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| CHANGE REQUEST |
| Meeting ID:\* | SDS #48 |
| Source:\* | Kenichi Yamamoto, KDDI, kc-yamamoto@kddi.com |
| Date:\* | 2020-12-16 |
| Reason for Change/s:\* | Editorial correction for Network Monitoring Request |
| CR against: Release\* | Rel-4 |
| CR against: WI\* | [x]  Active WI-0080[ ]  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-0026 v4.5.0 |
| Clauses \* | 7.15 |
| Type of change: \* | [ ]  Editorial change[x]  Bug Fix or Correction[ ]  Change to existing feature or functionality[ ]  New feature or functionalityOnly ONE of the above shall be ticked |
| Other TS/TR(s) impacted | TS-0001, TS-0004 Release 4 |
| 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 [x]  |
| Template Version: January 2019 (do not modify) |

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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 contribution addresses following editorial corrections for Network Monitoring Requeest procedures while doing stage 3 work.

* The configurations of *monitorEnable* attribute are added to Step 1 and Step 2.
* Deletion procedures of Network Status Report API in Step 7 and Step 8 are incorrect. All of the API procedures with SCEF interaction are within Step 3a. So the procedures are moved to Step 3a.
* Remove the subscription description in Step 1.
* Update the figure based on the corrections above.

R03 updates based on SDS/offline discussion.

* Undo the subscription procedures and move them to Step 1 with some modifications.
* Add the Update response to Step 3.
* Undo the notification procedures in Step 5 with some modifications.
* Move the error handling procedure to Step 9.
* Undo the deletion procedures for SCEF and revise some descriptions.
* Update the figure based on the corrections above.

R04 updates based on SDS discussion.

* Add some normative language to the procedures for Hosting CSE.

Following figure shows the procedure for Network Status Report API. The API is applicable to subscription procedure. So the deletion procedure of the SCEF API in Step 8 is necessary. The <nwMonitoringReq> notification of the Hosting CSE is triggered by Network Status Notification Request in Step 4a-5.



Following figure shows the procedure for Monitoring Event API (Number of UEs in an area). The <nwMonitoringReq> notification of the Hosting CSE is triggered by Monitoring Event Response in Step 4b-3. The API is applicable to one time request/response procedure. So the deletion procedure of the SCEF API is not necessary.



R05 updates based on agreed TS-0004 contributions (SDS-0019R08) .

* Add the limitations for Update operations to Step 2 and Step 3.
* Apply enum values of *monitorEnable* attribute.

R06 updates based on SDS discussion.

* Remove MonitorCongestionAndDeviceNumber of *monitorEnable* attribute.
* Add *monitorStatus* attribute to notify a response status from 3GPP SCEF, and update the procedures.
* Divide the procedures into 2 call flows.

R08 updates based on the comments from Peter (see SDS-0019R11)

R10 updates based on agreed TS-0004 contributions (see SDS-0019R12) .

* Add error handling procedures for *failureReason* attribute.

### ----------------------start of change 1 ----------------------------------------------------

## 7.15 Network Monitoring Request

### 7.15.1 Overview

This clause provides details on how an AE (Originator) exchanges with underlying 3GPP network parameters to be used for optimizing the data traffic over the underlying 3GPP network for a set of Field Domain Nodes hosted on UEs. If the AE (Originator) sets the type of network request with the associated attributes such as a geographic area, congestion threshold and External Group ID, the Hosting CSE determines the corresponding T8 API(s) based on the type of network request, maps the attributes to the T8 API(s), and communicates with the SCEF. When the SCEF returns a response to the Hosting CSE, the Hosting CSE maps the response to the specified oneM2M resource and sends a response to the AE (Originator). Based on the information, the AE (Originator) may adjust data processing/transfer for the Field Domain Nodes (ASN/MN/ADN).

### 7.15.2 Resource Structure

Refer to the clause 9.6.64 Resource Type <*nwMonitoringReq*> of oneM2M TS-0001[1].

### 7.15.3 Procedures

This clause describes procedures to retrieve an underlying 3GPP network information in a particular geographic area initiated by a request from an AE. The following T8 APIs are applicable for this procedure.

* Network Status Reports API
* Monitoring Event API (Monitoring Type: Number of UEs in an Area)

### 7.15.3.1 Procedure for Network Status Reports API

Figure 7.15.3.1 depicts a procedure to retrieve an underlying 3GPP network information in a particular geographic area with Network Status Reports API.



**Figure 7.15.3.1-1: Procedure for Network Status Reports API**

**Pre-conditions:**

There is a relationship in place between the Service Provider and MNO allowing the AE (Originator) to request 3GPP T8 API information from the underlying 3GPP network. The method for establishing this relationship is outside the scope of the present document.

