000000100125, and the response.

Request

```
GET /api/v1/users/ucode_00001C000000000000010000000100124,
ucode_00001C000000000000010000000100125/dc,title HTTP/1.1
Accept: application/json
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@graph": [
    {
      "@id": "urn:ucode_00001C00000000000001000000100124",
      "dc:title": "ABC Meter"
    },
    {
      "@id": "urn:ucode_00001C00000000000001000000100125",
      "dc:title": "XYZ Meter"
    }
  ]
}
```

### 4.7.5. Updating public data

Functional summary:
Updating public data.

Method:
PUT

URL path:
/api/v1/datapoints/<target>

- <target>: Public data identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update information on the public data specified by <target>.

Parameters:
The update information in RDF format is contained in the message body.

- The subject of the update information data is consistent with <target>.
- The values of predicates contained in the update information are completely consistent with the specified update information, including quantities.

- The values of predicates that are not included in the update information are not changed.

Required HTTP headers:

The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:

As shown in Table 4.7.10.

Responses:

If successful, the response body is empty.

Table 4.7.10. Status codes when updating public data

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect params or rdf. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched public data cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to update the name (dc:title) of public data indicated by the URI urn:ucode:_00001C000000000000001000000100124 to ABC meter, and the response.

Request

```
PUT /api/v1/datapoints/ucode_00001C000000000000001000000100124 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@id": "urn:ucode:_00001C000000000000001000000100124",
  "dc:title": "ABC Meter"
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.7.6. Updating public data: Specifying properties

Functional summary:
Specifying properties and updating public data.

Method:
PUT

URL path:
/api/v1/datapoints/<target>/<property>
- <target>: Public data identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to update information on the public data specified by <target>.

Parameters:
The RDF data representing the update information is contained in the message body.
- The subject of the update data is consistent with <targets>.
- After the command is completed, the property values specified by <properties> in the public data specified by <targets> will be completely consistent with the update information. Property values not specified by <properties> are not changed, even if they are included in the update information.

Required HTTP headers:
The format of RDF data contained in the message body should be stated in the Content-Type header, based on Table 3.4.1. (See section 3.4.1, Format of message body.)

Status codes:
As shown in Table 4.7.11.

Responses:
If successful, the response body is empty.

Table 4.7.11. Status codes when updating public data and specifying properties

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameter values. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched public data cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example
The following is an example of a request to update the name (dc:title) of public data indicated by the URI urn:ucode:_00001C000000000000010000000100124 to ABC meter, and the response.

Request

```
PUT /api/v1/datapoints/ucode_00001C0000000000000010000000100124/dc_title
  HTTP/1.1
Host: www.example.org
Content-Type: application/json; charset=utf-8
Content-Length: xxx

{
  "@context": {
    "dc": "http://purl.org/dc/elements/1.1/",
  },
  "@id": "urn:ucode:_00001C0000000000000010000000100124",
  "dc:title": "ABC Meter"
}
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.7.7. Deleting public data

Functional summary:
Deleting public data.

Method:
DELETE

URL path:
/api/v1/datapoints/<target>

- <target>: Public data identifier. (xsd:anyURI format)

Restrictions:
Access by a user who is authorized to delete the public data specified by <target>.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.7.12.

Table 4.7.12. Status codes when deleting public data

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | <target> is unspecified or incorrect. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched public data identifier cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:

If successful, the response body is empty.

API usage example

The following is an example of a request to delete public data indicated by the URI urn:ucode:_00001C000000000000010000000100124, and the response.

Request

```
DELETE /api/v1/datapoints/ucode_00001C000000000000010000000100124 HTTP/1.1
Host: www.example.org
Content-Length: xxx
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
```

### 4.7.8. Deleting attributes of public data

Functional summary:

Deleting specified attributes of public data.

Method:

DELETE

URL path:

/api/v1/datapoints/<target>/<property>

- <target>: Public data identifier. (xsd:anyURI format)
- <property>: Property identifier. (xsd:anyURI format)

Restrictions:

Access by a user who is authorized to update information on the public data indicated by <target>.

Parameters:

None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.7.13.

Table 4.7.13. Status codes when deleting attributes of public data

| Status code | Meaning | |
|---|---|---|
| 204 | No Content | Completed successfully. |
| 400 | Bad Request | Incorrect parameters. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | The searched public data cannot be found. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete the name (dc:title) of public data indicated by the URI urn:ucode:_00001C000000000000010000000100124, and the response.

Request

```
DELETE /api/v1/datapoints/ucode_00001C000000000000010000000100124/dc_title
  HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

## 4.8. Identification resolution commands

Identification resolution commands are commands to provide directory-type searches so that a user program can obtain the server that contains public data concerning the referent specified by an identifier of an object, place, or thing from that identifier.

These commands are listed in Table 4.8.1. Details concerning each API are provided below.

Table 4.8.1. List of identification resolution commands

| URL path | HTTP method | Meaning |
|---|---|---|
| /api/v1/rs/<ucode> | GET | Performing simplified ucode resolution |
| /api/v1/resolve/<ucode> | GET | Obtaining the referent of public data from ucode |
| /api/v1/resolve | POST | Creating a pair of ucode and its public data referent (ucode resolution information) |
| /api/v1/resolve/<ucode> | PUT | Creating ucode resolution information |
| /api/v1/resolve/<ucode> | DELETE | Deleting ucode resolution information |

### 4.8.1. Simplified ucode resolution

Functional summary:

Providing a ucode resolution function based on the Simplified ucode Resolution Protocol [15]; in other words, obtaining the referent of the information that is linked to a ucode.

Method:

GET

URL path:

/api/v1/rs/<ucode>

- <ucode>: ucode for resolution

Restrictions:

None. Anyone can make a request.

Parameters:

The parameters are as shown in Table 4.8.2.

They are given in the form of $<param_N>$ = $<value_N>$.

Table 4.8.2. Simplified ucode resolution parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| $param_N$ | xsd:string | Name of resolution parameter |
| $value_N$ | xsd:string | Value of resolution parameter |

The resolution parameters are based on [14] and [15]. The specific parameters used in these commands are listed in Table 4.8.3.

Required HTTP headers:

None.

Status codes:

As shown in Table 4.8.4.

Responses:

The response is the structured data shown in Table 4.8.5, represented in JSON or XML format. If redirect was specified for the X-UIDC-GWMODE parameter, it is redirected to the URL of the resolution destination. See [14] for the meanings of values.

Table 4.8.3. Ucode resolution search parameters

| Parameter name | Default value | Explanation |
|---|---|---|
| X-UIDC-GWMODE | resolveall | Resolution mode. Its values are as follows.<br>• resolveall: Identifier resolution (all hierarchies)<br>• resolve: Identifier resolution (only one hierarchy)<br>• redirect: Identifier resolution and HTTP redirect |
| X-UIDC-QUERYMASK | all 1 | Identifier resolution mask value |
| X-UIDC-QUERYATTRIBUTE | UIDC_ATTR_ANONYMOUS | Attributes of resolution information to be obtained. Its values are as follows.<br>• UIDC_ATTR_ANONYMOUS: Not specified.<br>• UIDC_ATTR_RS: Resolution server.<br>• UIDC_ATTR_IS: Information server.<br>• UIDC_ATTR_USER: User-defined information. |

Table 4.8.4. Status codes in simplified ucode resolution

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <ucode> is not specified. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding ucode is registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example

The following is an example of a request to obtain the simplified ucode resolution information for the ucode urn:ucode:_00001C000000000000010000000100123, and the response.

Request

```
GET /api/v1/rs/ucode_00001C000000000000010000000100123 HTTP/1.1
Host: www.example.org
```

Table 4.8.5. Response parameters in simplified ucode resolution

| Parameter name | | Format | Explanation |
|---|---|---|---|
| results | | hash[] | List of resolution information. Each item of information consists of the following hash data. |
| | X-UIDC-DATA | xsd:string | Data retrieved from ucode resolution |
| | X-UIDC-DATAVERSION | xsd:integer | Data version retrieved from ucode resolution |
| | X-UIDC-DATATYPE | xsd:integer | Data type retrieved from ucode resolution |
| | X-UIDC-RETURNMASK | xsd:string | Bitmask retrieved from ucode resolution |
| | X-UIDC-TTL | xsd:integer | Expiration date of data retrieved from ucode resolution |
| | X-UIDC-RESOLVEMODE | xsd:integer | Resolution mode |

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"results":[{
   "X-UIDC-DATA":"http://www.example.org/",
   "X-UIDC-DATATYPE":17,
   "X-UIDC-RETURNMASK":"FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF",
   "X-UIDC-TTL":100,
   "X-UIDC-RESOLVEMODE":0 } ] }
```

### 4.8.2. ucode resolution: Obtaining referent of public data from ucode

Functional summary:
Obtaining the referent of public data linked to a ucode.

Method:
GET

URL path:
/api/v1/resolve/<ucode>
- <ucode>: ucode for resolution

Restrictions:
None. Anyone can make a request.

Parameters:
The parameters are as shown in Table 4.8.6.
They are given in the form of $<param_N>$ = $<value_N>$.

Table 4.8.6. Parameters for ucode resolution (obtaining referent of public data from ucode)

| Parameter name | Format | Explanation |
|---|---|---|
| $param_N$ | std:string | Name of resolution parameter |
| $value_N$ | std:string | Value of resolution parameter |

The resolution parameters are parameters from a property URI or based on [14] and [15].

Required HTTP headers:
None.

Status codes:
As shown in Table 4.8.7.

Responses:
The response is the structured data shown in Table 4.8.5, represented in JSON or XML format. See [14] for the meanings of values.

Table 4.8.7. Status codes in ucode resolution (obtaining referent of public data from ucode)

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <ucode> is not specified. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding ucode is registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Table 4.8.8. Response parameters in ucode resolution (obtaining referent of public data from ucode)

| Parameter name | | Format | Explanation |
|---|---|---|---|
| results | | hash[] | List of resolution information. Each item of information consists of the following hash data. |
| | X-UIDC-ATTROBUTE | xsd:string | Data attribute retrieved from ucode resolution |
| | X-UIDC-DATA | xsd:string | Data retrieved from ucode resolution |
| | X-UIDC-RETURNMASK | xsd:string | Bitmask retrieved from ucode resolution |
| | X-UIDC-RESOLVEMODE | xsd:integer | Resolution mode |

API usage example
The following is an example of a request to obtain the referent of public information that an issuer (uc:issuer) indicated by the URI urn:ucode:_00001C000000000000010000000100124 has linked to the ucode urn:ucode:_00001C000000000000010000000100123, and the response.

Request

```
GET /api/v1/resolve/ucode_00001C0000000000000010000000100123?
uc_issuer=ucode_00001C0000000000000010000000100124 HTTP/1.1
Host: www.example.org
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"results":[{
  "X-UIDC-DATA":"http://www.example.org/",
  "X-UIDC-DATATYPE":17,
  "X-UIDC-RETURNMASK":"FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF",
  "X-UIDC-RESOLVEMODE":0 },{
  "X-UIDC-DATA":"http://www.example2.org/",
  "X-UIDC-DATATYPE":17,
  "X-UIDC-RETURNMASK":"FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF",
  "X-UIDC-RESOLVEMODE":0 } ] }
```

### 4.8.3. Creating new ucode resolution information

Functional summary:
Linking the referent of public data to a ucode.

Method:
POST

URL path:
/api/v1/resolve

Restrictions:
Access by a user who is authorized to create new ucode resolution information.

Parameters:
A string of characters in JSON or XML format, having the parameters shown in Table 4.8.9, is contained in the message body.

Table 4.8.9. Parameters for creating new ucode resolution information

| Parameter name | Format | Explanation |
|---|---|---|
| target | xsd:anyURI | The corresponding ucode |
| params | hash | Hash data where the key is the registered parameter name, and the value is the registered value. |

<target> and <params> must not be empty. The keys of <params> are parameters from a property URI or based on [14] and [15].

Required HTTP headers:

None.

Status codes:

As shown in Table 4.8.10.

Responses:

The response is the structured data shown in Table 4.8.11, represented in JSON or XML format.

API usage example

The following is an example of a request to register the URL，http://www.example.org/ as the referent of public information linked to the ucode urn:ucode:_00001C000000000000010000000100100, and the response.

Table 4.8.10. Status codes when creating new ucode resolution information

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <target> is unspecified. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding ucode is registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Table 4.8.11. Response format for creation of ucode resolution information

| Parameter | Format | Explanation |
|---|---|---|
| ucode | xsd:anyURI[] | ucode identifying the created ucode resolution information. |

Request

```
POST /api/v1/resolve HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{"target":"<urn:ucode:_00001C000000000000010000000100100>",
 "params":{"X-UIDC-ATTRIBUTE":17,"X-UIDC-DATA":"http://www.example.org/"}}
```

Response

```
HTTP/1.1 200 OK
Content-Length: xxx
Connection: close
Content-Type: application/json; charset=utf-8

{"ucode":["<urn:ucode:_00001C000000000000010000000100125>"]}
```

### 4.8.4. Updating ucode resolution information

Functional summary:
Updating the referent of public data linked to a ucode.

Method:
PUT

URL path:
/api/v1/resolve/<ucode>
- <ucode>: ucode identifying the ucode resolution information

Restrictions:
Access by the user who registered the ucode resolution information.

Parameters:
A string of characters in JSON or XML format, having the parameters shown in Table 4.8.12, is contained in the message body.

Table 4.8.12. Parameters for updating ucode resolution information

| Parameter name | Format | Explanation |
|---|---|---|
| target | xsd:anyURI | The corresponding ucode |
| params | hash | Hash data where the key is the registered parameter name, and the value is the registered value. |

<target> and <params> must not be empty. The keys of <params> are parameters from a property URI or based on [14] and [15].

Required HTTP headers:
None.

Status codes:
As shown in Table 4.8.13.

Responses:
If successful, the response body is empty.

Table 4.8.13. Status codes when updating ucode resolution information

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <target> is unspecified. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding ucode is registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

API usage example
The following is an example of a request to update the referent URL of public information linked to the ucode urn:ucode:_00001C000000000000010000000100125 to http://www.example.org/, and the response.

Request

```
PUT /api/v1/resolve/ucode_00001C000000000000010000000100125 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8

{"target":"<urn:ucode:_00001C000000000000010000000100100>",
 "params":{
   "X-UIDC-ATTRIBUTE":17,
   "X-UIDC-DATA":"http://www.example.org/" } }
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

### 4.8.5. Deleting ucode resolution information

Functional summary:
Deleting the linkage of public data and a referent with respect to a ucode.

Method:
DELETE

URL path:
/api/v1/resolve/<ucode>
- <ucode>: ucode identifying the ucode resolution information

Restrictions:
The user who registered the ucode resolution information can make a request.

Parameters:
None.

Required HTTP headers:
None.

Status codes:
As shown in Table 4.8.14.

Table 4.8.14. Status codes when deleting ucode resolution information

| Status code | Meaning | |
|---|---|---|
| 200 | OK | Completed successfully. |
| 400 | Bad Request | <ucode> is unspecified. |
| 403 | Forbidden | Access is not authorized. |
| 404 | Not Found | No corresponding ucode is registered in the ODDP system. |
| 500 | Internal Error | An error occurred within the ODDP system. |

Responses:
If successful, the response body is empty.

API usage example
The following is an example of a request to delete the referent of public information linked to the ucode urn:ucode:_00001C000000000000010000000100125, and the response.

Request

```
DELETE /api/v1/resolve/ucode_00001C000000000000010000000100125 HTTP/1.1
Host: www.example.org
Content-Length: xxx
Content-Type: application/json; charset=utf-8
```

Response

```
HTTP/1.1 204 No Content
Connection: close
```

## Appendix A. Summary of RDF

The Resource Description Framework (RDF) [37] is a set of specifications from the World Wide Web Consortium (W3C) for the description of information concerning things that can be identified on the Web (called "resources").

This chapter will explain the following three matters concerning RDF.

- RDF model and RDF graphs
- RDF syntax
- RDF graph searching with SPARQL

### A.1. RDF model and RDF graphs

In the RDF data model, information concerning resources is expressed by the following three elements. A set of these three elements is called a "triple" or a "statement."

- Subject: Identifies the resource to be described
- Predicate: Identifies a characteristic or aspect of the predicate.
- Object: Value of the characteristic or aspect expressed by the predicate with respect to the subject. The value is a string of characters or numerals (called a "literal") or an identifier.

In general, the RDF model is depicted using ovals for the subject and object identifiers and a rectangle for the literal, with the predicate written above an arrow pointing from the subject to the object. If the object is an identifier, the triple where that functions as subject is connected, forming a directed graph, or digraph. A digraph formed in this way is called an RDF graph.

In the RDF model, to make it possible to identify resources on the Web, resources are expressed as uniform resource identifiers, or URI [3]. However, if a subject or object has no URI, it can be expressed as a name that can only be identified within the RDF graph that includes it. This is called a blank node.

For example, Fig. A.1 shows an RDF graph indicating that the name of a resource expressed by the URL http://www.example.org/book/book6 is "Example book #6" where the predicate of the name of a book is expressed as the URI http://purl.org/dc/elements/1.1/title.


Fig. A.1. Example of RDF graph

### A.2. RDF syntax

There are several formats for expressing a triple under the RDF model as machine-readable data, including RDF/XML [1], N-Triples [29], and Notation3 [4].

For example, the RDF graph shown in Fig. A.1 is expressed as follows under RDF/XML, N-Triples, and Notation3, respectively.

RDF/XML

```
<?xml version="1.0"?>
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:dc="http://purl.org/dc/elements/1.1/" >
  <rdf:Description rdf:about="http://www.example.org/book/book6">
    <dc:title>Example Book #6</dc:title>
  </rdf:Description>
</rdf:RDF>
```

N-Triples

```
<http://www.example.org/book/book6> <http://purl.org/dc/elements/1.1/title>
  "Example Book #6" .
```

Notation3

```
@prefix dc: <http://purl.org/dc/elements/1.1/> .
<http://www.example.org/book/book6> dc:title "Example Book #6" .
```

## A.3. RDF graph searching with SPARQL

The Simple Protocol and RDF Query Language (SPARQL) [18] is a query language specified by W3C for searches and operations on data described in the RDF model

SPARQL has the function of querying a required or optional pattern that replaces a portion of an RDF graph with a variable (called a query pattern), along with its logical AND and logical OR. Upon receiving the query pattern, the server searches the database to determine the presence or absence of a subgraph composed by replacing the variables contained in the query pattern with resources or literals. This process is called pattern matching. The results of SPARQL queries are sets of variables with their values from pattern matching, RDF graphs, or Boolean values.

SPARQL 1.0 provides the following four query forms.

- SELECT: Returns all or a subset of the variables contained in a query pattern along with the corresponding values obtained through pattern matching.
- CONSTRUCT: Returns an RDF graph constructed by substituting the variables obtained through pattern matching into a set of triple templates.
- ASK: Returns a Boolean value indicating whether or not a query pattern matches.
- DESCRIBE: Returns an RDF graph describing the resources found.

Here, we will assume that the RDF graph shown in Fig. A.2 has been registered.

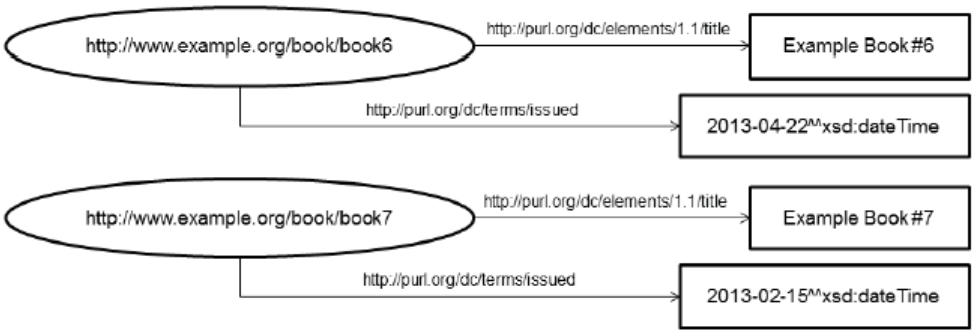



Fig. A.2. Example of RDF graph storage

The following is an example of a SELECT query to search for a resource which is a book entitled "Example book #6," and the response.

Example of SELECT query

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
SELECT ?title
WHERE  { ?title dc:title "Example book #6" . }
```

Example of SELECT response

| title |
| --- |
| <http://www.example.org/book/book6> |

In addition, the following is an example of a CONSTRUCT query to obtain the names of books issued on or before March 31, 2013 in RDF graph form, and the response.

Example of CONSTRUCT query

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX dcterms: <http://purl.org/dc/terms/>
CONSTRUCT { ?x dc:title ?name . }
WHERE  { ?x dc:title ?name .
         ?x dcterms:issued ?date .
         FILTER ?date < "2013-03-31T23:59:59Z"^^xsd:dateTime
       }
```

Example of CONSTRUCT response

```
@prefix dc: <http://purl.org/dc/elements/1.1/> .

