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| CHANGE REQUEST |
| Meeting:\* |  ARC TP30 |
| Source:\* | BeiXu，Huawei，Echo.xubei@huawei.com |
| Date:\* | 2017-04-24 |
| Contact:\* | BeiXu，Huawei，Echo.xubei@huawei.comYulan Lu, China Telecom, luyl@sttri.com.cn; Shuling Wang,China Unicom,wangsl49@chinaunicom.cn |
| Reason for Change/s:\* | Add new section about UE power saving mode feature |
| CR against: Release\* | <Release> Only ONE Release shall be indicated |
| CR against: WI\* | [x] Active <WI-0058 - 3GPP & Cellular IoT Interworking> [ ]  MNT Maintenace / < Work Item number(optional)>[ ]  STE Small Technical Enhancements / < Work Item number (optional)>Only ONE of the above shall be ticked |
| CR against: TS/TR\* | TS-0026 - 3GPP\_interworking-V0\_2\_0 |
| Clauses/Sub Clauses\* |  |
| Type of change: \* | [ ]  Editorial change[ ]  Bug Fix or Correction[ ]  Change to existing feature or functionality[x] New feature or functionalityOnly ONE of the above shall be ticked |
| 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 [ ] This CR is a mirror CR? YES [ ]  if YES, please indicate the document number of the original CR: <Document Number) : NO [ ]   |
| Template Version:27 May 2015 (Dot 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 separated “mirror CR” should be posted at the same time of this CR

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 sections need not show surrounding clauses as long as the proposed section number clearly shows where the new section 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

None

### -----------------------Start of change 1-------------------------------------------

## 7.X Node Schedule Management

### 7.X.1 Overview

The <schedule> resource in oneM2M contains scheduling information. The usage of the *<schedule>* resource is different depending on the associated resource type, as follows:

* A child *<schedule>* resource of the *<node>* resource shall indicate the time periods when the node can communicate via the Underlying Network. If multiple Underlying Networks are supported, for each there can be a maximum of one <*schedule>* resource. One <*schedule*> resource may be used for multiple Underlying Networks.

The *mgmtLink* attribute of the *<cmdhNwAccessRule>* child resource of a <node> resource shall link to a <schedule> resource that is also a child of the same <node> resource.

In the context of 3GPP connectivity technologies, according to 3GPP TS 23.682 [3], the network reachability and UE reachability are both indications that the UE becomes reachable for receiving either an SMS or downlink data. The SCEF supports the capability to notify the IN-CSE of the network reachable status or the UE reachable status. The IN-CSE shall maintain a <*schedule*> resource of a UE and if the the *networkCoordinated* attribute of the *<schedule>* isset to True, then the IN-CSE shall coordinate the schedule based on the UE’s reachability. For example, the IN-CSE shall support synchronizing the start time of the *scheduleElement* attributeto be the same as the start time of the targeted UE idle status which the IN-CSE receives from the Underlying 3GPP Network.

### 7.X.2 Resource Structure

Refer to the clause 9.6.9 Resource Type *schedule* of TS-0001[1]

### 7.X.3 Validation procedure based on the <*schedule*> of <*node*>



Figure 7.x.3-1: Service Flow of Targeting UE based on the <*schedule*> of <*node*> resource

Step 001: The IN-AE sends a request or response message to an ASN/MN-CSE or ADN-AE hosted on a UE.

Step 002: IN-CSE checks the local *<schedule>* of the targeted ASN/MN-CSE or ADN-AE node which indicates the pre-defined reachability schedule information of the targeted ASN/MN-CSE or ADN-AE. The IN-CSE also checks if the *networkCoordinated* attribute of the *<schedule>* resource is True, to determine whether the schedule is coordinated with the UE’s underlying network schedule. Based on this information, the IN-CSE determines whether the UE is available to receive a request or response message at the current time.

