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# Introduction

This contribution introduces a solution to handle license management.

There exist multiple ways to support data license management.

This solution provides a simple way to share open dataset with well-known data license scheme.

Comments from SDS-2021-0125R01:

* Do not bind with access control policy
* Role of owner of data license attributes..

### -----------------------Start of change 2-------------------------------------------

# 8 Proposed Solutions

*Editor’s Note: The section provides solutions to the required functions identified in the previous section.*

## 8.1 Solution: Key Issue 1 – License for Linked Open Data

*Editor’s Note: Each Solution section references one or more key issues identified in the previous section. A proposed solution needs to describe how the associated key issue(s) can be resolved.*

As the Semantic Web and Linked of Open Data (LoD) show improved data connectivity, scalability, and data discovery, there is a movement to use these technologies to the open data available on IoT platforms used in smart cities.

In order to build LoD, an application needs to know which data in IoT platforms can be freely used, re-used and redistributed under which license. Depending on the license, a way to use and manage data should be different. Here are different types of data license that widely available and used in data management.

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Typically the license scheme of an open dataset is distributed as a written text on the website describing the license scheme of the dataset. For example, a written text can be “This open dataset is released under CC BY-ND”. The user of the dataset downloads it and acknowledges the use of the dataset through adding the same text in their website or annotating the same license scheme to the dataset.

At the moment, oneM2M has Access Control Policy (ACP) to control the access of oneM2M data. However, ACP only checks the access right of a target resource. There is no way to check the license of data and control data usage based on the given license. For oneM2M to support an LoD application to discover open IoT data under a specific license, it is necessary to add information about data license to data stored in oneM2M systems.

With such additional information, it is possible to support the following use cases in oneM2M:

1. In order to make linked IoT data (linking IoT data to other relevant IoT data), one of the essential criteria is to retrieve open data only under CC-BY or CC0 licenses. Therefore, an IoT application linking relevant IoT data should be able to retrieve IoT data under CC-BY or CC0 licenses.
2. Whenever IoT data under CC-BY SA is transferred to another platform to be used for other purposes or based on service level agreement between IoT platform service providers, the same license should be applied at the target IoT platform based on the law. In this case, the creator of the data should be the same, as the original resource as the creator has to be credited based on the law.

In some cases the owner and the creator of the dataset are also mentioned in the license scheme. Therefore, it is proposed to add the dataLicense, dataOwner and dataCreator attributes to oneM2M resources. If a group of data need to be processed under the same data license, the proposed attributes can be added to the group resource.