<http://www.example.org/book/book6> dc:title "Example book #6" .
```

# Appendix B. Summary of ucode

This chapter provides a summary of ucode.

## B.1. Definition of ucode

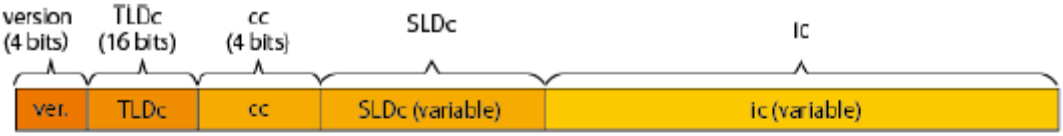
A ucode is an individual identification number that is used to identify various things, places, etc. that exist in the real world. Ucodes can also be assigned to content, information, and abstract concepts other than physical objects existing in the real world.

Ucode is a fixed-length, 128-bit identifier system. To allow larger codes than 128 bits to be defined as needed in the future, a mechanism is in place to allow ucodes to be extended in 128-bit units. When ucodes are assigned to physical things and places, they are stored in barcodes, two-dimensional matrix codes, or tags such as RFID (called ucode tags).

A ucode is merely an identification number. There is no relationship between its numerals and the attributes or meaning of the identified object. In ubiquitous ID architecture, an architecture that uses ucodes as identifiers, the basic approach is to store information concerning the attributes and meanings of identified objects in databases. The ucode serves as a key for extracting those attributes and meanings from the databases.

Because of the nature of ucodes as identification numbers, it is essential to maintain the uniqueness of issued ucodes. In other words, the same ucode must never be assigned to more than one object. When an object with an assigned ucode ceases to exist, its ucode is discarded, and the same ucode will not be reused in the future. A ucode is retired when its referent no longer exists. This ensures the uniqueness of ucodes over time as well as in space.

For the sake of convenience in issuing and managing ucodes, the structure shown in Fig. B.1 has been defined, providing management fields and allocation units. This structure is merely for the sake of management, and there is no correlation between the structure of ucodes and the attributes or meanings of the referents for which they are issued.




| Field name | Meaning |
|---|---|
| version | Version number |
| TLDc: Top Level Domain Code | Upper-level domain identification number |
| cc: Class Code | Code specifying the boundary of SLDc and ic |
| SLDc: Second Level Domain Code | Lower-level domain identification number |
| ic: Identification Code | Individual identification number |

Fig. B.1. Structure of ucode

## B.2. Features of ucode

In contrast to other existing systems for assigning identification codes to objects, ucode has the following characteristics.

1. Instead of expressing product types like product codes, ucode identifies individual objects. Because product codes such as EAN, UCC, and JAN identify product types by vendor, the same product code is assigned to multiple instances of the same product. Meanwhile, different ucode numbers are assigned to each individual instance of the same product.

2. In addition to objects, ucodes can be assigned to places, content, and concepts. Ucode is the only code system that can universally identify things, places, content, and so on.

3. Ucode is not dependent on application fields or industries. It is not a code system that is used only in a specific industry, such as logistics. Instead, ucodes can be assigned to all sorts of referents without regard to application or industry, including electric appliances, food products, places, and musical content. This is because the only aim of ucode is to uniquely identify objects, places, and so on, and because it is simply a numbering system with no inherent meaning. Therefore, ucode is particularly effective when providing services or managing items that extend across multiple industries or applications, and when managing places as well as things within the same system.

4. Ucodes are purely serial numbers and do not contain meaning. The basic architecture stores information on the nature and meaning of things and places on a server in a network. This approach is especially effective for applications where the nature and meaning of things and places with assigned unicodes may change from time to time. Guardrails on roads could be considered as an example. When guardrails are produced in a factory, they are products known as guardrails until they are delivered to a construction site. When they are installed along a road, they

become a component of a place. Finally, when guardrails are removed, they have the nature of waste until they are destroyed. The ucode is a straightforward way to identify the same item even as it changes according to its life cycle from product to place to waste.

5. Ucodes work with any type of tag. They can be stored on barcodes, two-dimensional matrix codes, RFIDs, active tags, and all other types of tags. Therefore, the optimal type of tag can be selected for ucode storage depending on the application and the usage environment.

6. Ucode is based on international standards. The ucode system is a technical standard based on Recommendation H.642.1 of ITU-T [35].

7. Ucode is compatible with RDF. By using ucode URNs, which will be described below, ucodes can be expressed as RDF resources.

Because the open data distribution platform system is based on the RDF model, URIs are used to identify data and its associated objects, organizations, places, etc. Because of the features of ucode as described above, ucode can be used as an identifier in cases where there is no identifier system to uniquely identify data and its associated objects, organizations, places, etc., and in cases where such identifiers cannot be expressed as URIs.

## B.3. Relationship between ucode and RDF

RFC 6558 [36] describes specifications on Uniform Resource Name (URN, a type of URI) notation for ucode. Ucodes represented according to this document can be used as resources under the RDF model.

For example, the following is the URN notation under RFC 6588 for the ucode value of 00001C0000000000000100000100800.

urn:ucode_00001C0000000000000100000100800

In addition, the RDF graph shown in Fig. B.2 can express the statement that "Example Book #6" is the name (dc:title) of a book identified by this ucode value.


Fig. B.2. Example of RDF graph containing ucode

# Appendix C. Vocabulary lists

This appendix provides lists of vocabulary as a reference for data representation based on these specifications.

## C.1. Vocabulary for basic RDF structure

The namespace for vocabulary concerning basic RDF structure is as follows.

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

Below, this namespace is indicated as "rdf:".

Terms belonging to this vocabulary are as shown in Tables C.1.1 and C.1.2. Except for "rdf:type" and "rdf:value", this vocabulary is used in descriptions concerning RDF data structure.

Table C.1.1. List of classes and instances of vocabulary for basic RDF structure

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE00000000000000000000010001 | rdf:Statement | rdfs:Resource | - |
| | RDF triple | | |
| 0FFFDE00000000000000000000010002 | rdf:Bag | rdfs:Container | - |
| | Unordered container | | |
| 0FFFDE00000000000000000000010003 | rdf:Seq | rdfs:Container | - |
| | Order container | | |
| 0FFFDE00000000000000000000010004 | rdf:Alt | rdfs:Container | - |
| | Container of alternative expressions | | |
| 0FFFDE00000000000000000000010005 | rdf:List | rdfs:Container | - |
| | List node of collections | | |
| 0FFFDE00000000000000000000010006 | rdf:nil | - | - |
| | End of list | | |
| 0FFFDE00000000000000000000010007 | rdf:XMLLiteral | rdfs:Literal | - |
| | XML literal | | |
| 0FFFDE00000000000000000000010008 | rdf:Property | rdfs:Resource | - |
| | RDF predicate class | | |

Table C.1.2. List of properties of vocabulary on basic RDF structure

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDDFFFFFFFFFFFFFFFFFFxxxxxxxx | rdf:_1, rdf:_2, ··· | - | |
| | - | - | - |
| | Indicates members of a container (enumerable to $2^{31}$ - 1) | | |
| 0FFFDE00000000000000000000018001 | rdf:type | - | |
| | rdfs:Class | rdfs:Resource | - |
| | Indicates subject class | | |
| 0FFFDE00000000000000000000018002 | rdf:first | - | |
| | rdf:List | rdfs:Resource | - |
| | First element of a collection | | |
| 0FFFDE00000000000000000000018003 | rdf:rest | - | |
| | rdf:List | rdf:List | - |
| | Remaining elements of a collection | | |
| 0FFFDE00000000000000000000018004 | rdf:value | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Main value | | |
| 0FFFDE00000000000000000000018005 | rdf:subject | - | |
| | rdf:Statement | rdfs:Resource | - |
| | Subject of a triple | | |
| 0FFFDE00000000000000000000018006 | rdf:predicate | - | |
| | rdf:Statement | rdfs:Resource | - |
| | Predicate of a triple | | |
| 0FFFDE00000000000000000000018007 | rdf:object | - | |
| | rdf:Statement | rdfs:Resource | - |
| | Object of a triple | | |

## C.2. RDF schema

The namespace for RDF schema is as follows.

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

Below, this namespace is indicated as "rdfs:".

Terms belonging to this vocabulary are as shown in Tables C.2.1 and C.2.2. This vocabulary is used for vocabulary definitions.

Table C.2.1. List of classes and instances of RDF schema

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000110001 | rdfs:Resource | - | - |
| | Resource (unit of RDF expression) | | |
| 0FFFDE0000000000000000000110002 | rdfs:Class | rdfs:Resource | - |
| | Indicates RDF class | | |
| 0FFFDE0000000000000000000110004 | rdfs:Literal | rdfs:Resource | - |
| | Class indicating a literal such as a string of characters | | |
| 0FFFDE0000000000000000000110005 | rdfs:Datatype | rdfs:Class | - |
| | Class indicating the data type of a literal | | |
| 0FFFDE0000000000000000000110006 | rdfs:Container | rdfs:Resource | - |
| | Class indicating RDF container | | |
| 0FFFDE0000000000000000000110007 | rdfs:ContainerMembershipProperty | rdf:Property | - |
| | Class of property indicating container membership | | |

Table C.2.2. List of properties of RDF schema

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000118001 | rdfs:subClassOf | - | |
| | rdfs:Class | rdfs:Class | - |
| | Subject is a subclass of the object | | |
| 0FFFDE0000000000000000000118002 | rdfs:subPropertyOf | - | |
| | rdf:Property | rdf:Property | - |
| | Subject is a subproperty of the object | | |
| 0FFFDE0000000000000000000118003 | rdfs:domain | - | |
| | rdf:Property | rdfs:Class | - |
| | Object class is domain of subject property | | |
| 0FFFDE0000000000000000000118004 | rdfs:range | - | |
| | rdf:Property | rdfs:Class | - |
| | Object class is value range of subject property | | |
| 0FFFDE0000000000000000000118005 | rdfs:label | - | |
| | rdfs:Resource | rdfs:Literal | - |
| | Human understandable name corresponding to the subject | | |
| 0FFFDE0000000000000000000118006 | rdfs:comment | - | |
| | rdfs:Resource | rdfs:Literal | - |
| | Human understandable explanation corresponding to the subject | | |
| 0FFFDE0000000000000000000118007 | rdfs:seeAlso | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Additional information concerning the subject | | |
| 0FFFDE0000000000000000000118008 | rdfs:isDefinedBy | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Definition information concerning the subject | | |
| 0FFFDE0000000000000000000118009 | rdfs:member | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Object is a member of the subject | | |

## C.3. OWL

The namespace for OWL is as follows.

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

Below, this namespace is indicated as "owl:".

Terms belonging to this vocabulary are as shown in Tables C.3.1 and C.3.2. Except for "rdf:type" and "rdf:value", this vocabulary is used in descriptions concerning RDF data structure. This vocabulary is used for vocabulary definitions.

Table C.3.1. List of classes and instances of OWL

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000120001 | owl:Ontology | rdfs:Resource | - |
| | Class representing ontology | | |
| 0FFFDE0000000000000000000120002 | owl:Class | rdfs:Class | - |
| | Class representing OWL class | | |
| 0FFFDE0000000000000000000120003 | owl:Restriction | owl:Class | - |
| | Class representing property restrictions | | |
| 0FFFDE0000000000000000000120004 | owl:ObjectProperty | rdf:Proprty | - |
| | Class representing thing value properties | | |
| 0FFFDE0000000000000000000120005 | owl:DatatypeProperty | rdf:Proprty | - |
| | Class representing data value properties | | |
| 0FFFDE0000000000000000000120006 | owl:SymmetricProperty | owl:ObjectProperty | - |
| | Class representing symmetric value properties | | |
| 0FFFDE0000000000000000000120007 | owl:TransitiveProperty | owl:ObjectProperty | - |
| | Class representing transition value properties | | |
| 0FFFDE0000000000000000000120008 | owl:FunctionalProperty | rdf:Property | - |
| | Class representing function value properties | | |
| 0FFFDE0000000000000000000120009 | owl:InverseFunctionalProperty | owl:ObjectProperty | - |
| | Class representing inverse function properties | | |
| 0FFFDE000000000000000000012000A | owl:OntologyProperty | rdf:Property | - |
| | Class representing ontology properties | | |
| 0FFFDE000000000000000000012000B | owl:AnnotationProperty | rdf:Property | - |
| | Class representing annotation properties | | |
| 0FFFDE000000000000000000012000C | owl:DeprecatedClass | rdfs:Class | - |
| | Class representing deprecated classes | | |
| 0FFFDE000000000000000000012000D | owl:DeprecatedProperty | rdf:Property | - |
| | Class representing deprecated class properties | | |
| 0FFFDE000000000000000000012000E | owl:AllDifferent | rdfs:Resource | - |
| | Class indicating that a series of things differ from each other | | |
| 0FFFDE000000000000000000012000F | owl:DataRange | rdfs:Resource | - |
| | Class for defining data types with listed data values | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000120010 | owl:Thing | - | - |
| | Class for all things of the world described in OWL | | |
| 0FFFDE0000000000000000000120011 | owl:Nothing | owl:Thing | - |
| | Class for empty sets | | |
| 0FFFDE0000000000000000000120012 | owl:AllDisjointClasses | rdfs:Resource | - |
| | Collection of mutually prime classes | | |
| 0FFFDE0000000000000000000120013 | owl:AllDisjointProperty | rdfs:Resource | - |
| | Collection of mutually prime properties | | |
| 0FFFDE0000000000000000000120014 | owl:Annotation | rdfs:Resource | - |
| | Class representing annotations | | |
| 0FFFDE0000000000000000000120015 | owl:AsymmetricProperty | rdf:Property | - |
| | Class indicating asymmetric properties | | |
| 0FFFDE0000000000000000000120016 | owl:Axiom | rdfs:Resource | - |
| | Class indicating explanatory axioms | | |
| 0FFFDE0000000000000000000120017 | owl:IrreflexiveProperty | owl:ObjectProperty | - |
| | Class representing non-recursive properties | | |
| 0FFFDE0000000000000000000120018 | owl:NameIndivisual | owl:Thing | - |
| | Class representing things having names | | |
| 0FFFDE0000000000000000000120019 | owl:NegativePropertyAssertion | rdfs:Resource | - |
| | Class asserting negative properties | | |
| 0FFFDE000000000000000000012001A | owl:ReflexiveProperty | owl:ObjectProperty | - |
| | Class representing recursive properties | | |

Table C.3.2. List of properties of OWL

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000128001 | owl:equivalentClass | - | |
| | rdfs:Class | rdfs:Class | - |
| | Equivalent class | | |
| 0FFFDE0000000000000000000128002 | owl:disjointWith | - | |
| | owl:Class | owl:Class | - |
| | Separated class | | |
| 0FFFDE0000000000000000000128003 | owl:equivalentProperty | - | |
| | rdf:Property | rdf:Property | - |
| | Equivalent property | | |
| 0FFFDE0000000000000000000128004 | owl:inverseOf | - | |
| | owl:ObjectProperty | owl:ObjectProperty | - |
| | Property having inverse relationship | | |
| 0FFFDE0000000000000000000128005 | owl:sameAs | - | |
| | owl:Thing | owl:Thing | - |
| | Same thing | | |
| 0FFFDE0000000000000000000128006 | owl:differentFrom | - | |
| | owl:Thing | owl:Thing | - |
| | Different thing | | |
| 0FFFDE0000000000000000000128007 | owl:distintMembers | - | |
| | owl:AllDifferent | rdf:List | - |
| | List of members that are distinct things from each other | | |
| 0FFFDE0000000000000000000128008 | owl:oneOf | - | |
| | owl:Restriction | rdf:Property | - |
| | Lists all subject class instances in object list | | |
| 0FFFDE0000000000000000000128009 | owl:unionOf | - | |
| | rdfs:class | rdf:List | - |
| | Subject class extension is the union of object class extensions | | |
| 0FFFDE000000000000000000012800A | owl:intersectionOf | - | |
| | rdfs:class | rdf:List | - |
| | Subject class extension is the intersection of object class extensions | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000012800B | owl:complementOf | - | |
| | owl:Class | owl:Class | - |
| | Subject class extension is the complement of object class extensions | | |
| 0FFFDE0000000000000000000012800C | owl:onProperty | - | |
| | owl:Restriction | rdf:Property | - |
| | Target property of restriction class representations | | |
| 0FFFDE0000000000000000000012800D | owl:allValuesFrom | - | |
| | owl:Restriction | rdfs:Class | - |
| | All values of the target property are members of object class extension | | |
| 0FFFDE0000000000000000000012800E | owl:someValuesFrom | - | |
| | owl:Restriction | rdfs:Class | - |
| | At least one target property is a member of object class extension | | |
| 0FFFDE0000000000000000000012800F | owl:hasValue | - | |
| | owl:Restriction | rdfs:Resource | - |
| | At least one target property value is equal to object value | | |
| 0FFFDE0000000000000000000128010 | owl:maxCardinality | - | |
| | owl:Restriction | xsd:nonNegativeInteger | - |
| | Maximum number of occurrences of target property in subject restriction class | | |
| 0FFFDE0000000000000000000128011 | owl:minCardinality | - | |
| | owl:Restriction | xsd:nonNegativeInteger | - |
| | Minimum number of occurrences of target property in subject restriction class | | |
| 0FFFDE0000000000000000000128012 | owl:cardinality | - | |
| | owl:Restriction | xsd:nonNegativeInteger | - |
| | Number of occurrences of target property in subject restriction class | | |
| 0FFFDE0000000000000000000128013 | owl:imports | - | |
| | owl:Ontology | owl:Ontology | - |
| | Subject ontology imports object ontology | | |
| 0FFFDE0000000000000000000128014 | owl:versionInfo | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Subject ontology version management information | | |
| 0FFFDE0000000000000000000128015 | owl:priorVersion | - | |
| | owl:Ontology | owl:Ontology | - |
| | Old version of subject ontology | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000128016 | owl:backwardCompatibleWith | - | |
| | owl:Ontology | owl:Ontology | - |
| | Subject ontology is backwards compatible with object ontology | | |
| 0FFFDE0000000000000000000128017 | owl:incompatibleWith | - | |
| | owl:Ontology | owl:Ontology | - |
| | Subject ontology is not compatible with object ontology | | |
| 0FFFDE0000000000000000000128018 | owl:annotatedProperty | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Annotation property | | |
| 0FFFDE0000000000000000000128019 | owl:annotatedSource | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Annotation subject | | |
| 0FFFDE000000000000000000012801A | owl:annotatedTarget | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Annotation object | | |
| 0FFFDE000000000000000000012801B | owl:assertionProperty | - | |
| | owl:NegativePropertyAssertion | rdf:Property | - |
| | Negative property | | |
| 0FFFDE000000000000000000012801C | owl:bottomDataProperty | - | |
| | owl:Thing | owl:Literal | - |
| | Empty data property | | |
| 0FFFDE000000000000000000012801D | owl:bottomObjectProperty | - | |
| | owl:Thing | owl:Thing | - |
| | Empty data property | | |
| 0FFFDE000000000000000000012801E | owl:datatypeCompelmentOf | - | |
| | rdfs:Datatype | rdfs:Datatype | - |
| | Subject data type extension is complement of object data type extension | | |
| 0FFFDE000000000000000000012801F | owl:deprecated | - | |
| | rdfs:Resource | rdfs:Resource | - |
| | Deprecated | | |
| 0FFFDE0000000000000000000128020 | owl:disjointUnionOf | - | |
| | owl:Class | rdf:List | - |
| | Subject does not belong to any class of object | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000128021 | owl:hasKey | - | |
| | owl:Class | rdf:List | - |
| | Key of object list | | |
| 0FFFDE0000000000000000000128022 | owl:hasSelf | - | |
| | owl:Restriction | rdfs:Resource | - |
| | Subject is self restriction with regard to object | | |
| 0FFFDE0000000000000000000128023 | owl:maxQualifiedCardinality | - | |
| | owl:Restriction | xsd:nonNegativeInteger | - |
| | Maximum number of instances with target property condition in subject restriction class | | |
| 0FFFDE0000000000000000000128024 | owl:members | - | |
| | rdfs:Resource | rdf:List | - |
| | List of disjoint classes | | |
| 0FFFDE0000000000000000000128025 | owl:minQualifiedCardinality | - | |
| | owl:Restriction | xsd:nonNegativeInteger | - |
| | Minimum number of instances with target property condition in subject restriction class | | |
| 0FFFDE0000000000000000000128026 | owl:onClass | - | |
| | owl:Restriction | owl:Class | - |
| | Class for restriction representations | | |
| 0FFFDE0000000000000000000128027 | owl:onDataRange | - | |
| | owl:Restriction | rdfs:Datatype | - |
| | Data range for restriction representations | | |
| 0FFFDE0000000000000000000128028 | owl:onDataType | - | |
| | owl:Restriction | rdfs:Datatype | - |
| | Data type for restriction representations | | |
| 0FFFDE0000000000000000000128029 | owl:propertyChainAxiom | - | |
