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| CHANGE REQUEST | |
| Meeting ID:\* | SDS #53 |
| Source:\* | Andreas Kraft, DT, [A.Kraft@telekom.de](mailto:A.Kraft@telekom.de)  Andreas Neubacher, DT, [Andreas.Neubacher@magenta.at](mailto:Andreas.Neubacher@magenta.at)  Andre Dutra, DT, [andre.dias-dutra@telekom.de](mailto:andre.dias-dutra@telekom.de) |
| Date:\* | 2022-01-31 |
| Reason for Change/s:\* | Add lastSeenTime and lastCommunicationTime attributes to <node> |
| CR against: Release\* | Release 5 |
| CR against: WI\* | Active WI-xxxx  MNT maintenance / < Work Item number(optional)>  Is this a mirror CR? Yes  No  mirror CR number: (Note to Rapporteur - use latest agreed revision)  STE Small Technical Enhancements / < Work Item number (optional)>  Only ONE of the above shall be ticked |
| CR against: TS/TR\* | TS-001, V4.13.0 |
| Clauses \* | 9.6.18 |
| Type of change: \* | Editorial change  Bug Fix or Correction  Change to existing feature or functionality  New feature or functionality  Only ONE of the above shall be ticked |
| Impacted other TS/TR(s) |  |
| Post Freeze checking:\* | This CR contains only essential changes and corrections? YES  NO  This CR may break backwards compatibility with the last approved version of the TS? YES  NO |
| Template Version: January 2017 (Do not modify) | |

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GUIDELINES for Change Requests:

Provide an informative introduction containing the problem(s) being solved, and a summary list of proposals.

Each CR should contain changes related to only one particular issue/problem.

In case of a correction, and the change apply to previous releases, a separate “mirror CR” should be posted at the same time of this CR

Mirror CR: applies only when the text, including clause numbering are exactly the same.

Companion CR: applies when the change means the same but the baselines differ in some way (e.g. clause number).

Follow the principle of completeness, where all changes related to the issue or problem within a deliverable are simultaneously proposed to be made E.g. A change impacting 5 tables should not only include a proposal to change only 3 tables. Includes any changes to references, definitions, and acronyms in the same deliverable.

Follow the drafting rules.

All pictures must be editable.

Check spelling and grammar to the extent practicable.

Use Change bars for modifications.

The change should include the current and surrounding clauses to clearly show where a change is located and to provide technical context of the proposed change. Additions of complete clauses need not show surrounding clauses as long as the proposed clause number clearly shows where the new clause is proposed to be located.

Multiple changes in a single CR shall be clearly separated by horizontal lines with embedded text such as, start of change 1, end of change 1, start of new clause, end of new clause.

When subsequent changes are made to content of a CR, then the accepted version should not show changes over changes. The accepted version of the CR should only show changes relative to the baseline approved text.

Introduction

This CR proposes two new attributes for the <node> resource type.

One important aspect when working with mobile devices is the information when the device has been seen by the network or one of its entities the last time. This is not necessarily the same time when the device has sent or received IoT data, but when it was last “online” and signalled to the network itself. This information is an important data point for managing fleets of devices that only rarely send or receive actual data.

Determining the last time a device was connected to the network is different from the time when the last (IoT) data communication (sending and/or receiving) with the device happened. This also is an important information for a management system for analysing device healthiness.

One solution, other than to introduce the new attribute, could be to re-use the “lastModifiedTime” attribute, but this attribute is reserved for modifications to resources themselves, but not for monitoring device activities. It also cannot distinguish between the different aspects of network connectivity, data communication, and just an update of the resource in the CSE..

Adding these attributes directly to the <node> resource type is in line with, for example, the “roaming” and “networkID” attributes of <node>. Also, this will reduce overhead to the CSE access by adding the attributes there instead of to one of the <mgmtObj> specializations, where actually none is fitting for hosting the attributes.