Table 8.1-1: A common attribute for License

| Attribute Name | Description |
| --- | --- |
| *accessControlPolicyIDs* | The attribute contains a list of identifiers for *<accessControlPolicy>* resources. The privileges defined in the *<accessControlPolicy>* resources that are referenced determine who is allowed to access the resource containing this attribute for a specific purpose (e.g. Retrieve, Update, Delete, etc.).  For an Update or Delete operation to a resource, the update or delete of the *accessControlPolicyIDs* attribute, if applicable, shall be performed prior to the update or delete of any other attributes of the resource.  To update this attribute, a Hosting CSE shall check whether an Originator has Update privilege in any *selfPrivileges,* regardless of *privileges,* of the *<accessControlPolicy>* resources which this attribute originally references.  After successful update of the *accessControlPolicyIDs* attribute, resource access checking for other attributes to be updated shall use the new *privileges* defined in the <*accessControlPolicy*> resource(s) that are referenced by the newly updated *accessControlPolicyIDs* attribute.  Similarly, to delete this attribute, a Hosting CSE shall check whether an Originator has Updateprivilege in any *selfPrivileges,* regardless of *privileges*, of the *<accessControlPolicy>* resources which this attribute originally references.  After successful deletion of the *accessControlPolicyIDs* attribute, resource access checking for other attributes to be deleted shall use the default access privileges as described in the following paragraphs.  If a resource type does not have an *accessControlPolicyIDs* attribute definition, then the *accessControlPolicyIDs* for that resource is governed in a different way, for example, the *accessControlPolicy* associated with the parent may apply to a child resource that does not have an *accessControlPolicyIDs* attribute definition, or the privileges for access are fixed by the system. Refer to the corresponding resource type definitions and procedures to see how access control is handled in such cases.  If a resource type does have an *accessControlPolicyIDs* attribute definition, but the (optional) *accessControlPolicyIDs* attribute value is not set in a resource instance, then the Hosting CSE shall apply the concept of the default access policy. The default policy shall provide unrestricted access only to the Originator of the successful resource creation request. All other entities shall be denied to access the resource. For that purpose, the Hosting CSE shall keep that Originator information of the resource. Note that how to keep that information is implementation specific. The default access policy is not applied to a resource which has a value assigned to the a*ccessControlPolicyIDs* attribute.  All resources are accessible if and only if the privileges (i.e. configured as *privileges* or *selfPrivileges* attribute of <accessControlPolicy> resource) allow it, therefore all resources shall have an associated *accessControlPolicyIDs* attribute, either explicitly (setting the attribute in the resource itself) or implicitly (either by using the parent privileges or the system default policies). Which means that the system shall provide default access privileges in case that the Originator does not provide a specific *accessControlPolicyIDs* during the creation of the resource. |
| *dataLicense* | This attribute contains the license information about the data stored in the resource.  The value of this attribute indicates which data license is applied to the referring resource and can have the following:   * CC-BY: This license lets others distribute, remix, tweak, and build upon specified resource(s), even commercially, as long as they credit the owner of resource(s) for the original creation. * CC-BY-SA: This license lets others remix, tweak, and build upon specified resource(s) work even for commercial purposes, as long as they credit the owner of resource(s) and license their new creations under the identical terms. * CC-BY-ND: This license lets others reuse the specified resource for any purpose, including commercially; however, it cannot be shared with others in adapted form, and credit must be provided to the owner of the resource(s). * CC-BY-NC: This license lets others remix, tweak, and build upon the specified resource non-commercially, and although their new resources must also acknowledge the owner of the resource and be non-commercial, they don’t have to license their derivative works on the same terms. * CC-BY-NC-SA: This license lets others remix, tweak, and build upon the specified resource(s) non-commercially, as long as they credit the owner of the resource and license their new creations under the identical terms. * CC-BY-NC-ND: This license only allows others to retrieve the specified resource(s) and share them with others as long as they credit the owner of the resource(s), but they can’t change the contents of the resource(s) in any way or use them commercially. * CC0: No copyright reserved |
| *dataLicenseHolder* | This attribute provides information about the ownership of an associated data license. |
| *dataLicenseCreator* | This attribute provides information about the creator of an associated data license. |

Proposed common attributes to support data license for open IoT data can be used in the <accessControlPolicy> resource to inidate the license information.

Table 8.1-2: Additional attributes of *<accessControlPolicy>* resource for License

| Attributes of *<accessControlPolicy>* | Multiplicity | RW/  RO/  WO | Description | *<accessControlPolicyAnnc>* Attributes |
| --- | --- | --- | --- | --- |
| *resourceType* | 1 | RO | See clause 9.6.1.3. | NA |
| *resourceID* | 1 | RO | See clause 9.6.1.3. | NA |
| *resourceName* | 1 | WO | See clause 9.6.1.3. | NA |
| *parentID* | 1 | RO | See clause 9.6.1.3. | NA |
| *expirationTime* | 1 | RW | See clause 9.6.1.3. | MA |
| *labels* | 0..1(L) | RW | See clause 9.6.1.3. | MA |
| *creationTime* | 1 | RO | See clause 9.6.1.3. | NA |
| *lastModifiedTime* | 1 | RO | See clause 9.6.1.3. | NA |
| *announceTo* | 0..1 (L) | RW | See clause 9.6.1.3. | NA |
| *announcedAttribute* | 0..1 (L) | RW | See clause 9.6.1.3. | NA |
| *privileges* | 1 | RW | A set of access control rules that applies to resources referencing this *<accessControlPolicy>* resource using the *accessControlPolicyID* attribute. | MA |
| *dataLicense* | 0..1 | RW | See clause 9.6.1.3. | OA |
| *dataLicenseOwner* | 0..1 | RW | See clause 9.6.1.3. | OA |
| *dataLicenseCreator* | 0..1 | RW | See clause 9.6.1.3. | OA |

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