The Hosting CSE is configured with system defaults as described in clause 7.8.

**Step 1: CREATE *<nwMonitoringReq>* Request & Response, Subscription creation**

An Originator (AE) requests the creation of a <*nwMonitoringReq*> resource at the Hosting CSE. The request shall include the following parameter as specified in clause 9.6.64 of oneM2M TS-0001[1]:

* *monitorStatus* shall be set to DISABLED.

If the operation is successful, the Originator receives a response message. And the Originator shall subsequently create the <*subscription*> resource as the child of the *<nwMonitoringReq>* resource to get notified of network monitoring status.

**Step 2: UPDATE *<nwMonitoringReq*> Request for enable network monitoring**

In order to initiate a monitoring request**,** the Originator sends a request to update the *monitorEnable* attribute of the *<nwMonitoringReq>* resource.

* *monitorEnable* shall be set to MonitorCongestion.
* *geographicArea* shall be set to the geographic area where the Originator wants to retrieve an underlying 3GPP network information.
* *congestionLevel* shall be set to one of following values:
	+ The list of congestion level(s) with exact value and specify what congestion threshold(s) the Originator wants to receive a report for.
	+ The list of enumerated types with values HIGH, MEDIUM and LOW that specify the type of congestion status the Originator would like to receive a report for.

If the value of *monitorStatus* is set to ENABLED, the Originator shall not send an UPDATE request.

**Step 3: UPDATE *<nwMonitoringReq>* Response**

The Hosting CSE shall update the *<nwMonitoringReq>* resource and return a response to the Originator.

If the value of *monitorEnable* is MonitorCongestion, the Hosting CSE shall check if *congestionLevel* attribute and *geographicArea* attribute are included in the request.

* If the attributes are present, the Hosting CSE shall set the value of *monitorStatus* to ENABLED, and the subsequent Update procedures of the Hosting CSE shall be performed for the resource.
* If the attributes are not present, the Hosting CSE shall not process the request and shall return a response primitive with a ***Response Status Code*** indicating "BAD\_REQUEST" error.

If the value of *monitorStatus* is ENABLED, the Hosting CSE shall reject the request with a ***Response Status Code*** indicating "CONFLICT" error.

If the Hosting CSE receives a request for deletion of *monitorEnable* attribute, the Hosting CSE shall set the value of *monitorStatus* to DISABLED.

**Step 4: Process Network Status Reports Request**

The Hosting CSE shall map the attributes of the *<nwMonitoringReq>* resource to the following attributes of Network Status Reports API as described in clause 7.8*.*

* The Hosting CSE shall set the fixed parameters with the corresponding attributes of the API (e.g. *URI, monitorExpireTime, supportedFeatures*).
* *geographicArea* of the <*nwMonitoringReq*> resource shall be set to *locationArea*.
* If the *congestionLevel* of the <*nwMonitoringReq*> resource indicates an abstracted value for congestion level(s) (e.g. HIGH, MEDIUM or LOW), *thresholdTypes* shall be set to the abstracted value of the *congestionLevel.* If *congestionLevel* indicates an exact value for congestion level(s) (e.g. between 0 and 31), *thresholdValues* shall be set to the exact value of the *congestionLevel.*

Then the Hosting CSE shall send a Network Status Report request to the SCEF, and the SCEF sends a Network Status Report response to the Hosting CSE as described clause 7.8.

**Step 5: NOTIFY *<nwMonitoringReq>***

The Hosting CSE sends a notification request of <*nwMonitoringReq*> resource to the Originator. The notification is configured as follows:

* After receiving a Network Status Report Notification request from the SCEF, the Hosting CSE shall map the following attributes of the Network Status Reports API described in clause 7.8 to the attribute of the *<nwMonitoringReq>* resource.
	+ *nsiValue* or *nsiType* shall be set to the *congestionStatus* of the *<nwMonitoringReq>* resource.

If the Hosting CSE receives an error response from the SCEF, the Hosting CSE shall set the value of *monitorStatus* to FAILED, and shall map the error response code to the corresponding value of *failureReason*. Then, the Hosting CSE shall send a notification request of <*nwMonitoringReq*> resource to the Originator. The each error response code is configured as follows:

* 400 Bad Request shall be set to BAD\_REQUEST.
* 401 Unauthorized shall be set to UNAUTHORIZED.
* 403 Forbidden shall be set to FORBIDDEN.
* 404 Not Found shall be set to NOT\_FOUND.
* 411 Length Required shall be set to LENGTH\_REQUIRED.
* 413 Payload Too Large shall be set to PAYLOAD\_TOO\_LARGE.
* 415 Unsupported Media Type shall be set to UNSUPPORTED\_MEDIA\_TYPE.
* 429 Too Many Requests shall be set to TOO\_MANY\_REQUESTS.
* 500 Internal Server Error shall be set to INTERNAL\_SERVER\_ERROR.
* 503 Service Unavailable shall be set to SERVICE\_UNAVAILABLE.