Case A: if the current time is within the period of <*schedule*>, then this indicates the target ASN/MN-CSE’s or ADN-AE’s current status is reachable and the following steps are applicable:

* Step 003a: IN-CSE sends the message to ASN/MN-CSE or ADN-AE directly after CMDH message processing is successful as specified in Annex H in TS-0004[xx] ;
* Step 004a: The ASN/MN-CSE or ADN-AE sends the response message to the IN-CSE if the message in Step 001 is a request;
* Step 005a: IN-CSE sends response message to the IN-AE if the message in Step 001 is a request;

Case B: if the current time is not in the period of <*schedule*>, then this indicates the target ASN/MN-CSE’s or ADN-AE’s current status is unreachable. The IN-CSE calculates the next reachable start time based on the *<schedule>*, and check if the ***Operation Execution Time*** or the ***Request Expiration Timestamp*** in the IN-AE request message is earlier than the next reachable start time, or if the ***Operation Execution Time*** or ***Request Expiration Timestamp*** isnot configured in the request. If this is the case, then go to Step 003b,

* Step 003b: IN-CSE sends error response message to the IN-AE which indicates that the request cannot be delivered to the target ASN/MN-CSE or ADN-AE:

If the ***Operation Execution Time*** and ***Request Expiration Timestamp*** are not configured, the error information should be the targeted resource is not reachable.

If the ***Request Expiration Timestamp*** is configured, and ***Request Expiration Timestamp*** is earlier than the next reachable start time, the error information should be the message cannot be delivered to the target resource before ***Request Expiration Timestamp*** expires.

If the ***Operation Execution Time*** are configured, the ***Operation Execution Time*** is earlier than the next reachable start time, the error information should be the request cannot be delivered to the target resource before ***Operation Execution Time*** expires.

Case C: if the current time is not in the period of <*schedule*>, then this indicates the target ASN/MN-CSE’s or ADN-AE’s current status is unreachable and the ***Operation Execution Time*** and ***Request Expiration Timestamp*** in the IN-AE message are both in the period of <*schedule*>. For example, later than the next reachable start time and earlier than the next end time. If this is the case, then go to Step 003c:

* Step 003c: IN-CSE buffers the message until the ASN/MN-CSE or ADN-AE is reachable again.
* Step 004c: IN-CSE(SCS) forwards the message to the target ASN/MN-CSE or ADN-AE before the ***Operation Execution Time*** and ***Request Expiration Timestamp*** expire during the next reachable time. Additional detail is specified in Annex H2.4 in in TS-0004[xx];
* Step 005c: the ASN/MN-CSE or ADN-AE sends the response message to the IN-CSE if the message in Step 001 is a request;

Step 006c: IN-CSE sends the response message to the IN-AE if the message in Step 001 is a request;.

### -----------------------End of change 1---------------------------------------------

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

## 2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] oneM2M TS-0001 Reference Architecture (v3)

[2] 3GPP 23.682 Architecture enhancements to facilitate communications with packet data networks and applications; (Release 14)

 [3] OMA-TS-REST-NetAPI-CommunicationPatterns-V1-0: '"RESTful Network API for Communication Patterns'", Version 1.0, Open Mobile Alliance.

[xx] oneM2M TS-0004 Service Layer Core Protocol Specification(v4)

### -----------------------End of change 2---------------------------------------------

CHECK LIST

* Does this change request include an informative introduction containing the problem(s) being solved, and a summary list of proposals.?
* Does this CR contain changes related to only one particular issue/problem?
* Have any mirror crs been posted?
* Does this change request make **all** the changes necessary to address the issue or problem? 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?
* Does this change request follow the drafting rules?
* Are all pictures editable?
* Have you checked the spelling and grammar?
* Have you used change bars for all modifications?
* Does the change 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 sections need not show surrounding clauses as long as the proposed section number clearly shows where the new section is proposed to be located.)
* Are multiple changes in this CR 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.?