If this CR is accepted, then other CRs will follow for

mirroring the changes to TS-0001 (R2, R3, R4),

adding attributes and possibly procedures to TS-0004,

adding elements to m2m:filtercriteria (e.g. lastSeenBefore, lastSeenAfter), and

adding these m2m:filtercriteria elements to the protocol binding (TS-0008).

Remarks

During writing this CR the following question arose that needs to be discussed because it influences how the new proposed attribute is going to be specified:

Why are the attributes “roamingStatus” and “networkID” defined as RO (and defined as NP/NP in TS-0004)? The CSE is or may not be able to provide these values, but a management IPE-AE that provides the network management connectivity has to do this. But since these attributes are RO an IPE-AE can technically not update these attributes.

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 9.6.18 Resource Type *node*

The *<node>* resource represents specific information that provides properties of an M2M Node that can be utilized by other oneM2M operations. The *<node>* resource has specialization of the *<mgmtObj>* as its child resources. These resources represent the Node's context information (e.g. memory and battery), network topology, device information, device capability etc. The specialized *<mgmtObj>* resources are used to perform management of the Node.

This node specific information stored in these resources such as *[memory]* and *[battery]* can be obtained either by the existing device management technologies (OMA DM [i.3], BBF TR-069 [i.2]) or any other way (e.g. JNI [i.18]).

For the case when the *<node>* resource belongs to an ADN, please see figure 9.6.18-1 in conjunction with the description of *nodeLink* attribute in the *<AE>* resource (clause 9.6.5).

For the case when the *<node>* resource belongs to an NoDN and the applications that correspond to interworked devices are represented by <*flexContainer>s* please see figure 9.6.18-2.



Figure 9.6.18-1: Relationship between IN/MN and ADN



Figure 9.6.18-2: Relationship between IPE, interworked Services and NoDN

The *<node>* resource shall contain the child resources specified in table 9.6.18-1.

Table 9.6.18-1: Child resources of *<node>* resource

| Child Resources of *<node>* | Child Resource Type | Multiplicity | Description | *<nodeAnnc>* Child Resource Type |
| --- | --- | --- | --- | --- |
| *[variable]* | *<semanticDescriptor>* | 0..n | See clause 9.6.30 | *<semanticDescriptor>, <semanticDescriptorAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*memory]* | 0..1 | This resource provides the memory (typically RAM) information of the node. (E.g. the amount of total volatile memory), See clause D.4. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*battery]* | 0..n | The resource provides the power information of the node. (E.g. remaining battery charge). See clause D.7. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*areaNwkInfo]* | 0..n | This resource describes the list of Nodes attached behind the MN/ASN node and its physical or underlying relation among the nodes in the M2M Area Network. This attribute is defined in case the Node is MN/ASN. See clause D.5. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*areaNwkDeviceInfo]* | 0..n | This resource describes the information about the Node in the M2M Area Network. See clause D.6. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*firmware]* | *0..n* | This resource describes the information about the firmware of the Node include name, version etc. See clause D.2. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*software]* | 0..n | This resource describes the information about the software of the Node. See clause D.3. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*deviceInfo]* | 0..n | The resource contains information about the identity, manufacturer and model number of the device. See clause D.8. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*deviceCapability]* | 0..n | The resource contains information about the capability supported by the Node. See clause D.9. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*reboot]* | 0..1 | The resource is the place to reboot or reset the Node. See clause D.10. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization [*eventLog]* | 0..1 | The resource contains the information about the log of events of the Node. See clause D.11. | *<mgmtObjAnnc>* |
| *[variable]* | *<mgmtObj>* as defined in the specialization *[cmdhPolicy]* | 0..n | The resource(s) contain(s) information about CMDH policies that are applicable to the CMDH processing on the CSE hosted on the node represented by this *<node>* resource and identified by the *hostedCSELink* attribute of this *<node>* resource. See clause D.12. | NA |
| *[variable]* | *<mgmtObj>* as defined in the specialization *[activeCmdhPolicy]* | 0..1 | This resource defines which of the present *[cmdhPolicy]* resource(s) shall be active for the CMDH processing on the CSE hosted on the node represented by this *<node>* resource and identified by the *hostedCSELink* attribute of this *<node>* resource. See clause D.12. | NA |
| *[variable]* | *<subscription>* | 0..n | See clause 9.6.8. | *<subscription>* |
| *[variable]* | *<schedule>* | 0..n | See clause 9.6.9. | *<scheduleAnnc>* |
| *[variable]* | *<transaction>* | 0..n | See clause 9.6.48 | *<transaction>* |
| *[variable]* | *<action>* | 0..n | See clause 9.6.61 | *None* |

The *<node>* resource shall contain the attributes specified in table 9.6.18-2.

