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| CHANGE REQUEST |
| Meeting ID:\* | SDS 42 |
| Source:\* | Bob Flynn, Convida Wireless , Bob.Flynn@convidawireless.com |
| Date:\* | 2019-08-23 |
| Reason for Change/s:\* | Device management for Device Connection Efficiency (DCE) |
| CR against: Release\* | Rel-4 |
| CR against: WI\* | [x]  Active <Work Item number> [ ]  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\* | TR-0024v4\_2\_0 |
| Clauses \* |  |
| Type of change: \* | [ ]  Editorial change[ ]  Bug Fix or Correction[x]  Change to existing feature or functionality[ ]  New feature or functionalityOnly ONE of the above shall be ticked |
| Other TS/TR(s) impacted | None |
| Post Freeze checking:\* | This CR contains only essential changes and corrections? YES [x]  NO [ ] This CR may break backwards compatibility with the last approved version of the TS? YES [ ]  NO [ ]  |
| Template Version: January 2019 (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

-------------------------------------------------- Start of Change 1--------------------------------------------------

## x.3 Solutions

*Editor's Note: This clause will contain the solutions that address the key issues in this area.*

### x.3.n Solution #y.1: TS.34\_4.1\_001

*Editor's Note: Solutions within the area are not in any particular order but they are added incrementally (n = 1, 2, 3…) when new solution is identified. 'y' refers to the area.*

#### x.3.n.1 Introduction

*Editor's Note: Each solution should list the key issues that it addresses. There may be references to the key issues outside the area.*

TS.34:

|  |  |
| --- | --- |
| TS.34\_4.1\_REQ\_001 | If data speed and latency is critical to the IoT Service the IoT Device Application should be able to retrieve mobile network speed and connection quality information from the IoT Embedded Service Layer in order to request the appropriate quality of content from the IoT Service Platform. |

a DM mgmtObj is needed to capture this information, such that the IoT application on the device can retrieve it from the CSE.

Some things to consider:

* should the IN-CSE read and provide this information (from the CN), or should the device read this information.
	+ An advantage for IN-CSE doing it is that one CN API Call can be used for many devices. Then the IN-CSE can update the device(s) according to the <schedule>. This will avoid devices making these requests on their own schedule (which can add to CN load).
	+ I am not sure that I see an advantage of the device reading this information
* Network Status Reporting from SCEF API. Research this call flow for details. eNodeB ID is provided. Location Reporting Status. The IN-CSE subscribes to receive Network Status reports for each network that a device is located in. We need to ensure that only one notification is received in the case of many devices in a specific network region.
* Use a resource and a way to associate a network ID with multiple CIoT devices. Use the CN provided identifier (eNodeB ID) that specifies a network “region”. Then each device also has a parameter for this information. Then, the CSE can send messages to devices based on a match. The device attribute would be specified by the CN when the CSE registers the device on the CN through the T8.
	+ Two management objects exist that can be considered as part of the solution: <areaNwkInfo> and <areaNwkDeviceInfo>, see extracted information from table 9.6.1.2.1-1
	+ Issues to be resolved
		- If <areaNwkInfo> is a child of a <node> resource then the CSE SHALL have a <node> resource that will be the parent of <areaNwkInfo> for storing all details about the CN that it attaches to [ can this be generalized to all underlying network connections? ]. When the CSE detects that a device is hosted in some CN region an <areaNwkInfo> resource SHALL be created/updated.
		- What is the <node> representing in this case? Should the <node> be related to the SCEF connection? Multiple SCEF connections seem possible. Store SCEF information in this resource, in a manner similar to POA for the SCEF.
		- Description of <areaNwkInfo> is not aligned with this approach. Suggested description is listed below.
* Table 9.6.1.2.1-1: <*mgmtObj*> Specializations

| Resource specialization  | Short Description | Child Resource Types | Parent Resource Types | Clause |
| --- | --- | --- | --- | --- |
| *areaNwkDeviceInfo* | Provides information about the Node in the M2M Area Network | *subscription* | *node* | D.6 |
| *areaNwkInfo* | Describes an Underlying Network connection and the information needed to make services available to devices that utilize the underlying network. | *subscription* | *node* | D.5 |