| | owl:ObjectProperty | rdf:List | - |
| | Property is chain included | | |
| 0FFFDE000000000000000000012802A | owl:propertyDisjointWith | - | |
| | rdf:Property | rdf:Property | - |
| | Separated property | | |
| 0FFFDE000000000000000000012802B | owl:qualifiedCardinality | - | |
| | owl:Restriction | xsd:nonNegativeInteger | - |
| | Exact number of instances of target property in subject restriction class | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000012802C | owl:sourceIndividual | - | |
| | owl:NegativePropertyAssertion | owl:Thing | - |
| | Subject of negative property assertion | | |
| 0FFFDE0000000000000000000012802D | owl:targetIndividual | - | |
| | owl:NegativePropertyAssertion | owl:Thing | - |
| | Object of negative property assertion | | |
| 0FFFDE0000000000000000000012802E | owl:targetValue | - | |
| | owl:NegativePropertyAssertion | rdfs:Literal | - |
| | Value of negative property assertion | | |
| 0FFFDE0000000000000000000012802F | owl:topDataProperty | - | |
| | owl:Thing | owl:Literal | - |
| | Universal data property | | |
| 0FFFDE00000000000000000000128030 | owl:topObjectProperty | - | |
| | owl:Thing | owl:Thing | - |
| | Universal object property | | |
| 0FFFDE00000000000000000000128031 | owl:versionIRI | - | |
| | owl:Ontology | owl:Ontology | - |
| | Subject ontology version IRI | | |
| 0FFFDE00000000000000000000128032 | owl:withRestrictions | - | |
| | rdfs:Datatype | rdf:List | - |
| | Restriction on data types | | |

## C.4. Dublin Core elements

The Dublin Core elements [22] are a vocabulary under the international standard ISO 15836 for describing information concerning resources on the WWW. The namespace for this vocabulary is as follows.

http://purl.org/dc/elements/1.1/

Below, this namespace is indicated as "dc:".

Terms belonging to this vocabulary are as shown in Table C.4.1.

Table C.4.1. List of properties of Dublin Core elements

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000028001 | dc:contributor | - | |
| | - | - | - |
| | Person, organization, or service contributing to content of the subject | | |
| 0FFFDE0000000000000000000028002 | dc:coverage | - | |
| | - | - | - |
| | Extent or scope of the subject (place, temporal period, etc.) | | |
| 0FFFDE0000000000000000000028003 | dc:creator | - | |
| | - | - | - |
| | Entity responsible for providing the subject (author) | | |
| 0FFFDE0000000000000000000028004 | dc:date | - | |
| | - | - | - |
| | Date of publication, availability, etc. of the subject | | |
| 0FFFDE0000000000000000000028005 | dc:description | - | |
| | - | - | - |
| | Text explaining the subject | | |
| 0FFFDE0000000000000000000028006 | dc:format | - | |
| | - | - | - |
| | Media type of the subject (MIME format) | | |
| 0FFFDE0000000000000000000028007 | dc:identifier | - | |
| | - | - | - |
| | Unambiguous reference to the subject (ISBN, URL, etc.) | | |
| 0FFFDE0000000000000000000028008 | dc:language | - | |
| | - | - | - |
| | Language of the subject (language code) | | |
| 0FFFDE0000000000000000000028009 | dc:publisher | - | |
| | - | - | - |
| | Person, organization, or service making the subject available | | |
| 0FFFDE000000000000000000002800A | dc:relation | - | |
| | - | - | - |
| | Reference to resource related to the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000002800B | dc:rights | - | |
| | - | - | - |
| | Information concerning rights applying to the subject | | |
| 0FFFDE0000000000000000000002800C | dc:source | - | |
| | - | - | - |
| | Resource from which the subject is derived | | |
| 0FFFDE0000000000000000000002800D | dc:subject | - | |
| | - | - | - |
| | Topic included in the subject (key word or classification code) | | |
| 0FFFDE0000000000000000000002800E | dc:title | - | |
| | - | - | - |
| | Name given to the subject | | |
| 0FFFDE0000000000000000000002800F | dc:type | - | |
| | - | - | - |
| | Category, nature, or genre of the subject | | |

## C.5. DCMI vocabulary

The DCMI vocabulary (DCMI Metadata Terms) [21] are a vocabulary that extends the Dublin Core elements, specifying and defining the meanings of terms. It includes the following four elements.

- Properties:
  Extends the Dublin Core elements; specifies and defines the meanings of terms.
- Vocabulary encoding schemes:
  Prescribes property value units and schemes.
- Syntax encoding schemes:
  Indicates property value description formats.
- Classes:
  Categories for grouping elements having shared characteristics, etc.

Below, the DCMI vocabulary namespace is indicated as "dct:".

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

Terms belonging to this vocabulary are as shown in Tables C.5.1 and C.5.2. Except for "rdf:type" and "rdf:value", terms belonging to this vocabulary are used in descriptions concerning RDF data structure.

Table C.5.1. List of classes and instances of DCMI vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000030001 | dct:DCMIType | - | - |
| | Set of DCMI type elements | | |
| 0FFFDE0000000000000000000030002 | dct:DDC | - | - |
| | Dewey Decimal Classification | | |
| 0FFFDE0000000000000000000030003 | dct:IMT | - | - |
| | Set of media types (MIME) specified by IANA | | |
| 0FFFDE0000000000000000000030004 | dct:LCC | - | - |
| | U.S. Library of Congress Classification | | |
| 0FFFDE0000000000000000000030005 | dct:LCSH | - | - |
| | U.S. Library of Congress Subject Headings | | |
| 0FFFDE0000000000000000000030006 | dct:MESH | - | - |
| | Medical Subject Headings | | |
| 0FFFDE0000000000000000000030007 | dct:NLM | - | - |
| | U.S. National Library of Medicine classification | | |
| 0FFFDE0000000000000000000030008 | dct:TGN | - | - |
| | Getty Thesaurus of Geographic Names | | |
| 0FFFDE0000000000000000000030009 | dct:UDC | - | - |
| | Universal Decimal Classification | | |
| 0FFFDE000000000000000000003000A | dct:Box | - | - |
| | Regions defined by geographic indicators | | |
| 0FFFDE000000000000000000003000B | dct:ISO3166 | - | - |
| | Country codes under ISO 3166-1 | | |
| 0FFFDE000000000000000000003000C | dct:ISO639-2 | - | - |
| | Language codes under ISO 639-2 | | |
| 0FFFDE000000000000000000003000D | dct:ISO639-3 | - | - |
| | Language codes under ISO 639-3 | | |
| 0FFFDE000000000000000000003000E | dct:Period | - | - |
| | Time intervals | | |
| 0FFFDE000000000000000000003000F | dct:Point | - | - |
| | Points defined by geographic coordinates | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000030010 | dct:RFC1766 | - | - |
| | Language codes under RFC 1766 | | |
| 0FFFDE0000000000000000000030011 | dct:RFC3066 | - | - |
| | Language codes under RFC 3066 (replaces RFC 1766) | | |
| 0FFFDE0000000000000000000030012 | dct:RFC4646 | - | - |
| | Language codes under RFC 4646 (replaces RFC 3066) | | |
| 0FFFDE0000000000000000000030014 | dct:URI | - | - |
| | Uniform Resource Identifiers (URI) under RFC 3986 | | |
| 0FFFDE0000000000000000000030015 | dct:W3CDTF | - | - |
| | Date and time notation under ISO 8601, indicated in the W3C notes | | |
| 0FFFDE0000000000000000000030016 | dct:Agent | - | - |
| | Resource (person, organization, software, etc.) that acts or has the power to act | | |
| 0FFFDE0000000000000000000030017 | dct:AgentClass | rdfs:Class | - |
| | Group of agents, including groups seen as classes, such as students, charities, and lecturers | | |
| 0FFFDE0000000000000000000030018 | dct:BibliographicResource | - | - |
| | Book, article, or other documentary resource | | |
| 0FFFDE0000000000000000000030019 | dct:FileFormat | dct:MediaType | - |
| | Digital resource format | | |
| 0FFFDE000000000000000000003001A | dct:Frequency | - | - |
| | Rate at which something recurs | | |
| 0FFFDE000000000000000000003001B | dct:Jurisdiction | dct:LocationPeriodOrJurisdiction | - |
| | Scope of judicial, law enforcement, or other authority | | |
| 0FFFDE000000000000000000003001C | dct:LicenseDocument | dct:RightsStatement | - |
| | Legal document giving official permission for use of a resource | | |
| 0FFFDE000000000000000000003001D | dct:LinguisticSystem | - | - |
| | System of symbols, sounds, gestures, or rules used in communication | | |
| 0FFFDE000000000000000000003001E | dct:Location | dct:LocationPeriodOrJurisdiction | - |
| | Spatial region or named place | | |
| 0FFFDE000000000000000000003001F | dct:LocationPeriodOrJurisdiction | - | - |
| | Location, period of time, or jurisdiction | | |
| 0FFFDE0000000000000000000030020 | dct:MediaType | dct:MediaTypeOrExtent | - |
| | File format or physical medium | | |
| 0FFFDE0000000000000000000030021 | dct:MediaTypeOrExtent | - | - |
| | Media type or size | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000030022 | dct:MethodOfAccrual | - | - |
| | Method for adding resources to a collection | | |
| 0FFFDE0000000000000000000030023 | dct:MethodOfInstruction | - | - |
| | Process used to engender knowledge, attitudes, and skills | | |
| 0FFFDE0000000000000000000030024 | dct:PeriodOfTime | dct:LocationPeriodOrJurisdiction | - |
| | Interval of time | | |
| 0FFFDE0000000000000000000030025 | dct:PhysicalMedium | dct:MediaType | - |
| | Physical medium | | |
| 0FFFDE0000000000000000000030026 | dct:PhysicalResource | - | - |
| | Material thing | | |
| 0FFFDE0000000000000000000030027 | dct:Policy | - | - |
| | Plan or course of action by an authority to influence decisions, actions, and other matters | | |
| 0FFFDE0000000000000000000030028 | dct:ProvenanceStatement | - | - |
| | Statement of any changes in ownership and management of a resource since its creation that are important for its authenticity, integrity, and interpretation | | |
| 0FFFDE0000000000000000000030029 | dct:RightsStatement | - | - |
| | Intellectual property rights held under a legal document giving permission to use a resource or a statement concerning access rights | | |
| 0FFFDE000000000000000000003002A | dct:SizeOrDuration | dct:MediaTypeOrExtent | - |
| | Size, or time taken to play or execute | | |
| 0FFFDE000000000000000000003002B | dct:Standard | - | - |
| | Standard (basis for comparison) | | |

Table C.5.2. List of properties of DCMI vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000038001 | dct:abstract | dc:description, dct:description | |
| | - | - | - |
| | Summary of the subject | | |
| 0FFFDE0000000000000000000038002 | dct:accessRights | dc:rights, dct:rights | |
| | - | dct:RightsStatement | - |
| | Persons who can access the subject, or security status | | |
| 0FFFDE0000000000000000000038003 | dct:accrualMethod | - | |
| | dct:Collection | dct:MethodOfAccrual | - |
| | Method for adding new items to the subject collection | | |
| 0FFFDE0000000000000000000038004 | dct:accrualPeriodicity | - | |
| | dct:Collection | dct:Frequency | - |
| | Frequency of adding new items to the subject collection | | |
| 0FFFDE0000000000000000000038005 | dct:accrualPolicy | - | |
| | dct:Collection | dct:Policy | - |
| | Policy on adding new items to the subject collection | | |
| 0FFFDE0000000000000000000038006 | dct:alternative | dc:title, dct:title | |
| | - | - | - |
| | Alternative title for the subject | | |
| 0FFFDE0000000000000000000038007 | dct:audience | - | |
| | - | dct:AgentClass | - |
| | Target users of the subject | | |
| 0FFFDE0000000000000000000038008 | dct:available | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date or time period of subject availability | | |
| 0FFFDE0000000000000000000038009 | dct:bibliographicCitation | dc:identifier, dct:identifier | |
| | dct:BibliographicResource | rdfs:Literal | - |
| | Bibliographic reference to the subject | | |
| 0FFFDE000000000000000000003800A | dct:conformsTo | dc:relation, dct:relation | |
| | - | dct:Standard | - |
| | Standard to which the subject conforms | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000003800B | dct:contributor | dc:contributor | |
| | - | dct:Agent | - |
| | Person, organization, or service contributing to content of the subject | | |
| 0FFFDE0000000000000000000003800C | dct:coverage | dc:coverage | |
| | - | dct:LocationPeriodOrJurisdiction | - |
| | Scope or applicability of the subject (place, time period, etc.) | | |
| 0FFFDE0000000000000000000003800D | dct:created | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date of subject creation | | |
| 0FFFDE0000000000000000000003800E | dct:creator | dc:creator, dct:contributor | |
| | - | dct:Agent | - |
| | Entity responsible for providing the subject (author) | | |
| 0FFFDE0000000000000000000003800F | dct:date | dc:date | |
| | - | rdfs:Literal | - |
| | Date of subject creation or updating, etc. | | |
| 0FFFDE0000000000000000000038010 | dct:dateAccepted | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date of subject acceptance | | |
| 0FFFDE0000000000000000000038011 | dct:dateCopyrighted | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date of subject copyright | | |
| 0FFFDE0000000000000000000038012 | dct:dateSubmitted | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date of subject submission | | |
| 0FFFDE0000000000000000000038013 | dct:description | dc:description | |
| | - | - | - |
| | Text explaining the subject | | |
| 0FFFDE0000000000000000000038014 | dct:educationLevel | dct:audience | |
| | - | dct:AgentClass | - |
| | Educational level of persons who are target of the subject | | |
| 0FFFDE0000000000000000000038015 | dct:extent | dc:format, dct:format | |
| | - | dct:SizeOrDuration | - |
| | Size or duration of the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000038016 | dct:format | dc:format | |
| | - | dct:MediaTypeOrExtent | - |
| | Media type of subject | | |
| 0FFFDE0000000000000000000038017 | dct:hasFormat | dc:relation, dct:relation | |
| | - | - | - |
| | Subject has object as a different record format | | |
| 0FFFDE0000000000000000000038018 | dct:hasPart | dc:relation, dct:relation | |
| | - | - | - |
| | Subject has object as a portion of itself | | |
| 0FFFDE0000000000000000000038019 | dct:hasVersion | dc:relation, dct:relation | |
| | - | - | - |
| | Subject has object as a version of itself | | |
| 0FFFDE000000000000000000003801A | dct:identifier | dc:identifier | |
| | - | rdfs:Literal | - |
| | Unambiguous reference to the subject | | |
| 0FFFDE000000000000000000003801B | dct:instructionalMethod | - | |
| | - | dct:MethodOfInstruction | - |
| | Method for understanding the subject | | |
| 0FFFDE000000000000000000003801C | dct:isFormatOf | dc:relation, dct:relation | |
| | - | - | - |
| | Subject is a different record format of the object | | |
| 0FFFDE000000000000000000003801D | dct:isPartOf | dc:relation, dct:relation | |
| | - | - | - |
| | Subject is a portion of the object | | |
| 0FFFDE000000000000000000003801E | dct:isReferencedBy | dc:relation, dct:relation | |
| | - | - | - |
| | Subject is referred to by the object | | |
| 0FFFDE000000000000000000003801F | dct:isReplacedBy | dc:relation, dct:relation | |
| | - | - | - |
| | Subject is replaced by the object (old version of object) | | |
| 0FFFDE0000000000000000000038020 | dct:isRequiredBy | dc:relation, dct:relation | |
| | - | - | - |
| | Subject is required by the object | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000038021 | dct:issued | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date of formal issuance of the subject | | |
| 0FFFDE0000000000000000000038022 | dct:isVersionOf | dc:relation, dct:relation | |
| | - | - | - |
| | Subject is a version of the object | | |
| 0FFFDE0000000000000000000038023 | dct:language | dc:language | |
| | - | dct:LinguisticSystem | - |
| | Language of the subject | | |
| 0FFFDE0000000000000000000038024 | dct:license | dc:rights, dct:rights | |
| | - | dct:LicenseDocument | - |
| | Legal or official permission for acts on the subject | | |
| 0FFFDE0000000000000000000038025 | dct:mediator | dct:audience | |
| | - | dct:AgentClass | - |
| | Entity that mediates access to the subject | | |
| 0FFFDE0000000000000000000038026 | dct:medium | dc:format, dct:format | |
| | dct:PhysicalResource | dct:PhysicalMedium | - |
| | Medium that carries the subject | | |
| 0FFFDE0000000000000000000038027 | dct:modified | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date when the subject was modified | | |
| 0FFFDE0000000000000000000038028 | dct:provenance | - | |
| | - | dct:ProvenanceStatement | - |
| | Statement of changes in owner or manager that are significant for the subject's authenticity or interpretation | | |
| 0FFFDE0000000000000000000038029 | dct:publisher | dc:publisher | |
| | - | dct:Agent | - |
| | Publishing company of the subject | | |
| 0FFFDE000000000000000000003802A | dct:references | dc:relation, dct:relation | |
| | - | - | - |
| | Subject refers to or quotes the object | | |
| 0FFFDE000000000000000000003802B | dct:relation | dc:relation | |
| | - | - | - |
| | Reference to a resource related to the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000003802C | dct:replaces | dc:relation, dct:relation | |
| | - | - | - |
| | Subject replaces the object | | |
| 0FFFDE0000000000000000000003802D | dct:requires | dc:relation, dct:relation | |
| | - | - | - |
| | Subject requires the object | | |
| 0FFFDE0000000000000000000003802E | dct:rights | dc:rights | |
| | - | dct:RightsStatement | - |
| | Information on rights applying to the subject | | |
| 0FFFDE0000000000000000000003802F | dct:rightsHolder | - | |
| | - | dct:Agent | - |
| | Person or organization having ownership or management rights of the subject | | |
| 0FFFDE0000000000000000000038030 | dct:source | dc:source, dct:relation | |
| | - | - | - |
| | Resource from which the subject is derived | | |
| 0FFFDE0000000000000000000038031 | dct:spatial | dc:coverage, dct:coverage | |
| | - | dct:Location | - |
| | Spatial or geographic target of the subject | | |
| 0FFFDE0000000000000000000038032 | dct:subject | dc:subject | |
| | - | - | - |
| | Topic included in the subject (key word or classification code) | | |
| 0FFFDE0000000000000000000038033 | dct:tableOfContents | dc:description, dct:description | |
| | - | - | - |
| | Table of contents of the subject | | |
| 0FFFDE0000000000000000000038034 | dct:temporal | dc:coverage, dct:coverage | |
| | - | dct:PeriodOfTime | - |
| | Time period of the subject | | |
| 0FFFDE0000000000000000000038035 | dct:title | dc:title | |
| | - | - | - |
| | Name of the subject | | |
| 0FFFDE0000000000000000000038036 | dct:type | dc:type | |
| | - | rdfs:Class | - |
| | Category, nature, or genre of the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000038037 | dct:valid | dc:date, dct:date | |
| | - | rdfs:Literal | - |
| | Date or time of validity of the subject | | |

## C.6. Dublin Core types

The Dublin Core types are vocabulary defining the data types of subjects. The namespace for this vocabulary is as follows.

http://purl.org/dc/dcmitype/

Below, this namespace is indicated as "dctype:".

This vocabulary is included in the DCMI vocabulary, but it is listed separately because it has a different namespace.

Terms belonging to this vocabulary are as shown in Table C.6.1.

Table C.6.1. List of classes and instances of Dublin Core types

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000040001 | dctype:Collection | - | - |
| | Set of resources | | |
| 0FFFDE0000000000000000000040002 | dctype:Dataset | - | - |
| | Data encoded in a defined structure (lists, tables, databases, etc.) | | |
| 0FFFDE0000000000000000000040003 | dctype:Event | - | - |
| | Time-based occurrence or event | | |
| 0FFFDE0000000000000000000040004 | dctype:Image | - | - |
| | Visual representation other than text | | |
| 0FFFDE0000000000000000000040005 | dctype:InteractiveResource | - | - |
| | Resource whose method of use is understood, executed, or experienced by the user (such as Web pages and applets) | | |
| 0FFFDE0000000000000000000040006 | dctype:Service | - | - |
| | System that provides useful functions to users | | |
| 0FFFDE0000000000000000000040007 | dctype:Software | - | - |
| | Computer program | | |
| 0FFFDE0000000000000000000040008 | dctype:Sound | - | - |
| | Auditory data | | |
| 0FFFDE0000000000000000000040009 | dctype:Text | - | - |
| | Textual information | | |
| 0FFFDE000000000000000000004000A | dctype:PhysicalObject | - | - |
| | Inanimate, three-dimensional object | | |
| 0FFFDE000000000000000000004000B | dctype:StillImage | dctype:Image | - |
| | Static image (subclass of dctype:Image) | | |
| 0FFFDE000000000000000000004000C | dctype:MovingImage | dctype:Image | - |
| | Moving image (subclass of dctype:Image) | | |

## C.7. FoaF

Friend of a Friend (FoaF) [8] is a project to allow simple and meaningful analysis of information concerning people using computers by representing information concerning people in RDF. The FoaF vocabulary is defined under this project.

The namespace for this vocabulary is as follows.

http://xmlns.com/foaf/0.1/

Below, this namespace is indicated as "foaf:".

Terms belonging to this vocabulary are as shown in Tables C.7.1 and C.7.2.

Table C.7.1. List of classes and instances of FoaF

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000070001 | foaf:PersonalProfileDocument | foaf:Document | - |
| | Representations concerning a person | | |
| 0FFFDE0000000000000000000070002 | foaf:Agent | - | - |
| | Agent (person, group, software, artifact, etc.) | | |
| 0FFFDE0000000000000000000070003 | foaf:Group | foaf:Agent | - |
| | Group (class of agents) | | |
| 0FFFDE0000000000000000000070004 | foaf:Organization | foaf:Agent | - |
| | Organization (company, association, etc.) | | |
| 0FFFDE0000000000000000000070005 | foaf:Person | foaf:Agent, w3cgeo:SpatialThing | - |
| | Person | | |
| 0FFFDE0000000000000000000070006 | foaf:Document | - | - |
| | Document | | |
| 0FFFDE0000000000000000000070007 | foaf:Image | - | - |
| | Image | | |