Table 9.6.18-2: Attributes of *<node>* resource

| Attributes of  *<node>* | Multiplicity | RW/  RO/  WO | Description | *<nodeAnnc>* 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 |
| *accessControlPolicyIDs* | 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 |
| *labels* | 0..1 (L) | RW | See clause 9.6.1.3. | MA |
| *announceTo* | 0..1 (L) | RW | See clause 9.6.1.3. | NA |
| *announcedAttribute* | 0..1 (L) | RW | See clause 9.6.1.3. | NA |
| *announceSyncType* | 0..1 | RW | See clause 9.6.1.3. | MA |
| *dynamicAuthorizationConsultationIDs* | 0..1 (L) | RW | See clause 9.6.1.3. | OA |
| *custodian* | 0..1 | RW | See clause 9.6.1.3 | NA |
| *nodeID* | 1 | RW | The M2M-Node-ID of the node which is represented by this *<node>* resource. | MA |
| *nodeType* | 0..1 | RW | Indicates the type of node.  It shall have one of the following values:   * IN * MN * ASN * ADN * NoDN­­ * UNSPECIFIED | OA |
| *hostedCSELink* | 0..1 | RW | This attribute allows to find the <CSEBase> or <remoteCSE> resource representing the CSE that is residing on the node that is represented by this <*node*> resource. The attribute contains the resource ID of a resource where all of the following applies:   * The resource is a *<CSEBase>* resource or a *<remoteCSE>* resource. * The resource represents the CSE which resides on the specific node that is represented by the current *<node>* resource.   In case the node that is represented by this <node> resource does not contain a CSE, this attribute shall not be present. | OA |
| *hostedAELinks* | 0..1(L) | RW | This attribute allows to find the AEs hosted by the node that is represented by this <*node*> resource. The attribute shall contain a list of resource identifiers of *<AE>* resources representing the ADN-AEs residing on the node that is represented by the current *<node>* resource.  In case the node that is represented by this <node> resource does not contain an AE, this attribute shall not be present. | OA |
| *hostedServiceLinks* | 0..1(L) | RW | This attribute allows to find <*flexContainer> resources that have* been created by an IPE to represent services hosted on a NoDN, the NoDN being represented by this <*node*> resource.  If the NoDN hosts a set of services represented by <*flexContainer>s,* then the attribute shall contain the list of resource identifiers of these <*flexContainer>* resources.  In case the node that is represented by this <*node*> resource does not contain a  service that is represented by a <*flexContainer>,* this attribute shall not be present. | OA |
| *mgmtClientAddress* | 0..1 | RW | Represents the physical address of management client of the node which is represented by this <node> resource.  This attribute is absent if management server is able to acquire the physical address of the management client. | OA |
| *roamingStatus* | 0..1 | RO | Indicates if the M2M Node is currently roaming from the perspective of the underlying network.  The allowed values are "Yes" or "No". | OA |
| *networkID* | 0..1 | RO | Configured with the identity of the underlying network which the M2M Node is currently attached to. | OA |
| *lastSeenTime* | 0..1 | RW | This attribute is a timestamp that indicates the last time the M2M node was online and has been seen by the underlying communication network. The attribute can be updated by the CSE or an AE, depending on the deployment and network technology of the M2M node. | OA |
| *lastCommunicationTime* | 0..1 | RW | This attribute is a timestamp that indicates the last time the M2M node was sending or receiving IoT data. The attribute can be updated by the CSE or an AE, depending on the deployment and network technology of the M2M node | OA |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*