Table D.5-2: Attributes of *[areaNwkInfo]* resource

| Attributes of *[areaNwkInfo]* | Multiplicity | RW/RO/WO | Description |
| --- | --- | --- | --- |
| *resourceType* | 1 | RO | See clause 9.6.1.3. |
| *resourceID* | 1 | RO | See clause 9.6.1.3. |
| *resourceName* | 1 | WO | See clause 9.6.1.3. |
| *parentID* | 1 | RO | See clause 9.6.1.3. |
| *expirationTime* | 1 | RW | See clause 9.6.1.3. |
| *accessControlPolicyIDs* | 0..1 (L) | RW | See clause 9.6.1.3. |
| *creationTime* | 1 | RO | See clause 9.6.1.3. |
| *lastModifiedTime* | 1 | RO | See clause 9.6.1.3. |
| *labels* | 0..1(L) | RW | See clause 9.6.1.3. |
| *mgmtDefinition* | 1 | WO | See clause 9.6.15. Has fixed value *"areaNwkInfo"* to indicate the resource is for area network information. |
| *objectIDs* | 0..1 (L) | WO | See clause 9.6.15. |
| *objectPaths* | 0..1 (L) | WO | See clause 9.6.15. |
| *description* | 0..1 | RW | See clause 9.6.15. |
| *areaNwkType* | 1 | RW | The a*reaNwkType* is an implementation-chosen string that indicates the type of M2M Area Network. This attribute is a specialization of *[objectAttribute]* attribute. |
|  |  |  |  |
| *networkID* | 1 | WO | Configured with the identity of the underlying network which the M2M Node is currently attached to.  |
| *networkCondition* | 1 | RW | Contains a qualitative description of the network condition. |

For 3GPP interworking, *areaNwkType* should indicate SCEF. Or maybe that is determined by the parent <node>

When new devices are registered to the CSE, determined by the creation of a <node> resource, then the <node> resource identifier should be added to *listOfDevices* of the appropriate <areaNwkInfo> resource. **Alternatively, the *listOfDevices* can be replaced with a NSE specific identifier that is also available in the <node> resource of the devices. <node> has a *networkID* attribute that can be used. Note that *networkID* in <node> should be changed to RW instead of RO, as that <node> (modeling a device) can be mobile.**

For 3GPP interworking, *networkID* is provided by the CN.

For 3GPP interworking, this management object SHALL be announced to a ASN-CSE hosted on a device and should be readable from an AE on the device if there is no ASN-CSE.

For TS.34\_4.1\_REQ\_001 a new attribute is defined for <areaNwkInfo> to contain “mobile network speed and connection quality information”. oneM2M should define an enumeration e.g. 0..10

underlying networks map to this range, so TS-0026 will map 0-31 to 0..10.

Summary:

During registration of an ASN-CSE, a <node> shall be created for the <remoteCSE>. Using the M2M-Ext\_ID attribute, the IN-CSE can determine the NetworkID of the device and store that in the <node> networkID.

* TBD should the ASN-CSE create the <node> or the registrar IN-CSE?

The IN-CSE shall then announce the <areaNwkInfo> with the matching networkID to the ASN-CSE.

* TBD we should specify a specific location so that AE’s registered to the ASN-CSE can have a specific and non-volatile location to read that value (this is the specific requirement in TS.34)

This value will be referenced in solutions to other requirements.