| 0FFFDE0000000000000000000070008 | foaf:OnlineAccount | owl:Thing | - |
| | Online account | | |
| 0FFFDE0000000000000000000070009 | foaf:Project | - | - |
| | Project | | |
| 0FFFDE000000000000000000007000A | foaf:LabelProperty | - | - |
| | Class representing any RDF property with textual information serving as labels | | |
| 0FFFDE000000000000000000007000B | foaf:OnlineChatAccount | foaf:OnlineAccount | - |
| | Online chat account | | |
| 0FFFDE000000000000000000007000C | foaf:OnlineEcommerceaccount | - | - |
| | e-commerce account | | |
| 0FFFDE000000000000000000007000D | foaf:OnlineGamingAccount | foaf:OnlineAccount | - |
| | Online gaming account | | |

Table C.7.2. List of properties of FoaF

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000078001 | foaf:mbox | - | |
| | foaf:Agent | owl:Thing | - |
| | Mailbox held by the subject | | |
| 0FFFDE0000000000000000000078002 | foaf:firstName | - | |
| | foaf:Person | rdfs:Literal | - |
| | Name of a person (The given name is recommended.) | | |
| 0FFFDE0000000000000000000078003 | foaf:surname | - | |
| | foaf:Person | rdfs:Literal | - |
| | Surname | | |
| 0FFFDE0000000000000000000078004 | foaf:nick | - | |
| | - | - | - |
| | Nickname | | |
| 0FFFDE0000000000000000000078005 | foaf:title | - | |
| | - | - | - |
| | Title (Mr., Mrs., Ms., Dr., etc.) | | |
| 0FFFDE0000000000000000000078006 | foaf:gender | - | |
| | foaf:Agent | rdfs:Literal | - |
| | Gender (male, female, etc.) | | |
| 0FFFDE0000000000000000000078007 | foaf:phone | - | |
| | - | - | - |
| | URI representation of telephone number, e.g. tel:+81-3-5437-2270 | | |
| 0FFFDE0000000000000000000078008 | foaf:birthday | - | |
| | foaf:Agent | rdfs:Literal | - |
| | Date of birth of the subject | | |
| 0FFFDE0000000000000000000078009 | foaf:homepage | foaf:page, foaf:isPrimaryTopicOf | |
| | owl:Thing | foaf:Document | - |
| | Homepage of the subject | | |
| 0FFFDE000000000000000000007800A | foaf:isPrimaryTopicOf | foaf:page | |
| | owl:Thing | foaf:Document | - |
| | Subject is the main topic of the object | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000007800B | foaf:knows | - | |
| | foaf:Person | foaf:Person | - |
| | Subject knows the object | | |
| 0FFFDE0000000000000000000007800C | foaf:made | - | |
| | foaf:Agent | owl:Thing | - |
| | Something made by the subject | | |
| 0FFFDE0000000000000000000007800D | foaf:maker | - | |
| | owl:Thing | foaf:Agent | - |
| | Resource made by the subject | | |
| 0FFFDE0000000000000000000007800E | foaf:member | - | |
| | foaf:Group | foaf:Agent | - |
| | Object is a member of the subject | | |
| 0FFFDE0000000000000000000007800F | foaf:primaryTopic | - | |
| | foaf:Document | owl:Thing | - |
| | Main topic of the subject (document) | | |
| 0FFFDE00000000000000000000078010 | foaf:account | - | |
| | - | - | - |
| | Subject has an online account | | |
| 0FFFDE00000000000000000000078011 | foaf:accountName | - | |
| | foaf:OnlineAccount | rdfs:Literal | - |
| | Name (identifier) associated with an online account | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000078012 | foaf:accountServiceHomepage | - | |
| | foaf:OnlineAccount | foaf:Document | - |
| | Homepage of service providing an online account | | |
| 0FFFDE0000000000000000000078013 | foaf:aimChatID | foaf:nick | |
| | foaf:Agent | rdfs:Literal | - |
| | AIM chat ID | | |
| 0FFFDE0000000000000000000078014 | foaf:based_near | - | |
| | w3cgeo:SpatialThing | w3cgeo:SpatialThing | - |
| | Subject is close to the object | | |
| 0FFFDE0000000000000000000078015 | foaf:currentProject | - | |
| | foaf:Person | owl:Thing | - |
| | Project that the subject is currently working on | | |
| 0FFFDE0000000000000000000078016 | foaf:depiction | - | |
| | owl:Thing | foaf:Image | - |
| | Photograph or drawing that depicts the subject | | |
| 0FFFDE0000000000000000000078017 | foaf:depicts | - | |
| | foaf:Image | owl:Thing | - |
| | Image that represents the subject | | |
| 0FFFDE0000000000000000000078018 | foaf:familyName | - | |
| | foaf:Agent | rdfs:Literal | - |
| | Surname | | |
| 0FFFDE0000000000000000000078019 | foaf:focus | - | |
| | - | - | - |
| | Entity associated with a concept such as a subject title | | |
| 0FFFDE000000000000000000007801A | foaf:givenName | - | |
| | foaf:Agent | rdfs:Literal | - |
| | Given name of a person | | |
| 0FFFDE000000000000000000007801B | foaf:icqChatID | foaf:nick | |
| | foaf:Agent | rdfs:Literal | - |
| | ICQ chat ID | | |
| 0FFFDE000000000000000000007801C | foaf:img | foaf:depiction | |
| | foaf:Person | foaf:Image | - |
| | Image depicting the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000007801D | foaf:interest | - | |
| | foaf:Person | foaf:Document | - |
| | Page concerning a matter of interest to the subject | | |
| 0FFFDE0000000000000000000007801E | foaf:jabberID | - | |
| | foaf:Agent | rdfs:Literal | - |
| | Jabber ID | | |
| 0FFFDE0000000000000000000007801F | foaf:lastName | - | |
| | foaf:Agent | rdfs:Literal | - |
| | Surname (The family name is recommended.) | | |
| 0FFFDE0000000000000000000078020 | foaf:logo | - | |
| | owl:Thing | owl:Thing | - |
| | Logo of the subject | | |
| 0FFFDE0000000000000000000078021 | foaf:mbox_sha1sum | - | |
| | foaf:Agent | rdfs:Literal | - |
| | SHA1 hash value of the subject's mailbox | | |
| 0FFFDE0000000000000000000078022 | foaf:msnChatID | foaf:nick | |
| | foaf:Agent | rdfs:Literal | - |
| | MSN chat ID | | |
| 0FFFDE0000000000000000000078023 | foaf:myersBriggs | - | |
| | foaf:Person | rdfs:Literal | - |
| | Myers Briggs (MBTI) personality classification code of the subject | | |
| 0FFFDE0000000000000000000078024 | foaf:name | rdfs:label | |
| | owl:Thing | rdfs:Literal | - |
| | Name of the subject | | |
| 0FFFDE0000000000000000000078025 | foaf:openid | foaf:isPrimaryTopicOf | |
| | foaf:Agent | foaf:Document | - |
| | OpenID of the subject | | |
| 0FFFDE0000000000000000000078026 | foaf:page | - | |
| | owl:Thing | foaf:Document | - |
| | Web page written about the subject | | |
| 0FFFDE0000000000000000000078027 | foaf:pastProject | - | |
| | foaf:Person | owl:Thing | - |
| | Project that the subject previously worked on | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000078007 | foaf:phone | - | |
| | - | - | - |
| | Telephone number of the subject | | |
| 0FFFDE0000000000000000000078028 | foaf:plan | - | |
| | foaf:Person | rdfs:Literal | - |
| | Plan of the subject | | |
| 0FFFDE0000000000000000000078029 | foaf:publications | - | |
| | foaf:Person | foaf:Document | - |
| | Link to a list of publications of the subject | | |
| 0FFFDE000000000000000000007802A | foaf:schoolHomePage | - | |
| | - | - | - |
| | Homepage of the subject's alma mater | | |
| 0FFFDE000000000000000000007802B | foaf:skypeID | - | |
| | - | - | - |
| | Skype ID | | |
| 0FFFDE000000000000000000007802C | foaf:thumbnail | - | |
| | foaf:Image | foaf:Image | - |
| | Image thumbnail | | |
| 0FFFDE000000000000000000007802D | foaf:tipjar | foaf:page | |
| | foaf:Agent | foaf:Document | - |
| | Page describing how to send payment or tips to the subject | | |
| 0FFFDE0000000000000000000078005 | foaf:title | - | |
| | - | - | - |
| | Honorific title of the subject | | |
| 0FFFDE000000000000000000007802E | foaf:topic | - | |
| | foaf:Document | owl:Thing | - |
| | Topic of the subject's page | | |
| 0FFFDE000000000000000000007802F | foaf:topic_interest | - | |
| | foaf:Person | owl:Thing | - |
| | Topic of interest to the subject | | |
| 0FFFDE0000000000000000000078030 | foaf:weblog | foaf:page | |
| | foaf:Agent | foaf:Document | - |
| | Blog of the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000078031 | foaf:workInfoHomePage | - | |
| | - | - | - |
| | Homepage explaining the content of the subject's work | | |
| 0FFFDE0000000000000000000078032 | foaf:workPlaceHomePage | - | |
| | - | - | - |
| | Homepage of the subject's workplace | | |
| 0FFFDE0000000000000000000078033 | foaf:yahooChatID | foaf:nick | |
| | foaf:Agent | rdfs:Literal | - |
| | Yahoo! chat ID | | |
| 0FFFDE0000000000000000000078034 | foaf:age | - | |
| | - | - | - |
| | Age of the subject | | |
| 0FFFDE0000000000000000000078035 | foaf:membershipClass | - | |
| | - | - | - |
| | Class of individuals where the subject is a member of the object | | |
| 0FFFDE0000000000000000000078036 | foaf:sha1 | - | |
| | foaf:Document | - | - |
| | Sha1 hash value of a document | | |
| 0FFFDE0000000000000000000078037 | foaf:status | - | |
| | - | - | - |
| | Status of the subject | | |

## C.8. GeoSPARQL vocabulary

GeoSPARQL [44] defines vocabulary for description of geographic information based on simple feature access under ISO 19125, extension functions for searching, and query rewriting rules. The namespaces for the vocabulary defined by GeoSPARQL are as indicated at tabreftab:vocab-geosparql-namespace.

Table C.8.1. GeoSPARQL namespaces

| Namespace | Qname | Explanation |
|---|---|---|
| http://www.opengis.net/ | ogc: | Basic vocabulary of GeoSPARQL |
| http://www.opengis.net/ont/geosparql# | ogc: | Vocabulary for description of geographic information |
| http://www.opengis.net/ont/sf# | sf: | Simple Features Geometry |
| http://www.opengis.net/ont/gml# | gml: | GML Geometry |
| http://www.opengis.net/def/function/geosparql/ | geof: | GeoSPARQL functions |
| http://www.opengis.net/def/rule/geosparql/ | geor: | GeoSPARQL query rewriting rules |

Below, these namespaces are indicated by the Qname notation in the above table.

Terms belonging to this vocabulary are as shown in Tables C.8.2 and C.8.3.

Table C.8.2. List of classes and instances of GeoSPARQL vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000140001 | ogccore:geomLiteral | - | - |
| | Literal that encodes geometric data | | |
| 0FFFDE0000000000000000000141001 | ogc:SpatialObject | - | - |
| | Object having a spatial representation | | |
| 0FFFDE0000000000000000000141002 | ogc:Feature | ogc:SpatialObject | - |
| | Spatial feature; same as GFI_Feature under ISO 19156 | | |
| 0FFFDE0000000000000000000141003 | ogc:Geometry | ogc:SpatialObject | - |
| | Geometric data; same as GM_Object under ISO 19156 | | |
| 0FFFDE0000000000000000000141004 | ogc:wktLiteral | - | - |
| | Data type of geometric data written in Well-Known Text format | | |
| 0FFFDE0000000000000000000141005 | ogc:gmlLiteral | - | - |
| | Data type of geometric data written in GML format | | |
| 0FFFDE0000000000000000000142001 | sf:Geometry | ogc:Geometry | - |
| | Geometric data in zero to two dimensions | | |
| 0FFFDE0000000000000000000142002 | sf:Point | sf:Geometry | - |
| | Point | | |
| 0FFFDE0000000000000000000142003 | sf:Curve | sf:Geometry | - |
| | Curve | | |
| 0FFFDE0000000000000000000142004 | sf:Surface | sf:Geometry | - |
| | Surface | | |
| 0FFFDE0000000000000000000142005 | sf:GeometryCollection | sf:Geometry | - |
| | Geometric data consisting of multiple items of geometric data | | |
| 0FFFDE0000000000000000000142006 | sf:LineString | sf:Curve | - |
| | One-dimensional geometric data representing a series of points and the line segment that connects them | | |
| 0FFFDE0000000000000000000142007 | sf:Line | sf:LineString | - |
| | Line segment | | |
| 0FFFDE0000000000000000000142008 | sf:LinearRing | sf:LineString | - |
| | LineString that is closed and simple (no intersection with line segments) | | |
| 0FFFDE0000000000000000000142009 | sf:Polygon | sf:Surface | - |
| | Polygon | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000014200A | sf:PolyhedralSurface | sf:Surface | - |
| | Polyhedral surface | | |
| 0FFFDE0000000000000000000014200B | sf:Triangle | sf:Polygon | - |
| | Triangle | | |
| 0FFFDE0000000000000000000014200C | sf:TIN | sf:PolyhedralSurface | - |
| | Digital data structure representing ground surface as a collection of triangles, or Triangled Irregular Network | | |
| 0FFFDE0000000000000000000014200D | sf:MultiPoint | sf:GeometryCollection | - |
| | Multiple points | | |
| 0FFFDE0000000000000000000014200E | sf:MultiCurve | sf:GeometryCollection | - |
| | Multiple curves | | |
| 0FFFDE0000000000000000000014200F | sf:MultiSurface | sf:GeometryCollection | - |
| | Multiple surfaces | | |
| 0FFFDE00000000000000000000142010 | sf:MultiLineString | sf:MultiCurve | - |
| | Multiple lines | | |
| 0FFFDE00000000000000000000142011 | sf:MultiPolygon | sf:MultiSurface | - |
| | Multiple polygons | | |

Table C.8.3. List of properties of GeoSPARQL vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000149001 | ogc:sfEquals | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Literal data that encodes the subject | | |
| 0FFFDE0000000000000000000000149001 | ogc:sfEquals | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject and object are the same geometric data | | |
| 0FFFDE0000000000000000000000149002 | ogc:sfDisjoint | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject and object do not intersect | | |
| 0FFFDE0000000000000000000000149003 | ogc:sfIntersects | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject and object intersect | | |
| 0FFFDE0000000000000000000000149004 | ogc:sfTouches | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject and object are touching | | |
| 0FFFDE0000000000000000000000149005 | ogc:sfWithin | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject is completely contained within object | | |
| 0FFFDE0000000000000000000000149006 | ogc:sfContains | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject contains object 12312123 | | |
| 0FFFDE0000000000000000000000149007 | ogc:sfOverlaps | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject overlaps with object | | |
| 0FFFDE0000000000000000000000149008 | ogc:sfCrosses | - | |
| | ogc:SpatialObject | ogc:SpatialObject | - |
| | Subject crosses object | | |
| 0FFFDE0000000000000000000000149009 | ogc:hasGeometry | - | |
| | ogc:Feature | ogc:Geometry | - |
| | Geometric representation of subject | | |
| | ogc:dimension | - | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000014900B | ogc:Geometry | xsd:integer | - |
| | Topological dimension of subject | | |
| 0FFFDE0000000000000000000014900C | ogc:coordinateDimension | - | |
| | ogc:Geometry | xsd:integer | - |
| | Number of coordinate system dimensions of the subject | | |
| 0FFFDE0000000000000000000014900D | ogc:spatialDimension | - | |
| | ogc:Geometry | xsd:integer | - |
| | Number of spatial dimensions of the subject | | |
| 0FFFDE0000000000000000000014900E | ogc:isEmpty | - | |
| | ogc:Geometry | xsd:boolean | - |
| | Subject is geographically empty | | |
| 0FFFDE0000000000000000000014900F | ogc:isSimple | - | |
| | ogc:Geometry | xsd:boolean | - |
| | Subject is a simple figure (not intersecting or contacting itself at any point) | | |
| 0FFFDE00000000000000000000149010 | ogc:hasSerialization | - | |
| | ogc:Geometry | rdfs:Literal | - |
| | Subject has a text-based description | | |
| 0FFFDE00000000000000000000149011 | ogc:asWKT | ogc:hasSerialization | |
| | ogc:Geometry | ogc:wktLiteral | - |
| | String of characters describing the subject in Well-Known Text format | | |
| 0FFFDE00000000000000000000149012 | ogc:asGML | ogc:hasSerialization | |
| | ogc:Geometry | ogc:gmlLiteral | - |
| | String of characters describing the subject in GML format | | |

## C.9. Basic Geo vocabulary

The Basic Geo vocabulary (WGS84 lat/long) [6] is a vocabulary specified by W3C for representing points with latitude and longitude based on WGS84.

The namespace for this vocabulary is as follows.

http://www.w3.org/2003/01/geo/wgs84_pos#

Below, this namespace is indicated as "geo:".

Terms belonging to this vocabulary are as shown in Tables C.9.1 and C.9.2.

Table C.9.1. List of classes and instances of Basic Geo vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000150001 | geo:SpatialThing | - | - |
| | Thing having a location and size (located in space) | | |
| 0FFFDE0000000000000000000150002 | geo:TemporalThing | - | - |
| | Thing having a time interval | | |
| 0FFFDE0000000000000000000150003 | geo:Event | geo:TemporalThing | - |
| | Event | | |
| 0FFFDE0000000000000000000150004 | geo:Point | geo:spatialThing | - |
| | Point | | |

Table C.9.2. List of properties of Basic Geo vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000158001 | geo:lat | - | |
| | geo:SpatialThing | - | - |
| | Latitude from WGS84 | | |
| 0FFFDE0000000000000000000158002 | geo:long | - | |
| | geo:SpatialThing | - | - |
| | Longitude from WGS84 | | |
| 0FFFDE0000000000000000000158003 | geo:time | - | |
| | geo:TemporalThing | - | - |
| | Time | | |
| 0FFFDE0000000000000000000158004 | geo:alt | - | |
| | geo:SpatialThing | - | - |
| | Altitude | | |
| 0FFFDE0000000000000000000158005 | geo:location | foaf:based_near | |
| | - | geo:SpatialThing | - |
| | Location | | |

## C.10. Data Catalog (DCAT) vocabulary

The Data Catalog (DCAT) vocabulary [39] is a vocabulary for describing metadata related to data sets. The namespace for this vocabulary is as follows.

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

Below, this namespace is indicated as "dcat:".

Terms belonging to this vocabulary are as shown in Tables C.10.1 and C.10.2.

Table C.10.1. List of classes and instances of Data Catalog Vocabulary (DCAT)

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000170001 | dcat:CatalogRecord | - | - |
| | A record of a data catalog describing a single dataset | | |
| 0FFFDE0000000000000000000170002 | dcat:Catalog | - | - |
| | Data catalog (collection of metadata concerning datasets) | | |
| 0FFFDE0000000000000000000170003 | dcat:Dataset | dctype:Dataset | - |
| | Collection of data issued from a single information source | | |
| 0FFFDE0000000000000000000170004 | dcat:Feed | dcat:Distribution | - |
| | Information on RSS feeds that can access a dataset | | |
| 0FFFDE0000000000000000000170005 | dcat:WebService | dcat:Distribution | - |
| | Information on Web services that can access a dataset | | |
| 0FFFDE0000000000000000000170006 | dcat:Distribution | - | - |
| | Dataset usage format | | |
| 0FFFDE0000000000000000000170007 | dcat:Download | dcat:Distribution | - |
| | Information for downloading a dataset | | |

Table C.10.2. List of properties of Data Catalog Vocabulary (DCAT)

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000178001 | dcat:themeTaxonomy | - | |
| | dcat:Catalog | skos:ConceptScheme | - |
| | Knowledge Organization System (KOS) used to categorize datasets of a catalog | | |
| 0FFFDE0000000000000000000178002 | dcat:dataset | - | |
| | dcat:Catalog | dcat:Dataset | - |
| | Datasets contained in a data catalog | | |
| 0FFFDE0000000000000000000178003 | dcat:distribution | - | |
| | dcat:Dataset | dcat:Distribution | - |
| | Access information for a dataset | | |
| 0FFFDE0000000000000000000178004 | dcat:dataQuality | - | |
| | dcat:Dataset | - | - |
| | Data quality (such as accuracy) | | |
| 0FFFDE0000000000000000000178005 | dcat:theme | dcterms:subject | |
| | dcat:Dataset | skos:Concept | - |
| | Dataset categories | | |
| 0FFFDE0000000000000000000178006 | dcat:dataDictionary | - | |
| | dcat:Dataset | - | - |
| | Link to dictionary for data interpretation | | |
| 0FFFDE0000000000000000000178007 | dcat:granularity | - | |
| | dcat:Dataset | - | - |
| | Level of data particle size (temporal or geographic) | | |
| 0FFFDE0000000000000000000178008 | dcat:size | dcterms:extent | |
| | dcat:Distribution | - | - |
| | Size of the data | | |
| 0FFFDE0000000000000000000178009 | dcat:keyword | dcterms:subject | |
| | - | rdfs:Literal | - |
| | Key words and tags indicating the data | | |
| 0FFFDE000000000000000000017800A | dcat:bytes | - | |
| | dcat:Distribution | xsd:integer | - |
| | Number of bytes of data | | |
| | dcat:record | - | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000017800B | dcat:Catalog | dcat:CatalogRecord | - |
| | Link to data catalog record | | |
| 0FFFDE0000000000000000000017800C | dcat:accessURL | - | |
| | - | rdfs:Resource | - |
| | Link information for accessing data | | |

## C.11. RDF Data Cube vocabulary

The RDF Data Cube vocabulary [24] is a vocabulary for describing multidimensional data such as statistical data. The namespace for this vocabulary is as follows.

http://purl.org/linked-data/cube#

Below, this namespace is indicated as "qb:".

Terms belonging to this vocabulary are as shown in Tables C.11.1 and C.11.2.

Table C.11.1. List of classes and instances of RDF Data Cube vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000001F0001 | qb:DataSet | - | - |
| | Collection of observations according to several common dimensional structures, composed of various slices | | |
| 0FFFDE0000000000000000001F0002 | qb:Observation | - | - |
| | A single observation having at least one measured value | | |
| 0FFFDE0000000000000000001F0003 | qb:ObservationGroup | - | - |
| | Representation of an arbitrary group of observations | | |
| 0FFFDE0000000000000000001F0004 | qb:Slice | - | - |
| | Represents a subset of a dataset defined by fixing dimensional values and component properties of slices | | |
| 0FFFDE0000000000000000001F0005 | qb:Attachable | - | - |
| | Abstract superset of everything that can have attributes and dimensions | | |
| 0FFFDE0000000000000000001F0006 | qb:ComponentProperty | - | - |
| | Abstract superset of all properties that represent dimensions, attributes, or measures | | |
| 0FFFDE0000000000000000001F0007 | qb:DimensionProperty | - | - |
| | Class of component properties that represent the dimensions of the cube | | |
| 0FFFDE0000000000000000001F0008 | qb:AttributeProperty | - | - |
| | Class of component properties that represent the attributes of observations in a cube, such as units of measure | | |
| 0FFFDE0000000000000000001F0009 | qb:MeasureProperty | - | - |