If the value of *failureReason* is set to BAD\_REQUEST, UNAUTHORIZED, NOT\_FOUND, LENGTH\_REQUIRED or UNSUPPORTED\_MEDIA\_TYPE, the Hosting CSE may be configured with the parameters which the SCEF is able to support.

**Step 6: The Originator adjusts data processing/transfer for Field Domain Nodes (ASN/MN/ADN)**

The Originator may use the information provided in Step 5 in order to adjusts data processing/transfer for Field Domain Nodes (ASN/MN/ADN).

If the value of *failureReason* is set to FORBIDDEN, the Originator may be configured with the values (e.g. *congestionLevel,geographicArea*) within the range defined by MNO policies.

If the value of *failureReason* is set to PAYLOAD\_TOO\_LARGE, the Originator may retry the request without optional attribute(s).

If the value of *failureReason* is set to TOO\_MANY\_REQUESTS, the Originator may reduce the frequency of requests or avoid immediate retries.

**Step 7 (Optional): DELETE *<nwMonitoringReq>* Request**

The Originator sends a request to delete the <*nwMonitoringReq*> resource.

**Step 8 (Optional): Process deletion of Network Status Reports**

The Hosting CSE shall send a DELETE request of the Network Status Reports API to the SCEF as described in clause 7.8.

**Step 9 (Optional): The Hosting CSE deletes the <*nwMonitoringReq*> resource**

If in step 8 the Hosting CSE receives a 204 No Content response code from the SCEF, the Hosting CSE shall delete the <*nwMonitoringReq*> resource. Otherwise, the Hosting CSE shall not delete the <*nwMonitoringReq*> resource.

**Step 10 (Optional): The Hosting CSE returns response to the Originator.**

The Hosting CSE shall send a DELETE response back to the Originator.

### 7.15.3.2 Procedure for Monitoring Event API (Monitoring Type: Number of UEs in an Area)

Figure 7.15.3.2 depicts a procedure to retrieve an underlying 3GPP network information in a particular geographic area with Monitoring Event API (Monitoring Type: Number of UEs in an Area).



**Figure 7.15.3.2-1: Procedure for Monitoring Event API (Monitoring Type: Number of UEs in an Area)**

**Pre-conditions:**

There is a relationship in place between the Service Provider and MNO allowing the AE (Originator) to request 3GPP T8 API information from the underlying 3GPP network. The method for establishing this relationship is outside the scope of the present document.

If the deployment uses External Group Identifier (*externalGroupId*) as described in 3GPP TS29.122 [4], when ASN/MN-CSEs or ADN-AEs register with the Hosting CSE (SCS), then they use *externalGroupId* information to configure the *externalGroupID* of the corresponding <*remoteCSE*> or <*AE*> resources (see clause 6.3 when *externalGroupID* is configured).

The Hosting CSE is configured with system defaults as described in clause 7.4.8.

**Step 1: CREATE *<nwMonitoringReq>* Request & Response, Subscription creation**

An Originator (AE) requests the creation of a <*nwMonitoringReq*> resource at the Hosting CSE. The request shall include the following parameter as specified in clause 9.6.64 of oneM2M TS-0001[1]:

* *monitorStatus* shall be set to DISABLED.

If the operation is successful, the Originator receives a response message. And the Originator shall subsequently create the <*subscription*> resource as the child of the *<nwMonitoringReq>* resource to get notified of network monitoring status.

**Step 2: UPDATE *<nwMonitoringReq*> Request for enable network monitoring**

In order to initiate a monitoring request**,** the Originator sends a request to update the *monitorEnable* attribute of the *<nwMonitoringReq>* resource.

* *monitorEnable* shall be set to MonitorDeviceNumber.
* *geographicArea* shall be set to the geographic area where the Originator wants to retrieve an underlying 3GPP network information.
* *externalGroupID* shall be set to the group of interest in the request, in which case the Monitoring Event Request is for the number of group-member UEs present in the area of interest.

If the value of *monitorStatus* is set to ENABLED, the Originator shall not send an UPDATE request.

**Step 3: UPDATE *<nwMonitoringReq>* Response**

The Hosting CSE shall update the *<nwMonitoringReq>* resource and return a response to the Originator.

If the value of *monitorEnable* is MonitorDeviceNumber, the Hosting CSE shall check if *geographicArea* attribute is included in the request.