The solution below needs to include the following:

1. CR to <areaNwkInfo> as described above.
2. Registration procedures in TS-0024 for an ASN-CSE hosted on an UE
	1. Creation of the <node>
	2. Use of the Network Status Reporting SCEF API to get networkID. This may already be available when IN-CSE initiated the registration via triggering.
	3. Announcement of <areaNwkInfo>

#### x.3.n.2 Solution details

*Editor's Note: This clause will describe the solution.*

#### x.3.n.3 Evaluation

*Editor's Note: This clause will contain a variety of evaluations of this solution.*

EDITORS NOTE: Each evaluation will include the requirement ID(s) from GSMA TS.34 that is solved with the proposed solution

### x.3.n1 Solution #y.1: TS.34\_4.2\_006 and TS.34\_4.2\_007

*Editor's Note: Solutions within the area are not in any particular order but they are added incrementally (n = 1, 2, 3…) when new solution is identified. 'y' refers to the area.*

#### x.3.n1.1 Introduction

*Editor's Note: Each solution should list the key issues that it addresses. There may be references to the key issues outside the area.*

TS.34:

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| TS.34\_4.2\_REQ\_006 | If the IoT Service requires the use of ‘keep alive’ messages, the IoT Embedded Service Layer should automatically detect the Mobile Network Operator’s TCP\_IDLE value or UDP\_IDLE value (NAT timers) when using push services. |
| This can be achieved by increasing the IoT Device Application’s polling interval until a network timeout occurs and then operating just below the timeout value. |
| The IoT Embedded Service Layer should adapt to the new value as opposed to using a hard coding a polling interval set within the device. |
| TS.34\_4.2\_REQ\_007 | If the IoT Service requires the use of ‘keep alive’ messages, use of dynamic polling interval (ref. TS.34\_4.2\_REQ\_006) is preferred. However, if a fixed polling interval is used, the IoT Embedded Service Layer should use a time value configurable by the Mobile Network Operator. If the preferred value of the Mobile Network Operator is unknown a default value of 29 minutes is recommended as the polling interval when devices use TCP protocol. |
| If a fixed polling interval is used, the IoT Embedded Service Layer should allow remote and/or local configuration of the interval. |
| Note: The suggested value of 29 minutes for devices using TCP protocol is recommended because the routers used by many Mobile Network Operators’ will clear the Network Address Translation (NAT) entry for the IoT Device’s data session 30 minutes after the last communication is sent to/from the IoT Device.Note: If the device uses UDP protocol the device must use a timer value appropriate for the target network operator environment. |

Requirement 006 describes a procedure to detect the Mobile Network Operator’s TCP\_IDLE value or UDP\_IDLE value (NAT timers) when using push services. Requirement 007 describes what to do if the detection approach in 006 is not done.

Starting with 007, this can be a parameter of the <areaNwkInf> mgmtObj – we may consider a specific 3GPP mgmtObj if there are many new attributes that are specific to 3GPP – TBD. By using this resource, and the procedure described above, this value is now available to the UE hosted ASN-CSE. We would specify a default of 29.

Now that we have a location for storing the information requirement 006 describes how to acquire the information. This procedure is implemented on the device, and assumes that it cannot simply be provided by the MNO via the SCEF API.

* TBD can we propose a change to the SCEF API to provide this information for a specific networkID?

CSE must detect the slowest polling interval to ensure 'keep alive' so that a newtork connection does not get shut down.

The solution should define the procedure as a ASN-CSE function (under NSE CSF?). The procedure should execute based on policy (DM policy), i.e. periodically when there are no comm failures, as needed when there are comm failures. On command from the IN-CSE, etc. When executed, it should be guided by the CMDH SWT parameter (backoff)

The result should be reported to IN-CSE so that it can be distributed to other UEs (so the procedure is not done too many times). The reported value should be stored in associated <areaNwkInfo> resource’s attribute.

#### x.3.n1.2 Solution details

*Editor's Note: This clause will describe the solution.*

#### x.3.n1.3 Evaluation

*Editor's Note: This clause will contain a variety of evaluations of this solution.*

EDITORS NOTE: Each evaluation will include the requirement ID(s) from GSMA TS.34 that is solved with the proposed solution

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