| | Class of component properties that represent measured values of observed phenomena | | |
| 0FFFDE0000000000000000001F000A | qb:CodedProperty | - | - |
| | Superset of all coded component properties | | |
| 0FFFDE0000000000000000001F000B | qb:DataStructureDefinition | - | - |
| | Structural definition of a dataset or slice | | |
| 0FFFDE0000000000000000001F000C | qb:ComponentSpecification | - | - |
| | Used to define properties of components (such as attributes and dimensions) whose method of use is determined by a Data Structure Definition (DSD) | | |
| 0FFFDE0000000000000000001F000D | qb:ComponentSet | - | - |
| | Abstract class of things that mention at least one component property | | |
| 0FFFDE0000000000000000001F000E | qb:SliceKey | - | - |
| | Subset of component properties of datasets determined by slices that do not conflict | | |
| | qb:HierarchicalCodeList | - | - |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| 0FFFDE0000000000000000000001F000F | Meaning | | |
| | Represents a generalized concept hierarchy used for coding | | |

Table C.11.2. List of properties of RDF Data Cube vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000001F8001 | qb:dataSet | - | |
| | - | - | - |
| | Indicates the containing dataset. | | |
| 0FFFDE0000000000000000001F8002 | qb:observation | - | |
| | - | - | - |
| | Indicates observations included in the dataset slice. | | |
| 0FFFDE0000000000000000001F8003 | qb:slice | - | |
| | - | - | - |
| | Indicates a subset of the dataset. | | |
| 0FFFDE0000000000000000001F8004 | qb:observationGroup | - | |
| | - | - | - |
| | Indicates a set of observations. | | |
| 0FFFDE0000000000000000001F8005 | qb:measureType | - | |
| | - | - | - |
| | Generic measure dimension whose value indicates which measure is obtained by the observation. | | |
| 0FFFDE0000000000000000001F8006 | qb:structure | - | |
| | - | - | - |
| | Indicates the structure followed by the dataset of the subject. | | |
| 0FFFDE0000000000000000001F8007 | qb:component | - | |
| | - | - | - |
| | Indicates a component specification included in the dataset structure. | | |
| 0FFFDE0000000000000000001F8008 | qb:componentProperty | - | |
| | - | - | - |
| | Indicates a component property expected in a dataset or a dimension fixed by a slice key. | | |
| 0FFFDE0000000000000000001F8009 | qb:order | - | |
| | - | - | - |
| | Order of priority for components of sets having this structure, used in representation guidance. | | |
| 0FFFDE0000000000000000001F800A | qb:componentRequired | - | |
| | - | - | - |
| | Indicates whether a component property is required or optional in a DSD. | | |
| | qb:componentAttachment | - | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000001F800B | - | - | - |
| | Indicates the level at which a component property should be attached. The level is qb:DataSet, qb:Slice, qb:Observation, or qb:MeasureProperty. | | |
| 0FFFDE0000000000000000000001F800C | qb:dimension | - | |
| | - | - | - |
| | Alternative to qb:componentProperty which clearly indicates that the component is a dimension. | | |
| 0FFFDE0000000000000000000001F800D | qb:measure | - | |
| | - | - | - |
| | Alternative to qb:componentProperty which clearly indicates that the component is a measurement. | | |
| 0FFFDE0000000000000000000001F800E | qb:attribute | - | |
| | - | - | - |
| | Alternative to qb:componentProperty which clearly indicates that the component is an attribute. | | |
| 0FFFDE0000000000000000000001F800F | qb:measureDimension | - | |
| | - | - | - |
| | Alternative to qb:componentProperty which clearly indicates that the component is a measurement dimension. | | |
| 0FFFDE0000000000000000000001F8010 | qb:sliceStructure | - | |
| | - | - | - |
| | Indicates a slice key corresponding to the subject slice. | | |
| 0FFFDE0000000000000000000001F8011 | qb:sliceKey | - | |
| | - | - | - |
| | Indicates a slice key used in the slice of the subject dataset. | | |
| 0FFFDE0000000000000000000001F8012 | qb:concept | - | |
| | - | - | - |
| | Gives the concept which is measured or indicated by a component property. | | |
| 0FFFDE0000000000000000000001F8013 | qb:codeList | - | |
| | - | - | - |
| | Gives the code list associated with a coded property. | | |
| 0FFFDE0000000000000000000001F8014 | qb:hierarchyRoot | - | |
| | - | - | - |
| | Specifies the root of a hierarchy. A hierarchy has at least one root. | | |
| 0FFFDE0000000000000000000001F8015 | qb:parentChildProperty | - | |
| | - | - | - |
| | Specifies a property for correlating parent concepts and child concepts in the hierarchy. | | |

## C.12. Simple Knowledge Organization System (SKOS)

The Simple Knowledge Organization System (SKOS) [40] is a vocabulary for describing many knowledge organization systems, including thesauri, taxonomies, classification schemes, and subject heading systems. The namespace for this vocabulary is as follows.

http://www.w3.org/2004/02/skos/core#

Below, this namespace is indicated as "skos:".

Terms belonging to this vocabulary are as shown in Tables C.12.1 and C.12.2.

Table C.12.1. List of classes and instances of SKOS (Simple Knowledge Organization System)

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE00000000000000000001E0001 | skos:Concept | - | - |
| | An idea or notion; a unit of thought. | | |
| 0FFFDE00000000000000000001E0002 | skos:ConceptScheme | - | - |
| | A set of concepts, optionally including statements about semantic relationships between those concepts. | | |
| 0FFFDE00000000000000000001E0003 | skos:Collection | - | - |
| | A meaningful collection of concepts. | | |
| 0FFFDE00000000000000000001E0004 | skos:OrderedCollection | - | - |
| | An ordered collection of concepts, where both the grouping and the ordering are meaningful. | | |

Table C.12.2. List of properties of SKOS (Simple Knowledge Organization System)

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000001E8001 | skos:inScheme | - | |
| | - | - | - |
| | Relates a resource (for example a concept) to a concept scheme in which it is included. | | |
| 0FFFDE0000000000000000001E8002 | skos:hasTopConcept | - | |
| | - | - | - |
| | Relates, by convention, a concept scheme to a concept which is topmost in the broader/narrower concept hierarchies for that scheme, providing an entry point to these hierarchies. | | |
| 0FFFDE0000000000000000001E8003 | skos:topConceptOf | - | |
| | - | - | - |
| | Relates a concept to the concept scheme that it is a top level concept of. | | |
| 0FFFDE0000000000000000001E8004 | skos:prefLabel | - | |
| | - | - | - |
| | The preferred lexical label for a resource, in a given language. | | |
| 0FFFDE0000000000000000001E8005 | skos:altLabel | - | |
| | - | - | - |
| | An alternative lexical label for a resource. | | |
| 0FFFDE0000000000000000001E8006 | skos:hiddenLabel | - | |
| | - | - | - |
| | A lexical label for a resource that should be hidden when generating visual displays of the resource, but should still be accessible to free text search operations. | | |
| 0FFFDE0000000000000000001E8007 | skos:notation | - | |
| | - | - | - |
| | A notation, also known as classification code, is a string of characters such as "T58.5" or "303.4833" used to uniquely identify a concept within the scope of a given concept scheme. | | |
| 0FFFDE0000000000000000001E8008 | skos:note | - | |
| | - | - | - |
| | A general note, for any purpose. | | |
| 0FFFDE0000000000000000001E8009 | skos:changeNote | - | |
| | - | - | - |
| | A note about a modification to a concept. | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000001E800A | skos:definition | - | |
| | - | - | - |
| | A statement or formal explanation of the meaning of a concept. | | |
| 0FFFDE0000000000000000000001E800B | skos:editorialNote | - | |
| | - | - | - |
| | A note for an editor, translator or maintainer of the vocabulary. | | |
| 0FFFDE0000000000000000000001E800C | skos:example | - | |
| | - | - | - |
| | An example of the use of a concept. | | |
| 0FFFDE0000000000000000000001E800D | skos:historyNote | - | |
| | - | - | - |
| | A note about the past state/use/meaning of a concept. | | |
| 0FFFDE0000000000000000000001E800E | skos:scopeNote | - | |
| | - | - | - |
| | A note that helps to clarify the meaning and/or the use of a concept. | | |
| 0FFFDE0000000000000000000001E800F | skos:semanticRelation | - | |
| | - | - | - |
| | Links a concept to a concept related by meaning. | | |
| 0FFFDE0000000000000000000001E8010 | skos:broader | - | |
| | - | - | - |
| | Relates a concept to a concept that is more general in meaning. | | |
| 0FFFDE0000000000000000000001E8011 | skos:narrower | - | |
| | - | - | - |
| | Relates a concept to a concept that is more specific in meaning. | | |
| 0FFFDE0000000000000000000001E8012 | skos:related | - | |
| | - | - | - |
| | Relates a concept to a concept with which there is an associative semantic relationship. | | |
| 0FFFDE0000000000000000000001E8013 | skos:broaderTransitive | - | |
| | - | - | - |
| | skos:broaderTransitive is a transitive superproperty of skos:broader. | | |
| 0FFFDE0000000000000000000001E8014 | skos:narrowerTransitive | - | |
| | - | - | - |
| | skos:narrowerTransitive is a transitive superproperty of skos:narrower. | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000001E8015 | skos:member | - | |
| | - | - | - |
| | Relates a collection to one of its members. | | |
| 0FFFDE0000000000000000000001E8016 | skos:memberList | - | |
| | - | - | - |
| | Relates an ordered collection to the RDF list containing its members. | | |
| 0FFFDE0000000000000000000001E8017 | skos:mappingRelation | - | |
| | - | - | - |
| | Relates two concepts coming, by convention, from different schemes, and that have comparable meanings | | |
| 0FFFDE0000000000000000000001E8018 | skos:broadMatch | - | |
| | - | - | - |
| | skos:broadMatch is used to state a hierarchical mapping link between two conceptual resources in different concept schemes. | | |
| 0FFFDE0000000000000000000001E8019 | skos:narrowMatch | - | |
| | - | - | - |
| | skos:narrowMatch is used to state a hierarchical mapping link between two conceptual resources in different concept schemes. | | |
| 0FFFDE0000000000000000000001E801A | skos:relatedMatch | - | |
| | - | - | - |
| | skos:relatedMatch is used to state an associative mapping link between two conceptual resources in different concept schemes. | | |
| 0FFFDE0000000000000000000001E801B | skos:exactMatch | - | |
| | - | - | - |
| | skos:exactMatch is used to link two concepts, indicating a high degree of confidence that the concepts can be used interchangeably across a wide range of information retrieval applications. skos:exactMatch is a transitive property, and is a sub-property of skos:closeMatch. | | |
| 0FFFDE0000000000000000000001E801C | skos:closeMatch | - | |
| | - | - | - |
| | skos:closeMatch is used to link two concepts that are sufficiently similar that they can be used interchangeably in some information retrieval applications. In order to avoid the possibility of "compound errors" when combining mappings across more than two concept schemes, skos:closeMatch is not declared to be a transitive property. | | |

## C.13. Vocabulary for basic classes and physical quantities of subject matter

The namespace of vocabulary for basic classes and physical quantities of subject matter is as follows.

http://uidcenter.org/vocab/ucr/uc#

Below, this namespace is indicated as "uc:".

Terms belonging to this vocabulary are as shown in Tables C.13.1 and C.13.2.

Table C.13.1. List of classes and instances of vocabulary for basic classes and physical quantities of subject matter

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000000001 | uc:Entity | - | - |
| | Entity class | | |
| 0FFFDE0000000000000000000000000002 | uc:RealEntity | uc:Entity | - |
| | Entity that exists in real space | | |
| 0FFFDE0000000000000000000000000003 | uc:VirtualEntity | uc:Entity | - |
| | Entity that does not exist in real space | | |
| 0FFFDE0000000000000000000000000004 | uc:Content | uc:VirtualEntity | - |
| | Content or item of information | | |
| 0FFFDE0000000000000000000000000005 | uc:Person | uc:RealEntity | foaf:Person |
| | Person | | |
| 0FFFDE0000000000000000000000000006 | uc:RealThing | uc:RealEntity | - |
| | Tangible entity existing in real space, other than a person or place | | |
| 0FFFDE0000000000000000000000000007 | uc:SpatialThing | uc:RealEntity | w3cgeo:SpatialThing |
| | Place in real space | | |
| 0FFFDE0000000000000000000000000008 | uc:Concept | uc:VirtualEntity | - |
| | Concept | | |
| 0FFFDE0000000000000000000000000009 | uc:Class | uc:Concept | rdfs:Class |
| | Class of classes | | |
| 0FFFDE000000000000000000000000000A | uc:Relation | uc:Concept | rdf:Property |
| | Relationship | | |
| 0FFFDE0000000000000000000000000023 | uc:Atom | - | rdfs:Literal |
| | Value based on lexical representation | | |
| 0FFFDE0000000000000000000000000024 | uc:Notification | uc:Concept | - |
| | Class describing notification conditions | | |

Table C.13.2. List of properties of vocabulary for basic classes and physical quantities of subject matter

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000008001 | uc:relation | - | |
| | uc:Entity | - | rdfs:predicate |
| | (General) relationship | | |
| 0FFFDE0000000000000000000008002 | uc:alias | uc:relation | |
| | uc:Entity | uc:Entity | owl:sameAs |
| | Alternative name | | |
| 0FFFDE0000000000000000000008003 | uc:length | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Length | | |
| 0FFFDE0000000000000000000008004 | uc:mass | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Mass | | |
| 0FFFDE0000000000000000000008005 | uc:time | uc:physicalAmount | |
| | uc:Entity | - | - |
| | Time | | |
| 0FFFDE0000000000000000000008006 | uc:currency | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Monetary amount | | |
| 0FFFDE0000000000000000000008007 | uc:area | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Area | | |
| 0FFFDE0000000000000000000008008 | uc:volume | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Volume | | |
| 0FFFDE0000000000000000000008009 | uc:electricalCurrent | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Electric current | | |
| 0FFFDE000000000000000000000800A | uc:voltage | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Voltage | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000800B | uc:luminousIntensity | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Luminosity | | |
| 0FFFDE0000000000000000000000800C | uc:temperature | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Temperature | | |
| 0FFFDE0000000000000000000000800D | uc:humidity | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Humidity | | |
| 0FFFDE0000000000000000000000800E | uc:airPressure | uc:physicalAmount | |
| | uc:RealEntity | - | - |
| | Barometric pressure | | |
| 0FFFDE0000000000000000000000800F | uc:weather | uc:relation | |
| | uc:Entity | - | - |
| | Weather | | |
| 0FFFDE0000000000000000000000008010 | uc:signature | uc:relation | |
| | uc:Entity | xsd:String | - |
| | Signature assigned to ucode | | |
| 0FFFDE0000000000000000000000008011 | uc:width | uc:length | |
| | uc:RealEntity | - | - |
| | Width (lateral length) | | |
| 0FFFDE0000000000000000000000008012 | uc:height | uc:length | |
| | uc:RealEntity | - | - |
| | Height (vertical length) | | |
| 0FFFDE0000000000000000000000008013 | uc:depth | uc:length | |
| | uc:RealEntity | - | - |
| | Depth | | |
| 0FFFDE0000000000000000000000008015 | uc:issued | dc:date | |
| | uc:Entity | - | - |
| | Date of subject ucode issuance | | |
| 0FFFDE0000000000000000000000008016 | uc:issuer | uc:relation | |
| | uc:Entity | - | - |
| | Issuer of subject ucode | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000008017 | uc:owner | uc:relation | |
| | uc:Entity | - | - |
| | Manager of subject ucode | | |
| 0FFFDE0000000000000000000000008018 | uc:registered | dc:date | |
| | uc:Entity | - | - |
| | Date and time when information concerning the subject ucode was first registered | | |
| 0FFFDE0000000000000000000000008019 | uc:lastUpdated | dc:date | |
| | uc:Entity | - | - |
| | Date and time when information concerning the subject ucode was last updated | | |
| 0FFFDE000000000000000000000000801A | uc:notificationCondition | uc:relation | |
| | uc:Notification | uc:Atom | - |
| | Notification conditions | | |
| 0FFFDE000000000000000000000000801B | uc:notificationURL | uc:relation | |
| | uc:Notification | uc:Atom | - |
| | URL for notification | | |
| 0FFFDE000000000000000000000000801C | uc:isValid | uc:relation | |
| | uc:Entity | xsd:boolean | - |
| | Subject is valid | | |
| 0FFFDE000000000000000000000000801D | uc:physicalAmount | uc:relation | |
| | - | - | - |
| | Physical amount | | |
| 0FFFDE000000000000000000000000801E | uc:meteorologicalAmount | uc:physicalAmount | |
| | - | - | - |
| | Weather-related amount | | |
| 0FFFDE000000000000000000000000801F | uc:pollenHourly | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Hourly pollen count (particles/$m^3$-hour) | | |
| 0FFFDE0000000000000000000000008020 | uc:pollenDaily | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Daily pollen count (particles/$m^3$-day) | | |
| 0FFFDE0000000000000000000000008021 | uc:pollenLevelHourly | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Hourly pollen dispersal level | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000008022 | uc:pollenLevelDaily | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Daily pollen dispersal level | | |
| 0FFFDE0000000000000000000000008023 | uc:precipitation | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Precipitation (mm) | | |
| 0FFFDE0000000000000000000000008024 | uc:windDirection | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Wind direction (degrees) | | |
| 0FFFDE0000000000000000000000008025 | uc:windSpeed | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Wind speed (m/s) | | |
| 0FFFDE0000000000000000000000008026 | uc:sunLight | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Sunlight (minutes) | | |
| 0FFFDE0000000000000000000000008027 | uc:sulfurDioxide | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Sulfur dioxide (ppm) | | |
| 0FFFDE0000000000000000000000008028 | uc:nitricMonoxide | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Nitric monoxide (ppm) | | |
| 0FFFDE0000000000000000000000008029 | uc:nitrogenDioxide | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Nitric dioxide (ppm) | | |
| 0FFFDE000000000000000000000000802A | uc:nitrogenOxide | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Nitrogen oxides (ppm) | | |
| 0FFFDE000000000000000000000000802B | uc:carbonMonoxide | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Carbon monoxide (ppm) | | |
| 0FFFDE000000000000000000000000802C | uc:photochemicalOxidant | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Photochemical oxidants (ppm) | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE00000000000000000000000802D | uc:nonMethaneHydrocarbon | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Nonmethane hydrocarbons (ppmC) | | |
| 0FFFDE00000000000000000000000802E | uc:methane | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Methane (ppmC) | | |
| 0FFFDE00000000000000000000000802F | uc:totalHydrocarbon | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Total hydrocarbons (ppmC) | | |
| 0FFFDE00000000000000000000008030 | uc:airborneParticle | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Airborne particulate matter (mg/m$^3$) | | |
| 0FFFDE00000000000000000000008031 | uc:microparticulateMatter | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Fine particulate matter (µg/m$^3$) | | |
| 0FFFDE00000000000000000000008032 | uc:floatingDust | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Airborne dust (mg/m$^3$) | | |
| 0FFFDE00000000000000000000008033 | uc:snowAccumulation | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Snow accumulation (cm) | | |
| 0FFFDE00000000000000000000008034 | uc:snowFall | uc:meteorologicalAmount | |
| | uc:RealEntity | - | - |
| | Snowfall (cm) | | |

## C.14. Access control vocabulary

The namespace of vocabulary for describing access control under section 4.4 (Security management commands) is as follows.

http://uidcenter.org/vocab/ucr/oddp-acl#

Below, this namespace is indicated as "odacl:".

Terms belonging to this vocabulary are as shown in Tables C.14.1 and C.14.2.

Table C.14.1. List of classes and instances of access control vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000001D0001 | odacl:ACLObject | rdfs:Class | - |
| | Data class for access management | | |
| 0FFFDE0000000000000000000001D0002 | odacl:RightStatement | dcterms:RightStatement, odacl:ACLObject | - |
| | Role | | |
| 0FFFDE0000000000000000000001D0003 | odacl:Dataset | dcat:Dataset, odacl:ACLObject | - |
| | Dataset (set of at least one item of data) | | |

Table C.14.2. List of properties of access control vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000001D8001 | odacl:accessTarget | - | |
| | odacl:RightsStatement | odacl:Dataset | - |
| | URI of dataset for roles | | |
| 0FFFDE0000000000000000001D8002 | odacl:memberOf | - | |
| | rdfs:Class | odacl:Dataset | - |
| | Belongs to dataset (for access control) | | |
| 0FFFDE0000000000000000001D8003 | odacl:accessToken | odacl:consumerKey | |
| | odacl:RightsStatement | xsd:string | - |
| | OAuth2 access token | | |
| 0FFFDE0000000000000000001D8004 | odacl:hasCreatePermission | - | |
| | odacl:RightsStatement | xsd:boolean | - |
| | Whether creation of data belonging to the dataset is authorized | | |
| 0FFFDE0000000000000000001D8005 | odacl:hasReadPermission | - | |
| | odacl:RightsStatement | xsd:boolean | - |
| | Whether viewing data belonging to the dataset is authorized | | |
