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| Input contributionUse case |
| Use Case Title:\* | Use cases for semantic query/discovrey based on automatic ontology mapping |
| Group Name:\* | REQ & MAS |
| Source:\* | Huawei, China Mobile |
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| Date:\* | 2018-07-04 |
| Abstract:\* | Propose to add the use case illustrates that, oneM2M system need to realize comprehensive and accurate semantic query/discovery in multi-ontologies scenarios based on automatic ontology mapping. |
| Agenda Item:\* |  |
| Work item(s): | WI 0015 - oneM2M Use Case Continuation |
| Document(s) Impacted\* | Technical Specification TR 0001 - oneM2M Use Case Technical Report |
| Intended purpose ofdocument:\* | [x]  Decision[ ]  Discussion[ ]  Information[ ]  Other <specify> |
| Decision requested or recommendation:\* | Approval of the Use Case |

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## 8.x Semantic query/discovery based on automatic ontology mapping

### 8.x.1 Description

Semantic descriptions in the oneM2M system can be annotated in heterogeneous ontologies given the data and knowledge can be generated from different domains and stakeholders. In many cases, heterogeneous ontologies may have common/similar concepts that are mappable (linked) between each other. Such mapping relationship is useful to get a more comprehensive result of semantic query/discovery. For example, the oneM2M system can return the semantic instances of both “Ontology-A:light” and “Ontology-B:lamp” for someone querying for a generic “light” device.

Automatic ontology mapping (described in clause 8.y) is to find the mapping relationships between different ontologies to reuse ontologies.

After completing the automated ontology mapping, the semantic query/discovery process can leverage the mapping knowledge to generate a more complete and accurate results.

### 8.x.2 Source

Huawei

### 8.x.3 Actors

* Application: the user who wants to do semantic query/discovery across heterogeneous ontologies.
* oneM2M Platform: an oneM2M CSE that supports semantic query/discovery based on ontology mapping.

### 8.x.4 Pre-conditions

* The oneM2M System stores semantic description of resources annotated in different ontologies (e.g. A & B).
* The ontology mapping results are saved and managed in the oneM2M System as a resource.

### 8.x.5 Triggers

The application issues a semantic query/discovery request to the oneM2M platform indicating the use of automatic ontology mapping.

### 8.x.6 Normal Flow

 The normal message flow is described as follows:

Application

Platform

1. request semantic query/discovery with ontology mapping

4. return query/discovery results

2 retrieve mapping results of ontology A and ontology B

3. perform query/discovery based on the ontology mapping results

Figure 8.x.6-1: Message flow for semantic query/discovery supported with automatic ontology mapping

1. An application sends a semantic query/discovery request to the oneM2M platform to query/discovery the semantic description of certain resources. The semantic query/discovery request contains semantic filter criteria described in ontology A, but also indicates that equivalent (or related) semantic description annotated in ontology B should be returned.
2. After receiving the query/discovery request, the oneM2M platform first retrieves mapping results of ontology A and ontology B.
3. The oneM2M platform then performs the semantic query/discovery combing the knowledge of the mapping results between ontology A and ontology B. This may be done by converting the semantic filter criteria or the target semantic descriptions according to the ontology mapping results.
4. The oneM2M platform returns the query/discovery results, which contains the matching semantic descriptions annotated in both ontology A and B, to the application

### 8.x.7 Alternative Flow

None.

### 8.x.8 Post-conditions

None.

### 8.x.9 High Level Illustration

None.

### 8.x.10 Potential requirements

1. The oneM2M system shall be able to support semantic query and discovery across heterogeneous ontologies including the support of automatic ontology mapping.