* If the attribute is present, the Hosting CSE shall set the value of *monitorStatus* to ENABLED, and the subsequent Update procedures of the Receiver shall be performed for the resource.
* If the attribute is not present, the Hosting CSE shall not process the request and shall return a response primitive with a ***Response Status Code*** indicating "BAD\_REQUEST" error.

If the value of *monitorStatus* is ENABLED, the Hosting CSE shall reject the request with a ***Response Status Code*** indicating "CONFLICT" error.

If the Hosting CSE receives a request for deletion of *monitorEnable* attribute, the Hosting CSE shall set the value of *monitorStatus* to DISABLED.

**Step 4: Process Monitoring Event (Number of UEs in an area) Request**

The Hosting CSE shall map the attributes of the *<nwMonitoringReq>* resource to the following attributes of Monitoring Event API (Number of UEs in an area) as described in clause 7.4.8.

* The Hosting CSE shall set the fixed parameters with the corresponding attributes of the API (e.g. *URI, supportedFeatures*).
* *geographicArea* of the <*nwMonitoringReq*> resource shall be set to *locationArea*.
* *externalGroupID* of the <*nwMonitoringReq*> resource shall be set to *externalGroupId* if in step 2 the Hosting CSE monitoring request targets identifying the number of UEs from a specific group in the area and the Hosting CSE determined an *externalGroupID* to be monitored.

Then the Hosting CSE shall send a Monitoring Event request to the SCEF as described in clause 7.4.8.

**Step 5: NOTIFY *<nwMonitoringReq>***

The Hosting CSE sends a notification request of <*nwMonitoringReq*> resource to the Originator. The notification is configured as follows:

* After receiving a Monitoring Event response from the SCEF, the Hosting CSE shall map the following attributes of the Monitoring Event API described in clause 7.4.8 to the attributes of the *<nwMonitoringReq>* resource.
	+ *ueCount* shall be set to the *numberOfDevices* of the *<nwMonitoringReq>* resource. If an *externalGroupId* has been provided in the request, the count indicates the number of UEs from the given group which are found at the location.
	+ *externalIds* shall be set to *M2M-Ext-ID* attribute of the *<nwMonitoringReq>* resource, if an *externalGroupId* has been provided in the request.

If the Hosting CSE receives an error response from the SCEF, the Hosting CSE shall set the value of *monitorStatus* to FAILED, and shall map the error response code to the corresponding value of *failureReason*. Then, the Hosting CSE shall send a notification request of <*nwMonitoringReq*> resource to the Originator. The each error response code is configured as follows:

* 400 Bad Request shall be set to BAD\_REQUEST.
* 401 Unauthorized shall be set to UNAUTHORIZED.
* 403 Forbidden shall be set to FORBIDDEN.
* 404 Not Found shall be set to NOT\_FOUND.
* 411 Length Required shall be set to LENGTH\_REQUIRED.
* 413 Payload Too Large shall be set to PAYLOAD\_TOO\_LARGE.
* 415 Unsupported Media Type shall be set to UNSUPPORTED\_MEDIA\_TYPE.
* 429 Too Many Requests shall be set to TOO\_MANY\_REQUESTS.
* 500 Internal Server Error shall be set to INTERNAL\_SERVER\_ERROR.
* 503 Service Unavailable shall be set to SERVICE\_UNAVAILABLE.

If the value of *failureReason* is set to BAD\_REQUEST, UNAUTHORIZED, NOT\_FOUND, LENGTH\_REQUIRED or UNSUPPORTED\_MEDIA\_TYPE, the Hosting CSE may be configured with the parameters which the SCEF is able to support.

**Step 6**: The Originator adjusts data processing/transfer for Field Domain Nodes (ASN/MN/ADN)

The Originator may use the information provided in Step 5 in order to adjusts data processing/transfer for Field Domain Nodes (ASN/MN/ADN).

If the value of *failureReason* is set to FORBIDDEN, the Originator may be configured with the values (e.g. *geographicArea*)within the range defined by MNO policies.

If the value of *failureReason* is set to PAYLOAD\_TOO\_LARGE, the Originator may retry the request without optional attribute(s).

If the value of *failureReason* is set to TOO\_MANY\_REQUESTS, the Originator may reduce the frequency of requests or avoid immediate retries.

**Step 7 (Optional): DELETE *<nwMonitoringReq>* Request**

The Originator sends a request to delete the <*nwMonitoringReq*> resource.

**Step 8 (Optional): The Hosting CSE deletes the <*nwMonitoringReq*> resource**

The Hosting CSE shall delete the <*nwMonitoringReq*> resource.

**Step 9 (Optional): The Hosting CSE returns response to the Originator.**

The Hosting CSE shall send a DELETE response back to the Originator.

### ----------------------end of change 1 -----------------------------------------------------