| 0FFFDE0000000000000000001D8006 | odacl:hasUpdatePermission | - | |
| | odacl:RightsStatement | xsd:boolean | - |
| | Whether updating data belonging to the dataset is authorized | | |
| 0FFFDE0000000000000000001D8007 | odacl:hasDeletePermission | - | |
| | odacl:RightsStatement | xsd:boolean | - |
| | Whether deleting data belonging to the dataset is authorized | | |
| 0FFFDE0000000000000000001D8008 | odacl:terms | - | |
| | odacl:RightsStatement | xsd:string | - |
| | Harvesting method (for natural products) | | |
| 0FFFDE0000000000000000001D8009 | odacl:condition | - | |
| | odacl:RightsStatement | xsd:string | - |
| | Fastening method | | |
| 0FFFDE0000000000000000001D800A | odacl:isActive | - | |
| | odacl:ACLObject | xsd:boolean | - |
| | Dataset rule validity | | |

## C.15. Geospatial vocabulary

The geospatial concept includes anything in real space. When it is necessary to identify features without actual substance, these may also be geospatial features. In addition to physical elements such as mountains, buildings, and mobile entities, geospatial features include elements such as administrative boundaries and points of interest.

The namespace for the geospatial vocabulary specified by [11] and [12] is as follows.

http://uidcenter.org/vocab/ucr/ug#

Below, this namespace is indicated as "ug:".

Terms belonging to this vocabulary are as shown in Tables C.15.1 and C.15.2.

Table C.15.1. List of classes and instances of geospatial vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000080001 | ug:Point | uc:SpatialThings | w3cgeo:Point |
| | Class of point information | | |
| 0FFFDE0000000000000000000080002 | ug:TinyPoint | ug:Point | - |
| | Simple ucode entity of latitude, longitude, and altitude (ucode URI) | | |
| 0FFFDE0000000000000000000080003 | ug:Poi | ug:Point | - |
| | Point of interest | | |
| 0FFFDE0000000000000000000080004 | ug:Category | - | - |
| | Class of geospatial categories | | |
| 0FFFDE0000000000000000000080005 | ug:Facility | ug:Category | - |
| | Any facility | | |
| 0FFFDE0000000000000000000080006 | ug:Station | ug:Stop | - |
| | Transport station | | |
| 0FFFDE0000000000000000000080007 | ug:PublicOffice | ug:Facility | - |
| | Public facility (government office, town hall, etc.) | | |
| 0FFFDE0000000000000000000080008 | ug:PoliceStation | ug:PublicOffice | - |
| | Police facility | | |
| 0FFFDE0000000000000000000080009 | ug:FireStation | ug:PublicOffice | - |
| | Firefighting facility | | |
| 0FFFDE000000000000000000008000A | ug:Banking | ug:Facility | - |
| | Financial facility | | |
| 0FFFDE000000000000000000008000B | ug:PostOffice | ug:Facility | - |
| | Postal facility | | |
| 0FFFDE000000000000000000008000C | ug:Hospital | ug:Facility | - |
| | Medical facility | | |
| 0FFFDE000000000000000000008000D | ug:Welfare | ug:Facility | - |
| | Welfare facility | | |
| 0FFFDE000000000000000000008000E | ug:Education | ug:Facility | - |
| | Educational facility | | |
| 0FFFDE000000000000000000008000F | ug:Research | ug:Facility | - |
| | Research facility | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE00000000000000000000080010 | ug:Shop | ug:Commerce | - |
| | Retail store facility | | |
| 0FFFDE00000000000000000000080011 | ug:Restaurant | ug:Commerce | ug:CookShop |
| | Food and drink facility | | |
| 0FFFDE00000000000000000000080012 | ug:Culture | ug:Facility | - |
| | Cultural facility | | |
| 0FFFDE00000000000000000000080013 | ug:Sightseeing | ug:Facility | - |
| | Tourism facility | | |
| 0FFFDE00000000000000000000080014 | ug:Leisure | ug:Facility | - |
| | Leisure facility | | |
| 0FFFDE00000000000000000000080015 | ug:Park | ug:Facility | - |
| | Park | | |
| 0FFFDE00000000000000000000080016 | ug:Transport | ug:Facility | - |
| | Means of public transportation | | |
| 0FFFDE00000000000000000000080017 | ug:Service | ug:Facility | - |
| | Service | | |
| 0FFFDE00000000000000000000080018 | ug:Common | ug:Facility | - |
| | Shared facility | | |
| 0FFFDE00000000000000000000080019 | ug:Parking | ug:Facility | - |
| | Parking | | |
| 0FFFDE0000000000000000000008001A | ug:Toilet | ug:Facility | - |
| | Restroom | | |
| 0FFFDE0000000000000000000008001B | ug:Elevator | ug:Facility | - |
| | Elevator | | |
| 0FFFDE0000000000000000000008001C | ug:Stairs | ug:Facility | - |
| | Stairs | | |
| 0FFFDE0000000000000000000008001D | ug:Escalator | ug:Facility | - |
| | Escalator | | |
| 0FFFDE0000000000000000000008001E | ug:Passage | ug:Facility | - |
| | Corridor | | |
| 0FFFDE0000000000000000000008001F | ug:Slope | ug:Facility | - |
| | Ramp | | |
| 0FFFDE00000000000000000000080020 | ug:UpDownRank | ug:Facility | - |
| | Step or bump | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000080021 | ug:Travolator | ug:Facility | - |
| | Moving walkway | | |
| 0FFFDE0000000000000000000080022 | ug:Railway | ug:Transport | - |
| | Railway | | |
| 0FFFDE0000000000000000000080023 | ug:BusRoute | ug:TransportRoute | - |
| | Bus (bus route) | | |
| 0FFFDE0000000000000000000080024 | ug:SeaRoute | ug:TransportRoute | - |
| | Ship (ship route) | | |
| 0FFFDE0000000000000000000080025 | ug:Airline | ug:TransportRoute | - |
| | Airline (air route) | | |
| 0FFFDE0000000000000000000080026 | ug:TaxiRoute | ug:TransportRoute | - |
| | Taxi | | |
| 0FFFDE0000000000000000000080027 | ug:Sidewalk | ug:Facility | - |
| | Sidewalk | | |
| 0FFFDE0000000000000000000080028 | ug:Manway | ug:Facility | - |
| | Pedestrian way | | |
| 0FFFDE0000000000000000000080029 | ug:NoSidewalkRoad | ug:Facility | - |
| | Road without sidewalks | | |
| 0FFFDE000000000000000000008002A | ug:ZebraZone | ug:Facility | - |
| | Marked crosswalk | | |
| 0FFFDE000000000000000000008002B | ug:Footbridge | ug:Facility | - |
| | Pedestrian overpass | | |
| 0FFFDE000000000000000000008002C | ug:Underpass | ug:Facility | - |
| | Underpass | | |
| 0FFFDE000000000000000000008002D | ug:RailroadCrossing | ug:Transport | - |
| | Railroad crossing | | |
| 0FFFDE000000000000000000008002E | ug:Wicket | ug:Transport | - |
| | Ticket gate | | |
| 0FFFDE000000000000000000008002F | ug:GettingOnPosition | ug:Transport | - |
| | Position for boarding | | |
| 0FFFDE0000000000000000000080030 | ug:BusStop | ug:Stop | - |
| | Bus stop | | |
| 0FFFDE0000000000000000000080031 | ug:TaxiStand | ug:Stop | - |
| | Taxi stand | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000080032 | ug:Gateway | ug:Facility | - |
| | Entrance/exit | | |
| 0FFFDE0000000000000000000080033 | ug:HostSite | ug:Facility | - |
| | Installation | | |
| 0FFFDE0000000000000000000080034 | ug:Platform | ug:Transport | - |
| | Platform | | |
| 0FFFDE0000000000000000000080035 | ug:Node | ug:Feature | - |
| | Spatial network node | | |
| 0FFFDE0000000000000000000080036 | ug:Link | ug:Feature | - |
| | Spatial network link | | |
| 0FFFDE0000000000000000000080037 | ug:Entrance | ug:Feature | - |
| | Entrance (for one-way use) | | |
| 0FFFDE0000000000000000000080038 | ug:Exit | ug:Feature | - |
| | Exit (for one-way use) | | |
| 0FFFDE0000000000000000000080039 | ug:Upstairs | - | - |
| | Ascending direction of link | | |
| 0FFFDE000000000000000000008003A | ug:Downstairs | - | - |
| | Descending direction of link | | |
| 0FFFDE000000000000000000008003B | ug:Region | ug:Feature | - |
| | Class of spatial range or scope indicated by geographical feature | | |
| 0FFFDE000000000000000000008003C | ug:CRS | - | - |
| | Coordinate reference system class | | |
| 0FFFDE000000000000000000008003D | ug:ServiceArea | ug:Region | - |
| | Class of range or scope where services are provided | | |
| 0FFFDE000000000000000000008003E | ug:GISObject | ug:Region | - |
| | Atom class of gisObject format under openGIS | | |
| 0FFFDE000000000000000000008003F | ug:WGS84 | ug:Region | - |
| | WGS84 coordinate system (one instance of ug:CRS) | | |
| 0FFFDE0000000000000000000080040 | ug:PILRS | - | - |
| | LRS of PI | | |
| 0FFFDE0000000000000000000080041 | ug:Marker | ug:Feature | - |
| | Location of ucode tag or ucode mark | | |
| 0FFFDE0000000000000000000080042 | ug:Group | ug:Feature | - |
| | Grouping of multiple geographical features | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000080043 | ug:Floor | ug:Facility | - |
| | Floor of a building | | |
| 0FFFDE0000000000000000000080044 | ug:Building | ug:Facility | - |
| | Building | | |
| 0FFFDE0000000000000000000080045 | ug:Room | ug:Facility | - |
| | Room | | |
| 0FFFDE0000000000000000000080046 | ug:Advertisement | ug:Facility | - |
| | Advertisement | | |
| 0FFFDE0000000000000000000080047 | ug:AED | ug:HostSite | - |
| | Defibrillator (AED) | | |
| 0FFFDE0000000000000000000080048 | ug:ATM | ug:Banking | - |
| | ATM | | |
| 0FFFDE0000000000000000000080049 | ug:BabyBed | ug:HostSite | - |
| | Baby crib | | |
| 0FFFDE000000000000000000008004A | ug:BabyChangingTable | ug:HostSite | - |
| | Baby changing station | | |
| 0FFFDE000000000000000000008004B | ug:BaggageClaim | ug:Service | - |
| | Baggage room | | |
| 0FFFDE000000000000000000008004C | ug:Bench | ug:HostSite | - |
| | Bench | | |
| 0FFFDE000000000000000000008004D | ug:BoxLunch | ug:Restaurant | - |
| | Packed lunch shop | | |
| 0FFFDE000000000000000000008004E | ug:Cafe | ug:Restaurant | - |
| | Café | | |
| 0FFFDE000000000000000000008004F | ug:ChangeMachine | ug:HostSite | - |
| | Change machine | | |
| 0FFFDE0000000000000000000080050 | ug:ChangeRoom | ug:Room | - |
| | Changing room | | |
| 0FFFDE0000000000000000000080051 | ug:ChangeRoomForMen | ug:ChangeRoom | - |
| | Changing room (for men) | | |
| 0FFFDE0000000000000000000080052 | ug:ChangeRoomForWomen | ug:ChangeRoom | - |
| | Changing room (for women) | | |
| 0FFFDE0000000000000000000080053 | ug:CoinOperatedLocker | ug:HostSite | - |
| | Coin-operated locker | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000080054 | ug:ConvenienceStore | ug:Shop | - |
| | Convenience store | | |
| 0FFFDE0000000000000000000000080055 | ug:CourierOffice | ug:Service | - |
| | Parcel delivery office | | |
| 0FFFDE0000000000000000000000080056 | ug:EmergencyEvacuationArea | ug:Facility | - |
| | Emergency shelter | | |
| 0FFFDE0000000000000000000000080057 | ug:EventSpace | ug:Facility | - |
| | Event space | | |
| 0FFFDE0000000000000000000000080058 | ug:FacilityForDisabled | ug:Facility | - |
| | Facility for persons with disabilities | | |
| 0FFFDE0000000000000000000000080059 | ug:FirstAid | ug:Service | - |
| | First-aid station | | |
| 0FFFDE000000000000000000000008005A | ug:ForeignExchangeShop | ug:Banking | - |
| | Currency exchange facility | | |
| 0FFFDE000000000000000000000008005B | ug:GeneralStore | ug:Shop | - |
| | General store | | |
| 0FFFDE000000000000000000000008005C | ug:Hotel | ug:Facility | - |
| | Lodging facility | | |
| 0FFFDE000000000000000000000008005D | ug:IdPhotoMachine | ug:Facility | - |
| | ID photo booth | | |
| 0FFFDE000000000000000000000008005E | ug:Information | ug:Service | - |
| | Information desk | | |
| 0FFFDE000000000000000000000008005F | ug:LostAndFoundOffice | ug:Service | - |
| | Lost & found office | | |
| 0FFFDE0000000000000000000000080060 | ug:LotteryShop | ug:Banking | - |
| | Lottery stand | | |
| 0FFFDE0000000000000000000000080061 | ug:Monument | ug:Facility | - |
| | Attractions and monuments | | |
| 0FFFDE0000000000000000000000080062 | ug:NursingRoom | ug:Service | - |
| | Nursing mothers room | | |
| 0FFFDE0000000000000000000000080063 | ug:Phone | ug:HostSite | - |
| | Public telephone | | |
| 0FFFDE0000000000000000000000080064 | ug:Post | ug:PostOfifce | - |
| | Mailbox | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE00000000000000000000080065 | ug:RestRoomForBaby | ug:Room | - |
| | Baby break room | | |
| 0FFFDE00000000000000000000080066 | ug:SmokingArea | ug:Facility | - |
| | Smoking area | | |
| 0FFFDE00000000000000000000080067 | ug:Souvenirs | ug:Shop | - |
| | Souvenir store | | |
| 0FFFDE00000000000000000000080068 | ug:Takeout | ug:Restaurant | - |
| | Takeout restaurant | | |
| 0FFFDE00000000000000000000080069 | ug:TicketBooth | ug:Service | - |
| | Ticket office or booth | | |
| 0FFFDE0000000000000000000008006A | ug:TicketVendingMachine | ug:TicketBooth | - |
| | Ticket vending machine | | |
| 0FFFDE0000000000000000000008006B | ug:ToiletForDisabled | ug:Toilet | - |
| | Disabled restroom | | |
| 0FFFDE0000000000000000000008006C | ug:VendingMachine | ug:Shop, ug:HostSite | - |
| | Vending machine | | |
| 0FFFDE0000000000000000000008006D | ug:WaitingRoom | ug:Room | - |
| | Waiting room | | |
| 0FFFDE0000000000000000000008006E | ug:Feature | uc:SpatialThings | - |
| | Geographical feature | | |
| 0FFFDE0000000000000000000008006F | ug:GovernmentOffice | ug:Facility | - |
| | Government office or government building | | |
| 0FFFDE00000000000000000000080070 | ug:MinistryOffice | ug:GovernmentOffice | - |
| | Government agency | | |
| 0FFFDE00000000000000000000080071 | ug:PrefectureGovernmentOffice | ug:GovernmentOffice | - |
| | Prefectural government office | | |
| 0FFFDE00000000000000000000080072 | ug:CityGovernmentOffice | ug:GovernmentOffice | - |
| | City government office | | |
| 0FFFDE00000000000000000000080073 | ug:WardGovernmentOffice | ug:GovernmentOffice | - |
| | Ward government office | | |
| 0FFFDE00000000000000000000080074 | ug:BranchGovernmentOffice | ug:GovernmentOffice | - |
| | Branch office | | |
| 0FFFDE00000000000000000000080075 | ug:TownGovernmentOffice | ug:GovernmentOffice | - |
| | Town government office | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000080076 | ug:VillageGovernmentOffice | ug:GovernmentOffice | - |
| | Village government office | | |
| 0FFFDE0000000000000000000080077 | ug:Court | ug:PublicOffice | - |
| | Courthouse | | |
| 0FFFDE0000000000000000000080078 | ug:PublicHelthInstitute | ug:PublicOffice | - |
| | Public health center | | |
| 0FFFDE0000000000000000000080079 | ug:AdministrativeArea | ug:Region | - |
| | Administrative district | | |
| 0FFFDE000000000000000000008007A | ug:Prefecture | ug:AdministrativeArea | - |
| | Prefecture | | |
| 0FFFDE000000000000000000008007B | ug:City | ug:AdministrativeArea | - |
| | City | | |
| 0FFFDE000000000000000000008007C | ug:Ward | ug:AdministrativeArea | - |
| | Ward | | |
| 0FFFDE000000000000000000008007D | ug:Town | ug:AdministrativeArea | - |
| | Town | | |
| 0FFFDE000000000000000000008007E | ug:Village | ug:AdministrativeArea | - |
| | Village | | |
| 0FFFDE000000000000000000008007F | ug:RelligiousFacility | ug:Facility | - |
| | Religious facility | | |
| 0FFFDE0000000000000000000080080 | ug:Charch | ug:RelligiousFacility | - |
| | Church | | |
| 0FFFDE0000000000000000000080081 | ug:Shrine | ug:RelligiousFacility | - |
| | Shrine | | |
| 0FFFDE0000000000000000000080082 | ug:Temple | ug:RelligiousFacility | - |
| | Temple | | |
| 0FFFDE0000000000000000000080083 | ug:Mosque | ug:RelligiousFacility | - |
| | Mosque | | |
| 0FFFDE0000000000000000000080084 | ug:TransportRoute | ug:Transport | - |
| | Public transportation service route | | |
| 0FFFDE0000000000000000000080085 | ug:Stop | ug:Transport | - |
| | Transport station, stop, or pier | | |
| 0FFFDE0000000000000000000080086 | ug:Port | ug:Stop | - |
| | Port | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000080087 | ug:AirPort | ug:Stop | - |
| | Airport | | |
| 0FFFDE0000000000000000000080088 | ug:Transportation | ug:Feature | - |
| | Vehicle | | |
| 0FFFDE0000000000000000000080089 | ug:Train | ug:Transportation | - |
| | Train | | |
| 0FFFDE000000000000000000008008A | ug:Car | ug:Transportation | - |
| | Car (automobile) | | |
| 0FFFDE000000000000000000008008B | ug:Bicycle | ug:Transportation | - |
| | Bicycle | | |
| 0FFFDE000000000000000000008008C | ug:MotorCycle | ug:Transportation | - |
| | Motorcycle | | |
| 0FFFDE000000000000000000008008D | ug:Taxi | ug:Transportation | - |
| | Taxi | | |
| 0FFFDE000000000000000000008008E | ug:Bus | ug:Transportation | - |
| | Bus | | |
| 0FFFDE000000000000000000008008F | ug:Ship | ug:Transportation | - |
| | Ship | | |
| 0FFFDE0000000000000000000080090 | ug:Airplane | ug:Transportation | - |
| | Aircraft | | |
| 0FFFDE0000000000000000000080091 | ug:Road | ug:Facility | - |
| | Road | | |
| 0FFFDE0000000000000000000080092 | ug:Commerce | ug:Facility | - |
| | Commercial facility | | |
| 0FFFDE0000000000000000000080093 | ug:Mountain | ug:Feature | - |
| | Mountain | | |
| 0FFFDE0000000000000000000080094 | ug:Forest | ug:Feature | - |
| | Forest | | |
| 0FFFDE0000000000000000000080095 | ug:BambooForest | ug:Forest | - |
| | Bamboo forest | | |
| 0FFFDE0000000000000000000080096 | ug:BroadleafForest | ug:Forest | - |
| | Broadleaf forest | | |
| 0FFFDE0000000000000000000080097 | ug:ConiferForest | ug:Forest | - |
| | Coniferous forest | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000080098 | ug:Field | ug:Feature | - |
| | Agricultural field or other field | | |
| 0FFFDE0000000000000000000000080099 | ug:Paddy | ug:Field | - |
| | Paddy | | |
| 0FFFDE000000000000000000000008009A | ug:Cultivation | ug:Field | - |
| | Cultivated field | | |
| 0FFFDE000000000000000000000008009B | ug:Orchard | ug:Cultivation | - |
| | Fruit orchard | | |
| 0FFFDE000000000000000000000008009C | ug:TeaGarden | ug:Cultivation | - |
| | Tea plantation | | |
| 0FFFDE000000000000000000000008009D | ug:MulberryPlantation | ug:Cultivation | - |
| | Mulberry plantation | | |
| 0FFFDE000000000000000000000008009E | ug:Lake | ug:Feature | - |
| | Lake | | |
| 0FFFDE000000000000000000000008009F | ug:River | ug:Feature | - |
| | River | | |
| 0FFFDE00000000000000000000000800A0 | ug:Bridge | ug:Facility | - |
| | Bridge | | |
| 0FFFDE00000000000000000000000800A1 | ug:Residence | ug:Facility | - |
| | Residence | | |
| 0FFFDE00000000000000000000000800A2 | ug:House | ug:Residence | - |
| | House (detached home) | | |
| 0FFFDE00000000000000000000000800A3 | ug:ApartmentBuilding | ug:Residence | - |
| | Apartment building (as a whole) | | |
| 0FFFDE00000000000000000000000800A4 | ug:Apartment | ug:Residence | - |
| | Single dwelling unit in an apartment building | | |
| 0FFFDE00000000000000000000000800A5 | ug:Factory | ug:Facility | - |
| | Factory | | |
| 0FFFDE00000000000000000000000800A6 | ug:FuneralHall | ug:Facility | - |
| | Funeral parlor | | |
| 0FFFDE00000000000000000000000800A7 | ug:Cemetery | ug:Facility | - |
| | Cemetery | | |
| 0FFFDE00000000000000000000000800A8 | ug:University | ug:Education | - |
| | University | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000800A9 | ug:HighSchool | ug:Education | - |
| | High school | | |
| 0FFFDE0000000000000000000000800AA | ug:ProfessionalSchool | ug:Education | - |
| | Professional school | | |
| 0FFFDE0000000000000000000000800AB | ug:JuniorHighSchool | ug:Education | - |
| | Junior high school | | |
| 0FFFDE0000000000000000000000800AC | ug:ElementarySchool | ug:Education | - |
| | Elementary school | | |
| 0FFFDE0000000000000000000000800AD | ug:Nursery | ug:Education | - |
| | Kindergarten or nursery school | | |
| 0FFFDE0000000000000000000000800AE | ug:Library | ug:Education | - |
| | Library | | |
| 0FFFDE0000000000000000000000800AF | ug:Museum | ug:Education | - |
| | Museum | | |
| 0FFFDE0000000000000000000000800B0 | ug:ElderCardFacility | ug:Welfare | - |
| | Elder care facility | | |
| 0FFFDE0000000000000000000000800B1 | ug:PowerPlant | ug:Facility | - |
| | Power plant | | |
| 0FFFDE0000000000000000000000800B2 | ug:Lighthouse | ug:Facility | - |
| | Lighthouse | | |
| 0FFFDE0000000000000000000000800B3 | ug:Spa | ug:Facility | - |
| | Hot spring spa | | |
| 0FFFDE0000000000000000000000800B4 | ug:HistoricalSite | ug:Facility | - |
| | Historical site | | |
| 0FFFDE0000000000000000000000800B5 | ug:GeoJSONLiteral | - | - |
| | Literal in GeoJSON format | | |

Table C.15.2. List of properties of geospatial vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000088001 | ug:place | uc:relation | |
| | uc:SpatialThing | - | - |
| | Relationship for describing information related to geographic location of the entity | | |
| 0FFFDE0000000000000000000088002 | ug:iso6709 | ug:place | |
| | uc:SpatialThing | - | - |
| | Latitude and longitude represented according to extended ISO 6709 notation | | |
| 0FFFDE0000000000000000000088003 | ug:address | - | |
| | uc:SpatialThing | - | - |
| | Residence based on dwelling indication | | |
| 0FFFDE0000000000000000000088004 | ug:floor | - | |
| | uc:SpatialThing | - | - |
| | Floor number. First basement is -1, semi-underground level is -0.5, ground floor is 1, mezzanine is 1.5, etc. | | |
| 0FFFDE0000000000000000000088005 | ug:title | dc:title | |
| | uc:SpatialThing | - | - |
| | Proper name of a place or facility | | |
| 0FFFDE0000000000000000000088006 | ug:radius | - | |
| | uc:SpatialThing | - | - |
| | Radius of the error circle (or sphere) in meters | | |
| 0FFFDE0000000000000000000088007 | ug:linkTo | - | |
| | ug:Node | - | - |
| | Linked node entity | | |
| 0FFFDE0000000000000000000088008 | ug:sameAs | owl:sameAs | |
| | - | - | - |
| | Geographical feature is the same as the geographical feature of the object (correlating a ug:Link type entity to an entity that embodies the ug:linkTo relation). | | |
| 0FFFDE0000000000000000000088009 | ug:length | uc:length | |
| | - | - | - |
| | Length of link. The recommended unit for this value is meters. | | |
| 0FFFDE000000000000000000008800A | ug:direction | - | |
| | - | - | - |
| | Direction of link. The recommended unit for this value is degrees clockwise from N as 0. | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000008800B | ug:consistsOf | - | |
| | - | - | - |
| | Geographical feature contains the geographical feature of the object as a portion of itself. | | |
| 0FFFDE0000000000000000000000008800C | ug:belongsTo | - | |
| | - | - | - |
| | Geographical feature is a portion of the geographical feature of the object. | | |
| 0FFFDE0000000000000000000000008800D | ug:region | ug:place | |
| | - | - | - |
| | Geographical feature is in the scope indicated by the object. | | |
| 0FFFDE0000000000000000000000008800E | ug:countiguous | - | |
| | - | - | - |
| | Geographical feature is contiguous with the object. | | |
| 0FFFDE0000000000000000000000008800F | ug:crs | - | |
| | - | - | - |
| | Spatial reference system that provides the basis for the scope | | |
| 0FFFDE0000000000000000000000088010 | ug:postalCode | - | |
| | - | - | - |
| | Postal code | | |
| 0FFFDE0000000000000000000000088011 | ug:alternative | - | |
| | - | - | - |
| | Alternative geographical feature | | |
| 0FFFDE0000000000000000000000088012 | ug:type | rdf:type | |
| | - | - | - |
| | Type of geographical feature | | |
| 0FFFDE0000000000000000000000088013 | ug:alternativeName | - | |
| | - | - | - |
| | Alternative name of geographical feature | | |
| 0FFFDE0000000000000000000000088014 | ug:piLRS | - | |
| | - | - | - |
| | LRS for PI | | |
| 0FFFDE0000000000000000000000088015 | ug:piLocationType | - | |
| | - | - | - |
| | LRS location type | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000088016 | ug:from | - | |
| | - | - | - |
| | Starting point of spatial code indicating link node | | |
| 0FFFDE0000000000000000000088017 | ug:to | - | |
| | - | - | - |
| | Ending point of spatial code indicating link node | | |
| 0FFFDE0000000000000000000088018 | ug:forwardWeight | - | |
| | - | - | - |
| | Weighted cost in link forward direction | | |
| 0FFFDE0000000000000000000088019 | ug:backwardWeight | - | |
| | - | - | - |
| | Weighted cost in link backward direction | | |
| 0FFFDE000000000000000000008801A | ug:centroid | - | |
| | - | - | - |
| | Center of gravity of the area | | |
| 0FFFDE000000000000000000008801B | ug:depiction | - | |
| | - | - | - |
| | Photo, drawing, or other depiction of the geographical feature | | |
| 0FFFDE000000000000000000008801C | ug:registrant | - | |
| | - | - | - |
| | Registrant of geographical feature | | |
| 0FFFDE000000000000000000008801D | ug:locatedAt | uc:relation | |
| | uc:Entity | uc:SpatialThing | - |
| | Place where the subject is located or indicated | | |

## C.16. Place accessibility vocabulary

The vocabulary on the accessibility of places [10] is a vocabulary for describing the physical accessibility of points of interest. The namespace for this vocabulary is as follows.

http://uidcenter.org/vocab/ucr/spac#

Below, this namespace is indicated as "spac:".

Terms belonging to this vocabulary are as shown in Tables C.16.1 and C.16.2.

Table C.16.1. List of classes and instances of place accessibility vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000090001 | spac:Accessibility | - | - |
| | Spatial accessibility class of the geographical feature | | |
| 0FFFDE0000000000000000000090002 | spac:MoverType | - | - |
| | Class of user types | | |
| 0FFFDE0000000000000000000090003 | spac:Walker | spac:MoverType | - |
| | Pedestrian | | |
| 0FFFDE0000000000000000000090004 | spac:WheeledLuggage | spac:MoverType | - |
| | Wheeled luggage | | |
| 0FFFDE0000000000000000000090005 | spac:Aged | spac:MoverType | - |
| | Elderly person | | |
| 0FFFDE0000000000000000000090006 | spac:VisuallyHandicapped | spac:MoverType | - |
| | Person with visual impairment | | |
| 0FFFDE0000000000000000000090007 | spac:WheelChair | spac:MoverType | - |
| | Wheelchair | | |
| 0FFFDE0000000000000000000090008 | spac:GuideDog | spac:MoverType | - |
| | Guide dog | | |
| 0FFFDE0000000000000000000090009 | spac:WalkerForAgedPerson | spac:MoverType | - |
| | 4-wheel rolling walker | | |
| 0FFFDE000000000000000000009000A | spac:Perambulator | spac:MoverType | - |
| | Stroller | | |
| 0FFFDE000000000000000000009000B | spec:MobilityScooter | spac:MoverType | - |
| | Electric tricycle or electric cart | | |
| 0FFFDE000000000000000000009000C | spac:Assistant | ug:SpatialThings | - |
| | Class of things that improve spatial accessibility | | |
| 0FFFDE000000000000000000009000D | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Continuous tactile ground surface indicators | | |
| 0FFFDE000000000000000000009000E | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Discontinuous tactile ground surface indicators | | |
| 0FFFDE000000000000000000009000F | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Wheelchair-accessible facility | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000090010 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Visual impairment accessible facility | | |
| 0FFFDE0000000000000000000090011 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Wheelchair accessible telephone | | |
| 0FFFDE0000000000000000000090012 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Extended green light function | | |
| 0FFFDE0000000000000000000090013 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Pedestrian signal | | |
| 0FFFDE0000000000000000000090014 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Roof (rain shelter) | | |
| 0FFFDE0000000000000000000090015 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Wheelchair accessible fax machine | | |
| 0FFFDE0000000000000000000090016 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Audio signals for guidance | | |
| 0FFFDE0000000000000000000090017 | urn:ucode:_0FFFDE0000000000000000[illegible]tant | | - |
| | Attendant employed at facility | | |
| 0FFFDE0000000000000000000090018 | spac:Barrier | - | - |
| | Class of things that reduce spatial accessibility (barriers) | | |
| 0FFFDE0000000000000000000090019 | spac:Bump | spac:Barrier | - |
| | Step or bump | | |
| 0FFFDE000000000000000000009001A | spac:SmallBump | spac:Barrier | - |
| | Small step or bump | | |
| 0FFFDE000000000000000000009001B | spac:MiddleBump | spac:Barrier | - |
| | Medium step or bump | | |
| 0FFFDE000000000000000000009001C | spac:LargeBump | spac:Barrier | - |
| | Large step or bump | | |
| 0FFFDE000000000000000000009001D | spac:Motorway | spac:Barrier | - |
| | Roadway | | |
| 0FFFDE000000000000000000009001E | spac:Gutter | spac:Barrier | - |
| | Gutter | | |
| 0FFFDE000000000000000000009001F | spac:RailwayTrack | spac:Barrier | - |
| | Railway track | | |
| 0FFFDE0000000000000000000090020 | spac:Slope | - | - |
| | Ramp | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000090021 | urn:ucode:_0FFFDE0000000000000000spac0Slope | | - |
| | Ramp in direction of travel | | |
| 0FFFDE0000000000000000000090022 | urn:ucode:_0FFFDE0000000000000000spac0Slope | | - |
| | Ramp in transverse direction | | |
| 0FFFDE0000000000000000000090023 | spac:MeshedGutter | - | - |
| | Grate covered gutter | | |
| 0FFFDE0000000000000000000090024 | spac:Wall | spac:Barrier | - |
| | Wall | | |
| 0FFFDE0000000000000000000090025 | spac:Pole | spac:Barrier | - |
| | Utility pole | | |
| 0FFFDE0000000000000000000090026 | spac:BumpingPost | spac:Barrier | - |
| | Bollard | | |
| 0FFFDE0000000000000000000090027 | spac:OnStreetParking | spac:Barrier | - |
| | Car parked on the street | | |
| 0FFFDE0000000000000000000090028 | spac:OnStreetBicycleParking | spac:Barrier | - |
| | Bicycle parked on the street | | |

Table C.16.2. List of properties of place accessibility vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000098001 | spac:hasAccessibility | - | |
| | - | - | - |
| | Spatial accessibility of a geospatial feature | | |
| 0FFFDE0000000000000000000098002 | spac:user | - | |
| | - | - | - |
| | Target user type | | |
| 0FFFDE0000000000000000000098003 | spac:hasAssistant | - | |
| | - | - | - |
| | Geospatial feature has something that improves spatial accessibility | | |
| 0FFFDE0000000000000000000098004 | spac:hasBarrier | - | |
| | - | - | - |
| | Geospatial feature has something that reduces spatial accessibility (barrier) | | |
| 0FFFDE0000000000000000000098005 | spac:hasBoundaryBarrier? | - | |
| | - | - | - |
| | Barrier exists along the boundary of the geospatial feature | | |
| 0FFFDE0000000000000000000098006 | spac:hasLeftSideBarrier? | - | |
| | - | - | - |
| | Barrier exists along the left side of the geospatial feature | | |
| 0FFFDE0000000000000000000098007 | spac:hasRightSideBarrier? | - | |
| | - | - | - |
| | Barrier exists along the right side of the geospatial feature | | |
| 0FFFDE0000000000000000000098008 | spac:width | - | |
| | - | - | - |
| | Width of passage | | |
| 0FFFDE0000000000000000000098009 | spac:leftWidth | - | |
| | - | - | - |
| | Width to the left of center of the passage | | |
| 0FFFDE000000000000000000009800A | spac:rightWidth | - | |
| | - | - | - |
| | Width to the right of center of the passage | | |

## C.17. Unit system vocabulary

The unit system vocabulary is a vocabulary for describing physical quantities, monetary units, and so on. The namespace for this vocabulary is as follows.

http://uidcenter.org/vocab/ucr/uc#

Below, this namespace is indicated as "uc:". This is the same as in section C.13 (Vocabulary for basic classes and physical quantities of subject matter).

Terms belonging to this vocabulary are as shown in Tables C.17.1 and C.17.2.

Table C.17.1. List of classes and instances of unit system vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000000B | uc:Unit | uc:Concept | - |
| | Class of units | | |
| 0FFFDE0000000000000000000000000C | uc:PhycialAmountUnit | uc:Unit | - |
| | Class of physical amounts | | |
| 0FFFDE0000000000000000000000000D | uc:CurrencyUnit | uc:Unit | - |
| | Class of currency units | | |
| 0FFFDE0000000000000000000000000E | uc:Meters | uc:PhycialAmountUnit | - |
| | Meter unit | | |
| 0FFFDE0000000000000000000000000F | uc:Grams | uc:PhycialAmountUnit | - |
| | Gram unit | | |
| 0FFFDE00000000000000000000000010 | uc:Seconds | uc:PhycialAmountUnit | - |
| | Second unit | | |
| 0FFFDE00000000000000000000000011 | uc:Minutes | uc:PhycialAmountUnit | - |
| | Minute unit | | |
| 0FFFDE00000000000000000000000012 | uc:Hours | uc:PhycialAmountUnit | - |
| | Hour unit | | |
| 0FFFDE00000000000000000000000013 | uc:Days | uc:PhycialAmountUnit | - |
| | Day unit | | |
| 0FFFDE00000000000000000000000014 | uc:Months | uc:PhycialAmountUnit | - |
| | Month unit | | |
| 0FFFDE00000000000000000000000015 | uc:Years | uc:PhycialAmountUnit | - |
| | Year unit | | |
| 0FFFDE00000000000000000000000016 | uc:SquareMeter | uc:PhycialAmountUnit | - |
| | Square meter unit | | |
| 0FFFDE00000000000000000000000017 | uc:CubicMeters | uc:PhycialAmountUnit | - |
| | Cubic meter unit | | |
| 0FFFDE00000000000000000000000018 | uc:Ampere | uc:PhycialAmountUnit | - |
| | Ampere unit | | |
| 0FFFDE00000000000000000000000019 | uc:Volt | uc:PhycialAmountUnit | - |
| | Volt unit | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000001A | uc:Lux | uc:PhycialAmountUnit | - |
| | Lux unit | | |
| 0FFFDE0000000000000000000000001B | ucodegreeCelsius | uc:PhycialAmountUnit | - |
| | Degree Celsius unit | | |
| 0FFFDE0000000000000000000000001C | ucodegreeFahrenheit | uc:PhycialAmountUnit | - |
| | Degree Fahrenheit unit | | |
| 0FFFDE0000000000000000000000001D | uc:Percent | uc:PhycialAmountUnit | - |
| | Percent | | |
| 0FFFDE0000000000000000000000001E | uc:HectoPascal | uc:PhycialAmountUnit | - |
| | Hectopascal unit | | |
| 0FFFDE0000000000000000000000001F | uc:Shine | - | - |
| | Sunny | | |
| 0FFFDE00000000000000000000000020 | uc:Cloudy | - | - |
| | Cloudy | | |
| 0FFFDE00000000000000000000000021 | uc:Rain | - | - |
| | Rain | | |
| 0FFFDE00000000000000000000000022 | uc:Snow | - | - |
| | Snow | | |

Table C.17.2. List of properties of unit system vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000008014 | uc:unit | uc:relation | |
| | uc:Entity | - | - |
| | Unit | | |

## C.18. Event vocabulary

The event vocabulary is a vocabulary for describing events managed by the open data distribution platform. The namespace for this vocabulary is as follows.

http://uidcenter.org/vocab/ucr/event#

Below, this namespace is indicated as "ev:".

Terms belonging to this vocabulary are as shown in Tables C.18.1 and C.18.2.

Table C.18.1. List of classes and instances of event vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000130001 | ev:Event | - | - |
| | Class of events | | |
| 0FFFDE0000000000000000000130002 | ev:IssuedEvent | ev:Event | - |
| | Event of the target being issued | | |
| 0FFFDE0000000000000000000130003 | ev:ChangedEvent | ev:Event | - |
| | Event of the target being changed | | |
| 0FFFDE0000000000000000000130004 | ev:UpdatedEvent | ev:Event | - |
| | Event of target information being changed | | |
| 0FFFDE0000000000000000000130005 | ev:DisabledEvent | ev:Event | - |
| | Event of the target being extinguished | | |
| 0FFFDE0000000000000000000130006 | ev:ShippingEvent | ev:Event | - |
| | Shipping event | | |
| 0FFFDE0000000000000000000130007 | ev:DeliveryEvent | ev:Event | - |
| | Delivery event | | |
| 0FFFDE0000000000000000000130008 | ev:ArrivalEvent | ev:Event | - |
| | Arrival event | | |
| 0FFFDE0000000000000000000130009 | ev:DivisionEvent | ev:Event | - |
| | Cargo division (split) event | | |
| 0FFFDE000000000000000000013000A | ev:CombinationEvent | ev:Event | - |
| | Cargo combination event | | |
| 0FFFDE000000000000000000013000B | ev:TransactionEvent | ev:Event | - |
| | Transaction event | | |
| 0FFFDE000000000000000000013000C | ev:PurchaseEvent | ev:Event | - |
| | Purchase event | | |
| 0FFFDE000000000000000000013000D | ev:ReviewEvent | ev:Event | - |
| | Review (human evaluation) event | | |

Table C.18.2. List of properties of event vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000138001 | ev:type | rdf:type | |
| | - | - | - |
| | Event type | | |
| 0FFFDE0000000000000000000138002 | ev:abstract | dcterms:abstract | |
| | - | - | - |
| | Summary explanation of the event | | |
| 0FFFDE0000000000000000000138003 | ev:descritption | dc:description | |
| | - | - | - |
| | Explanation of the event | | |
| 0FFFDE0000000000000000000138004 | ev:place | ug:place | |
| | - | - | - |
| | Place of event occurrence | | |
| 0FFFDE0000000000000000000138005 | ev:startPlace | ev:place | |
| | - | - | - |
| | Place at the time when the event starts | | |
| 0FFFDE0000000000000000000138006 | ev:endPlace | ev:place | |
| | - | - | - |
| | Place at the time when the event ends | | |
| 0FFFDE0000000000000000000138007 | ev:owner | - | |
| | - | - | - |
| | Event owner (creator or manager) | | |
| 0FFFDE0000000000000000000138008 | ev:startOwner | ev:owner | |
| | - | - | - |
| | Owner at the time when the event starts | | |
| 0FFFDE0000000000000000000138009 | ev:endOwner | ev:owner | |
| | - | - | - |
| | Owner at the time when the event ends | | |
| 0FFFDE000000000000000000013800A | ev:date | dc:date | |
| | - | - | - |
| | Time and date of event occurrence | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000013800B | ev:startDate | ev:date | |
| | - | - | - |
| | Time and date when the event starts | | |
| 0FFFDE0000000000000000000013800C | ev:endDate | ev:date | |
| | - | - | - |
| | Time and date when the event ends | | |
| 0FFFDE0000000000000000000013800D | ev:target | - | |
| | - | - | - |
| | Target of the event | | |
| 0FFFDE0000000000000000000013800E | ev:source | ev:target | |
| | - | - | - |
| | Target at the time when the event starts | | |
| 0FFFDE0000000000000000000013800F | ev:destination | ev:target | |
| | - | - | - |
| | Target at the time when the event ends | | |
| 0FFFDE00000000000000000000138010 | ev:depiction | - | |
| | - | - | - |
| | Photo, audio, video, or other depiction of the event | | |
| 0FFFDE00000000000000000000138011 | ev:startDepiction | ev:depiction | |
| | - | - | - |
| | Depiction at the time when the event starts | | |
| 0FFFDE00000000000000000000138012 | ev:endDepiction | ev:depiction | |
| | - | - | - |
| | Depiction at the time when the event ends | | |
| 0FFFDE00000000000000000000138013 | ev:title | dc:title | |
| | - | - | - |
| | Name of the event | | |
| 0FFFDE00000000000000000000138014 | ev:comment | - | |
| | - | - | - |
| | Owner's comments concerning the event | | |

## C.19. Geographic information service vocabulary

The geographic information service vocabulary is a vocabulary for describing service information related to geospatial features and facilities. The namespace for this vocabulary is as follows.

http://uidcenter.org/vocab/ucr/ugsrv#

Below, this namespace is indicated as "ugsrv:".

Terms belonging to this vocabulary are as shown in Tables C.19.1 and C.19.2.

Table C.19.1. List of classes and instances of geographic information service vocabulary

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000B0001 | ugsrv:Abstract | - | - |
| | Class of summary information | | |
| 0FFFDE0000000000000000000B0002 | ugsrv:Description | - | - |
| | Class of explanatory information | | |
| 0FFFDE0000000000000000000B0003 | ugsrv:Permanent | - | - |
| | Class of basic information | | |
| 0FFFDE0000000000000000000B0004 | ugsrv:Temporary | - | - |
| | Class of temporary information | | |
| 0FFFDE0000000000000000000B0005 | ugsrv:Theme | - | - |
| | Class of themes | | |
| 0FFFDE0000000000000000000B0006 | ugsrv:SubTheme | - | - |
| | Class of subthemes | | |
| 0FFFDE0000000000000000000B0007 | ugsrv:Category | - | - |
| | Class of categories | | |
| 0FFFDE0000000000000000000B0008 | ugsrv:SubCategory | - | - |
| | Class of subcategories | | |

Table C.19.2. List of properties of geographic information service vocabulary

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000A8001 | ugsrv:keyword | - | |
| | - | - | - |
| | Key words | | |
| 0FFFDE0000000000000000000000A8002 | urn:ucode:_0FFFDE0000000000000000000000A8002 | | |
| | - | - | - |
| | Business days and regular holidays | | |
| 0FFFDE0000000000000000000000A8003 | ugsrv:closeDate | dc:date | |
| | - | - | - |
| | End date | | |
| 0FFFDE0000000000000000000000A8004 | ugsrv:openDate | dc:date | |
| | - | - | - |
| | Start date | | |
| 0FFFDE0000000000000000000000A8005 | ugsrv:price | - | |
| | - | - | - |
| | Fee | | |
| 0FFFDE0000000000000000000000A8007 | ugsrv:WOMURL | - | |
| | - | - | - |
| | Review URL | | |
| 0FFFDE0000000000000000000000A8008 | ugsrv:howToAccess | - | |
| | - | - | - |
| | Access method | | |
| 0FFFDE0000000000000000000000A8009 | ugsrv:address | ug:address | |
| | - | - | - |
| | Address | | |
| 0FFFDE0000000000000000000000A800A | ugsrv:zipcode | ug:zipcode | |
| | - | - | - |
| | Postal code | | |
| 0FFFDE0000000000000000000000A800B | ugsrv:email | - | |
| | - | - | - |
| | email | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000A800C | ugsrv:url | - | |
| | - | - | - |
| | URL | | |
| 0FFFDE0000000000000000000000A800D | ugsrv:fax | - | |
| | - | - | - |
| | Fax number | | |
| 0FFFDE0000000000000000000000A800E | ugsrv:tel | - | |
| | - | - | - |
| | Telephone number | | |
| 0FFFDE0000000000000000000000A800F | ugsrv:remark | - | |
| | - | - | - |
| | Remarks | | |
| 0FFFDE00000000000000000000000A8010 | ugsrv:addressKana | - | |
| | - | - | - |
| | Japanese phonetic spelling of address | | |
| 0FFFDE00000000000000000000000A8012 | ugsrv:goodsInfo | - | |
| | - | - | - |
| | Product information | | |
| 0FFFDE00000000000000000000000A8017 | ugsrv:nearStop | - | |
| | - | - | - |
| | Closest transport station or stop | | |
| 0FFFDE00000000000000000000000A8018 | ugsrv:serviceStartTime | - | |
| | - | - | - |
| | Service start time | | |
| 0FFFDE00000000000000000000000A8019 | ugsrv:serviceEndTime | - | |
| | - | - | - |
| | Service end time | | |
| 0FFFDE00000000000000000000000A801A | ugsrv:subCategoryName | - | |
| | - | - | - |
| | Subcategory name | | |
| 0FFFDE00000000000000000000000A8025 | ugsrv:imageURL | - | |
| | - | - | - |
| | URL of image file | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000A8026 | ugsrv:voiceURL | - | |
| | - | - | - |
| | URL of audio file | | |
| 0FFFDE0000000000000000000000A8027 | ugsrv:movieURL | - | |
| | - | - | - |
| | URL of video file | | |
| 0FFFDE0000000000000000000000A8029 | ugsrv:tagClass | - | |
| | - | - | - |
| | Type of tag | | |
| 0FFFDE0000000000000000000000A804E | ugsrv:lowerAge | - | |
| | - | - | - |
| | Minimum age for use | | |
| 0FFFDE0000000000000000000000A804F | ugsrv:upperAge | - | |
| | - | - | - |
| | Maximum age for use | | |
| 0FFFDE0000000000000000000000A8050 | ugsrv:min | - | |
| | - | - | - |
| | Minimum value | | |
| 0FFFDE0000000000000000000000A8051 | ugsrv:max | - | |
| | - | - | - |
| | Maximum value | | |
| 0FFFDE0000000000000000000000A8052 | ugsrv:categoryName | - | |
| | - | - | - |
| | Category name | | |
| 0FFFDE0000000000000000000000A8053 | ugsrv:hasTheme | - | |
| | - | - | - |
| | Theme to which the content belongs | | |
| 0FFFDE0000000000000000000000A8054 | ugsrv:hasCategory | - | |
| | - | - | - |
| | Category to which the content belongs | | |
| 0FFFDE0000000000000000000000A8055 | ugsrv:superTheme | - | |
| | - | - | - |
| | Upper-level theme of the subject | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000A8056 | ugsrv:superCategory | - | |
| | - | - | - |
| | Upper-level category of the subject | | |
| 0FFFDE0000000000000000000A8057 | ugsrv:distribution | - | |
| | - | - | - |
| | Distribution | | |
| 0FFFDE0000000000000000000A8058 | ugsrv:installationSource | - | |
| | - | - | - |
| | Source of installation | | |
| 0FFFDE0000000000000000000A8059 | ugsrv:installationYear | - | |
| | - | - | - |
| | Year of installation | | |
| 0FFFDE0000000000000000000A805A | ugsrv:workday | - | |
| | - | - | - |
| | Business days | | |
| 0FFFDE0000000000000000000A805B | ugsrv:holiday | - | |
| | - | - | - |
| | Closed days (regular holidays) | | |
| 0FFFDE0000000000000000000B8001 | ugsrv:automony | - | |
| | - | - | - |
| | Local government that manages the content | | |
| 0FFFDE0000000000000000000B8002 | ugsrv:chamber | - | |
| | - | - | - |
| | Association that manages the content | | |
| 0FFFDE0000000000000000000B8003 | ugsrv:couponURL | - | |
| | - | - | - |
| | Coupon URL | | |
| 0FFFDE0000000000000000000B8004 | ugsrv:siteTagUcode | - | |
| | - | - | - |
| | ucode of site tag | | |
| 0FFFDE0000000000000000000B8005 | ugsrv:QRucode | - | |
| | - | - | - |
| | QRucode of site tag | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000B8006 | ugsrv:RFIDucode | - | |
| | - | - | - |
| | RFIDucode of site tag | | |
| 0FFFDE0000000000000000000B8007 | ugsrv:siteTagSerial | - | |
| | - | - | - |
| | Serial number of site tag | | |
| 0FFFDE0000000000000000000B8008 | ugsrv:siateTagStatus | - | |
| | - | - | - |
| | Usage status of site tag | | |
| 0FFFDE0000000000000000000B8009 | ugsrv:siteTagChamber | - | |
| | - | - | - |
| | Association that manages the site tag | | |
| 0FFFDE0000000000000000000B800A | ugsrv:siteTagAutonomy | - | |
| | - | - | - |
| | Local government that manages the site tag | | |
| 0FFFDE0000000000000000000B800B | ugsrv:alternativeURL | - | |
| | - | - | - |
| | Alternative URL | | |
| 0FFFDE0000000000000000000B8101 | ugsrv:siteChamber | - | |
| | - | - | - |
| | Association that manages the site | | |
| 0FFFDE0000000000000000000B8102 | ugsrv:siteAutonomy | - | |
| | - | - | - |
| | Local government that manages the site | | |

## C.20. Vocabulary for products and goods

The namespace of the vocabulary for products and goods is as follows.

http://uidcenter.org/vocab/ucr/uobj#

Below, this namespace is indicated as "uobj:".

Terms belonging to this vocabulary are as shown in Tables C.20.1 and C.20.2.

Table C.20.1. List of classes and instances of vocabulary for products and goods

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE00000000000000000000D0001 | uobj:Product | - | - |
| | Class of products and goods | | |
| 0FFFDE00000000000000000000D0002 | uobj:Holder | - | - |
| | Manager (user) of equipment | | |
| 0FFFDE00000000000000000000D0003 | uobj:References | - | - |
| | Class of equipment reference materials | | |
| 0FFFDE00000000000000000000D0004 | uobj:IndustrialProduct | - | - |
| | Industrial product | | |
| 0FFFDE00000000000000000000D0005 | uobj:AgricaltualProduct | - | - |
| | Agricultural product | | |
| 0FFFDE00000000000000000000D0006 | uobj:AquaticProduct | - | - |
| | Marine product | | |
| 0FFFDE00000000000000000000D0007 | uobj:ForestProduct | - | - |
| | Forestry product | | |
| 0FFFDE00000000000000000000D0008 | uobj:TraditionalCraft | - | - |
| | Traditional craft | | |

Table C.20.2. List of properties of vocabulary for products and goods

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000D8001 | uobj:acquisitionDate | - | |
| | - | - | - |
| | Date acquired | | |
| 0FFFDE0000000000000000000D8002 | uobj:owner | - | |
| | - | - | - |
| | Owner (manager) | | |
| 0FFFDE0000000000000000000D8003 | uobj:depository | - | |
| | - | - | - |
| | Management location | | |
| 0FFFDE0000000000000000000D8004 | uobj:readPermitted | - | |
| | - | - | - |
| | Viewing of attributes (object) is permitted | | |
| 0FFFDE0000000000000000000D8005 | uobj:writePermitted | - | |
| | - | - | - |
| | Writing of attributes (object) is permitted | | |
| 0FFFDE0000000000000000000D8006 | uobj:jancode | - | |
| | - | - | - |
| | JAN code of the equipment is to be integrated into dc:identifier | | |
| 0FFFDE0000000000000000000D8007 | uobj:administrator | - | |
| | - | - | - |
| | Person responsible for management of the equipment | | |
| 0FFFDE0000000000000000000D8008 | uobj:numofPrinted | - | |
| | - | - | - |
| | Number of times the equipment label has been printed | | |
| 0FFFDE0000000000000000000D8009 | uobj:identifier | - | |
| | - | - | - |
| | Management number of product or goods | | |
| 0FFFDE0000000000000000000D800A | uobj:title | - | |
| | - | - | - |
| | Name of product or goods | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000D800B | uobj:abstract | - | |
| | - | - | - |
| | Summary explanation of product or goods | | |
| 0FFFDE0000000000000000000000D800C | uobj:description | - | |
| | - | - | - |
| | Detailed explanation of product or goods | | |
| 0FFFDE0000000000000000000000D800D | uobj:manual | - | |
| | - | - | - |
| | Link to instructions for product or goods | | |
| 0FFFDE0000000000000000000000D800E | uobj:level | - | |
| | - | - | - |
| | Level | | |
| 0FFFDE0000000000000000000000D800F | uobj:procuder | - | |
| | - | - | - |
| | Producer | | |
| 0FFFDE00000000000000000000D8010 | uobj:producedDate | - | |
| | - | - | - |
| | Date when produced | | |
| 0FFFDE00000000000000000000D8011 | uobj:producedPlace | - | |
| | - | - | - |
| | Place where produced | | |
| 0FFFDE00000000000000000000D8012 | uobj:type | - | |
| | - | - | - |
| | Type of product or goods | | |
| 0FFFDE00000000000000000000D8013 | uobj:acquisitionPlace | - | |
| | - | - | - |
| | Place acquired (place of purchase) | | |
| 0FFFDE00000000000000000000D8014 | uobj:expireDate | - | |
| | - | - | - |
| | Expiration date (use by date, etc.) | | |
| 0FFFDE00000000000000000000D8015 | uobj:size | - | |
| | - | - | - |
| | Size | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000D8016 | uobj:isPartOf | - | |
| | - | - | - |
| | Subject is contained in object (inside it) | | |
| 0FFFDE0000000000000000000000D8017 | uobj:hasPart | - | |
| | - | - | - |
| | Subject contains object | | |

## C.21. Vocabulary for transactions

The namespace of the vocabulary for transactions is as follows.

http://uidcenter.org/ucr/vocab/trans#

Below, this namespace is indicated as "trans:".

Terms belonging to this vocabulary are as shown in Tables C.21.1 and C.21.2.

Table C.21.1. List of classes and instances of vocabulary for transactions

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000C0001 | trans:Transaction | - | - |
| | Class of transactions | | |
| 0FFFDE0000000000000000000000C0002 | trans:Receipt | - | - |
| | Class of receipts | | |
| 0FFFDE0000000000000000000000C0003 | trans:TransactionUnit | - | - |
| | Class of transaction units (subset of the class of transactions) | | |

Table C.21.2. List of properties of vocabulary for transactions

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000C803E | trans:creditor | - | |
| | - | - | - |
| | Creditor of transaction | | |
| 0FFFDE0000000000000000000000C803F | trans:debtor | - | |
| | - | - | - |
| | Debtor of transaction | | |
| 0FFFDE0000000000000000000000C8040 | trans:priceUnit | - | |
| | - | - | - |
| | Price unit | | |
| 0FFFDE0000000000000000000000C8041 | trans:address | - | |
| | - | - | - |
| | Addressee (not address) of receipt | | |
| 0FFFDE0000000000000000000000C8042 | trans:shopName | - | |
| | - | - | - |
| | Name of store | | |
| 0FFFDE0000000000000000000000C8043 | trans:shopAddr | - | |
| | - | - | - |
| | Address of store | | |
| 0FFFDE0000000000000000000000C8044 | trans:shopTel | - | |
| | - | - | - |
| | Telephone number of store | | |
| 0FFFDE0000000000000000000000C8045 | trans:signature | uc:sign | |
| | - | - | - |
| | ucode signature | | |
| 0FFFDE0000000000000000000000C8046 | trans:isStraight | - | |
| | - | - | - |
| | Settlement complete flag | | |
| 0FFFDE0000000000000000000000C8047 | trans:references | - | |
| | - | - | - |
| | Reference transaction | | |

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000C8048 | trans:before | - | |
| | - | - | - |
| | Receipt before division | | |
| 0FFFDE0000000000000000000000C8049 | trans:after | - | |
| | - | - | - |
| | Receipt after division | | |
| 0FFFDE0000000000000000000000C804E | trans:date | dc:date | |
| | - | - | - |
| | Time and date when transaction occurred | | |

## C.22. Vocabulary for basic attributes of pharmaceutical products

The vocabulary for the basic attributes of pharmaceutical products is a vocabulary for describing information related to pharmaceutical products. Categories of pharmaceutical products are based on *The Japanese Pharmacopoeia, Sixteenth Edition* [53]. Some commonly used category names have also been added. The namespace for this vocabulary is as follows.

http://uidcenter.org/vocab/ucr/med#

Below, this namespace is indicated as "med:".

Terms belonging to this vocabulary are as shown in Tables C.22.1 and C.22.2.

Table C.22.1. List of classes and instances of vocabulary for basic attributes of pharmaceutical products

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000F0001 | med:Medicine | uobj:Product | - |
| | Pharmaceutical product | | |
| 0FFFDE0000000000000000000F0004 | med:Prescription | med:Medicine | - |
| | Prescription medication (pharmaceutical product requiring a prescription) | | |
| 0FFFDE0000000000000000000F0005 | med:OTC | med:Medicine | - |
| | Over-the-counter pharmaceutical product | | |
| 0FFFDE0000000000000000000F0006 | med:OralMedicine | med:Medicine | med:PreparationsForOralAdministration |
| | Oral medication | | |
| 0FFFDE0000000000000000000F0007 | med:Injections | med:PreparationsForInjection | - |
| | Medication for injection | | |
| 0FFFDE0000000000000000000F0008 | med:ExternalMedicine | med:Medicine | - |
| | Medication for external use | | |
| 0FFFDE0000000000000000000F0009 | med:AgentsForEpidermis | med:Medicine | med:PreparationsForCutaneousApplication |
| | Dermatological medication | | |
| 0FFFDE0000000000000000000F000A | med:Ointments | med:PreparationsForCutaneousApplication | |
| | Ointment or liniment | | |
| 0FFFDE0000000000000000000F000B | med:Patchs | med:AgentsForEpidermis | - |
| | Patch | | |
| 0FFFDE0000000000000000000F000C | med:Aerosols | med:SpraysForCataneousApplication | med:AerosolsForCataneousApplication |
| | Topical aerosol | | |
| 0FFFDE0000000000000000000F000D | med:EyeDrops | med:PreparatinsForOphthalmicApplication | med:OphthalmicPreparations |
| | Eye drops | | |
| 0FFFDE0000000000000000000F000E | med:NoseDrops | med:ExternalMedicine | med:NasalPreparations |
| | Nasal drops | | |
| 0FFFDE0000000000000000000F000F | med:OralMucosalMedicine | med:Medicine | med:PreparationsForOromucosalApplication |
| | Oral cavity medication | | |
| 0FFFDE0000000000000000000F0010 | med:Mouthwash | med:PreparationsForOromucosalApplication | med:PreparationsForGargles |
| | Mouthwash | | |
| 0FFFDE0000000000000000000F0011 | med:MistMedicine | med:PreparationsForOromucosalApplication | med:SpraysForOromucosalApplication |
| | Spray medication | | |
| | med:Suppository | med:PreparationsForRectalApplication | med:SuppositoriesForRectalApplication |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| ~~0FFFDE0000000000000000000000F0012~~ | Meaning | | |
| | Suppository | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000F0013 | med:InfusionOintment | med:SemisolidPreparstionsForRectalApplication | - |
| | Ointment for rectal infusion | | |
| 0FFFDE0000000000000000000000F0014 | med:Enema | med:EnemasForRectalApplication | - |
| | Enema | | |
| 0FFFDE0000000000000000000000F0015 | med:PreparationsForOralAdministrationMedicine | - | |
| | Preparation for oral administration | | |
| 0FFFDE0000000000000000000000F0016 | med:Tablets | med:PreparationsForOralAdministration | |
| | Tablet | | |
| 0FFFDE0000000000000000000000F0017 | med:OrodispersibleTablets | med:Tablet | - |
| | Orally disintegrating tablet | | |
| 0FFFDE0000000000000000000000F0018 | med:ChewableTablets | med:Tablet | - |
| | Chewable tablet | | |
| 0FFFDE0000000000000000000000F0019 | med:EffervescentTablets | med:Tablet | - |
| | Effervescent tablet | | |
| 0FFFDE0000000000000000000000F001A | med:DispersibleTablets | med:Tablet | - |
| | Dispersible tablet | | |
| 0FFFDE0000000000000000000000F001B | med:SolubleTablets | med:Tablet | - |
| | Soluble tablet | | |
| 0FFFDE0000000000000000000000F001C | med:Capsules | med:PreparationsForOralAdministration | |
| | Capsule | | |
| 0FFFDE0000000000000000000000F001D | med:Granules | med:PreparationsForOralAdministration | |
| | Granules | | |
| 0FFFDE0000000000000000000000F001E | med:EffervescentGranules | med:Granules | - |
| | Effervescent granules | | |
| 0FFFDE0000000000000000000000F001F | med:Powders | med:PreparationsForOralAdministration | |
| | Powder | | |
| 0FFFDE0000000000000000000000F0020 | med:LiquidsAndSolutionsForOralAdministPreparationsForOralAdministration | | |
| | Oral liquid | | |
| 0FFFDE0000000000000000000000F0021 | med:Elixirs | med:LiquidsAndSolutionsForOralAdministation | |
| | Elixir | | |
| 0FFFDE0000000000000000000000F0022 | med:Suspension | med:LiquidsAndSolutionsForOralAdministation | |
| | Suspension | | |
| 0FFFDE0000000000000000000000F0023 | med:Emulsions | med:LiquidsAndSolutionsForOralAdministation | |
| | Emulsion | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000F0024 | med:Lemonades | med:LiquidsAndSolutionsForOralAdministation | - |
| | "Lemonade" (sweet, tart, clear drink) preparation | | |
| 0FFFDE0000000000000000000000F0025 | med:Syrups | med:OralMedicine | - |
| | Syrup | | |
| 0FFFDE0000000000000000000000F0026 | med:PreparationsForSyrup | med:Syrups | - |
| | Preparation for syrup | | |
| 0FFFDE0000000000000000000000F0027 | med:JelliesForOralAdministration | med:OralMedicine | - |
| | Gel for oral administration | | |
| 0FFFDE0000000000000000000000F0028 | med:PreparationsForOromucosalApplication | med:Medicine | - |
| | Preparation for application in the oral cavity | | |
| 0FFFDE0000000000000000000000F0029 | med:TabletsForOromucosalApplication | med:PreparationsForOromucosalApplication | - |
| | Tablet for use in the oral cavity | | |
| 0FFFDE0000000000000000000000F002A | med:Troches | med:TabletsForOromucosalApplication | - |
| | Lozenge | | |
| 0FFFDE0000000000000000000000F002B | med:SublingualTablets | med:TabletsForOromucosalApplication | - |
| | Sublingual tablet | | |
| 0FFFDE0000000000000000000000F002C | med:BuccalTablets | med:TabletsForOromucosalApplication | - |
| | Buccal tablet | | |
| 0FFFDE0000000000000000000000F002D | med:MucoadhesiveTablets | med:TabletsForOromucosalApplication | - |
| | Mucoadhesive tablet | | |
| 0FFFDE0000000000000000000000F002E | med:MedicatedChewingGums | med:TabletsForOromucosalApplication | - |
| | Chewing gum | | |
| 0FFFDE0000000000000000000000F002F | med:SpraysForOromucosalApplication | med:PreparationsForOromucosalApplication | - |
| | Spray for use in the oral cavity | | |
| 0FFFDE0000000000000000000000F0030 | med:SemisolidPreparationdForOromucosalApplications | med:PreparationsForOromucosalApplication | - |
| | Semisolid application for use in the oral cavity | | |
| 0FFFDE0000000000000000000000F0031 | med:PreparationsForGargles | med:PreparationsForOromucosalApplication | - |
| | Oral rinse | | |
| 0FFFDE0000000000000000000000F0032 | med:PreparationsForInjection | med:Medicine | - |
| | Preparation for administration by injection | | |
| 0FFFDE0000000000000000000000F0033 | med:ParenteralInfusions | med:PreparationsForInjection | - |
| | Infusion solution | | |
| 0FFFDE0000000000000000000000F0034 | med:Implants | med:PreparationsForInjection | - |
| | Injectable implant preparation | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000F0035 | med:ProlongedReleaseInjections | med:PreparationsForInjection | - |
| | Sustained-delivery injection | | |
| 0FFFDE0000000000000000000000F0036 | med:PreparationsForDialysis | med:Medicine | - |
| | Preparation for dialysis | | |
| 0FFFDE0000000000000000000000F0037 | med:DialysisAgents | med:PreparationsForDialysis | - |
| | Dialysis agents | | |
| 0FFFDE0000000000000000000000F0038 | med:PeritonealDialysisAgents | med:DialysisAgents | - |
| | Peritoneal dialysis agents | | |
| 0FFFDE0000000000000000000000F0039 | med:HemodialysisAgents | med:DialysisAgents | - |
| | Hemodialysis agents | | |
| 0FFFDE0000000000000000000000F003A | med:PreparationsForInhalation | med:Medicine | - |
| | Preparation for bronchial and lung inhalation | | |
| 0FFFDE0000000000000000000000F003B | med:Inhalations | med:PreparationsForInhalation | - |
| | Inhalant | | |
| 0FFFDE0000000000000000000000F003C | med:DryPowderInhalers | med:Inhalations | - |
| | Insufflation powder | | |
| 0FFFDE0000000000000000000000F003D | med:InhalationSolutions | med:Inhalations | - |
| | Liquid inhalant | | |
| 0FFFDE0000000000000000000000F003E | med:MeteredDoseInhalers | med:Inhalations | - |
| | Aerosol inhalant | | |
| 0FFFDE0000000000000000000000F003F | med:PreparationsForOphthalmicApplication | med:Medicine | - |
| | Preparation for ophthalmic application | | |
| 0FFFDE0000000000000000000000F0040 | med:OphthalmicPreparations | med:PreparationsForOphthalmicApplication | - |
| | Ophthalmic preparation | | |
| 0FFFDE0000000000000000000000F0041 | med:OphthalmicOnitments | med:PreparationsForOphthalmicApplication | - |
| | Ophthalmic ointment | | |
| 0FFFDE0000000000000000000000F0042 | med:PreparationsForOticApplication | med:Medicine | - |
| | Preparation for application in the ear | | |
| 0FFFDE0000000000000000000000F0043 | med:EarPreparations | med:PreparationsForOticApplication | - |
| | Ear drops | | |
| 0FFFDE0000000000000000000000F0044 | med:PreparationsForNasalApplication | med:Medicine | - |
| | Preparation for nasal application | | |
| 0FFFDE0000000000000000000000F0045 | med:NasalPreparations | med:PreparationsForNasalApplication | - |
| | Nasal drops | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000000F0046 | med:NasalDryPowderInhalers | med:NasalPreparations | - |
| | Nasal powder | | |
| 0FFFDE0000000000000000000000F0047 | med:NasalSolutions | med:NasalPreparations | - |
| | Nasal solution | | |
| 0FFFDE0000000000000000000000F0048 | med:PreparationsForRectalApplication | med:Medicine | - |
| | Preparation for rectal application | | |
| 0FFFDE0000000000000000000000F0049 | med:SuppositoriesForRectalApplication | med:PreparationsForRectalApplication | - |
| | Suppository | | |
| 0FFFDE0000000000000000000000F004A | med:SemisolidPreparstionsForRectalApplication | med:PreparationsForRectalApplication | - |
| | Semisolid preparation for rectal application | | |
| 0FFFDE0000000000000000000000F004B | med:EnemasForRectalApplication | med:PreparationsForRectalApplication | - |
| | Enema | | |
| 0FFFDE0000000000000000000000F004C | med:PreparationsForVaginlApplication | med:Medicine | - |
| | Preparation for vaginal application | | |
| 0FFFDE0000000000000000000000F004D | med:TabletsForVaginalsUse | med:EnemasForRectalApplication | - |
| | Vaginal tablet | | |
| 0FFFDE0000000000000000000000F004E | med:SuppositoriesForVaginalUse | med:EnemasForRectalApplication | - |
| | Vaginal suppository | | |
| 0FFFDE0000000000000000000000F004F | med:PreparationsForCutaneousApplication | med:Medicine | - |
| | Preparation for cutaneous application | | |
| 0FFFDE0000000000000000000000F0050 | med:SolidDosageFormsForCataneousApplication | med:PreparationsForCutaneousApplication | - |
| | Solid preparation for external use | | |
| 0FFFDE0000000000000000000000F0051 | med:PowdersForCataneousApplication | med:SolidDosageFormsForCataneousApplication | - |
| | Powder for external use | | |
| 0FFFDE0000000000000000000000F0052 | med:LiquidsAndSolutionsForCataneousAdministation | med:PreparationsForCutaneousApplication | - |
| | Liquid preparation for external use | | |
| 0FFFDE0000000000000000000000F0053 | med:Liniments | med:LiquidsAndSolutionsForCataneousAdinistation | - |
| | Liniment | | |
| 0FFFDE0000000000000000000000F0054 | med:Lotions | med:LiquidsAndSolutionsForCataneousAdinistation | - |
| | Lotion | | |
| 0FFFDE0000000000000000000000F0055 | med:SpraysForCataneousApplication | med:PreparationsForCutaneousApplication | - |
| | Spray | | |
| 0FFFDE0000000000000000000000F0056 | med:AerosolsForCataneousApplication | med:SpraysForCataneousApplication | - |
| | Aerosol for external use | | |

| ucode | alias URI | rdfs:subClassOf | owl:sameAs |
|---|---|---|---|
| | Meaning | | |
| 0FFFDE0000000000000000000F0057 | med:PumpSpraysForCataneousApplication | med:SpraysForCataneousApplication | - |
| | Pump spray | | |
| 0FFFDE0000000000000000000F0058 | med:Creams | med:PreparationsForCutaneousApplication | - |
| | Cream | | |
| 0FFFDE0000000000000000000F0059 | med:Gels | med:PreparationsForCutaneousApplication | - |
| | Gel | | |
| 0FFFDE0000000000000000000F005A | med:Tapes | med:Patches | - |
| | Tape | | |
| 0FFFDE0000000000000000000F005B | med:GelPatches | med:Patches | - |
| | Patch | | |

Table C.22.2. List of properties of vocabulary for basic attributes of pharmaceutical products

| ucode | alias URI | rdfs:subPropertyOf | |
|---|---|---|---|
| | rdfs:domain | rdfs:range | owl:sameAs |
| | Meaning | | |
| 0FFFDE0000000000000000000000F8001 | med:consistsOf | uc:relation | |
| | med:Medicine | med:Medicine | - |
| | Subject has object as an ingredient | | |
| 0FFFDE0000000000000000000000F800A | med:label | uobj:title | |
| | med:Medicine | xsd:String | - |
| | Name of a medicine | | |
| 0FFFDE0000000000000000000000F800B | med:drugCode | uc:relation | |
| | med:Medicine | xsd:String | - |
| | Individual pharmaceutical product code (registration code) | | |
| 0FFFDE0000000000000000000000F800C | med:janCode | uc:relation | |
| | med:Medicine | xsd:String | - |
| | JAN code (product code) | | |
| 0FFFDE0000000000000000000000F800D | med:type | rdf:type | |
| | med:Medicine | - | - |
| | Type of medicine | | |
| 0FFFDE0000000000000000000000F800E | med:receives | uc:relation | |
| | uc:RealEntity | med:Medicine | - |
| | Subject is given the pharmaceutical product of object | | |
| 0FFFDE0000000000000000000000F800F | med:description | dc:description | |
| | med:Medicine | xsd:String | - |
| | Explanation of medicine (package insert) | | |
| 0FFFDE0000000000000000000000F8010 | med:comment | rdfs:comment | |
| | med:Medicine | xsd:String | - |
| | Supplementary explanations and comments about the medicine | | |