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| CHANGE REQUEST | |
| Meeting ID:\* | SDS 51 |
| Source:\* | Miguel Angel Reina Ortega, ETSI, [MiguelAngel.ReinaOrtega@etsi.org](mailto:MiguelAngel.ReinaOrtega@etsi.org)  Neeta Meshram, C-DOT, [neeta@cdot.in](mailto:neeta@cdot.in)  Bob Flynn, Exacta GSS, bob.flynn@exactagss.com |
| Date:\* | 2020-12-02 |
| Reason for Change/s:\* | notificationEventType for timeSeries |
| CR against: Release\* | Rel-3 |
| CR against: WI\* | Active < WI-0077>  MNT maintenance / < Work Item number(optional)>  Is this a mirror CR? Yes  No  mirror CR number:  STE Small Technical Enhancements / < Work Item number (optional)>  Only ONE of the above shall be ticked |
| CR against: TS/TR\* | TS-0004 v3.22.0 |
| Clauses \* | 6.3.4.2.19, 6.3.5.7, 7.5.1.2.9, 7.4.8.2.1, 7.4.8.2.3, 6.3.4.2.18, 6.3.5.62, 7.5.1.2.2 |
| 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 |
| Other TS/TR(s) impacted | TS-0001 |
| 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 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

This CR proposes a new notificationEventType which will be used for timeSeries. This will allow:

* Configure properly the subscription to the timeSeries to get notifications on the number of missingDataPoints
* Notifications generated from timeSeries procedure to be clearly distinguished

R01 – Create and Update Subscription procedures updated to include error case when missingData is missing and notificationEventType is set to “Report of generated missing data points”.

R02 - Create and Update Subscription procedures updated to include error case when notificationEventType is set to “Report of generated missing data points” and missingData is not present. Also, when missingData-duration in <subscription> resource is smaller than *periodicInterval* of <timeSeries> resource.

R03 – Addition of a new notificationContentType value and definition of the new notification data object for timeSeries notification

R04 – Some typos

R05 – Comments from Peter:

Change 1. The style you have used for the interpretation of the new enum value 8 (Report on generated missing data points) does not match the style used for enum values 1..7

[MRO] Fixed  
  
Change 2. See my TS-0001 comment about the multiplicity of *notifcationEventType*.

[MRO] Fixed

Change 3.  When we reviewed this CR previously, I asked that you re-instate (and update where necessary)  the text in 7.5.1.2.9 , however you have not done this. We have the detailed procedures for the other types of notification in the neighbouring clauses in TS-0004 and it makes things easier for the reader if they don't have to flip between TS-0004 and TS-0001 to get the information they need to implement this.  Also   
  
i) Having the text in TS-0004 means that we can refer to types and members using the names that that are used in TS-0004 (e.g. missingData/duration)   
ii) We made some updates to the text in TS-0004, which would get lost if you simply delete the text.

[MRO] I understood that it was fine with everyone to remove duplicated text in TS-0001 and TS-0004. The text is exactly the same as TS-0001, so nothing will be lost. Perhaps we need to rediscuss this.

[PN] The wording you deleted was not identical to the TS-0001 words, even before the additions you have in your TS-0001 CR.  I did ask for you not to delete it on the conference call when we first looked at this.   
  
For example TS-0004 has   
  
·        If the timer expires, the timer is restarted, and the missing data points counter is reset back to 0.   
·        The renewal of the timer and the missing data points counter upon timer expiry shall continue until such time as the subscription is cancelled or terminated. Once a subscription is terminated, a final Notify request is sent out with the current number of missing data points and the timer is stopped.   
and TS-0001 has   
  
·        If the timer expires, the missing data points counter is reset back to 0. The timer is restarted upon detection of next missing data.   
·        The reset of the timer and the missing data points counter upon timer expiry shall continue until such time as the subscription is cancelled or terminated.   
In general I think that this level of detail more properly belongs in TS-0004.  Also the point I was trying to make in my previous email is that now you have properly defined the timeSeriesNotification in change 9 (thank you for doing that), the text in these bullets can now refer to the elements in this notification content with their proper names, which is something you can't do in TS-0001 since you don't define the format of the notification content in that document.

[MRO]ok, I will bring it back and apply proper names.

Changes 5 and 6.  Your tests allow a subscription on <timeSeries> to have a missingData condition even if is not type 8 (missing data points).  Was this intentional?  If you want to have a check that forbids missingData, I would have thought it made more sense to say that it must only be provided for type 8, regardless of the subscribed-to resource type.

[MRO] As explained above, yes, that was intentional. One can provide missingData and later on the notificationEventType = 8 to start the timeSeries notifications. However, missingData attribute can only be provided if subscribed-to resource is a timeSeries  
  
Changes 8 and 13.  Why do we need a new XSD file here? Couldn'twe  include the element  and its type in the existing CDT\_notification file?

[MRO] That was just to be consistent with the way TriggerPayload was done, that was defined in a separate XSD. No problem, to move it the CDT\_notification file. But in that case, should we move TriggerPayload too?

[PN] I was trying to avoid having to create another XSD file, since it is only a small one. If you would like to follow the triggerPayload precedent and have it in a separate file, then I am ok with that.  However in the R4 version you need to remove the v3\_18\_0 from the file name  in change 8.

[MRO] I would like to keep it separately for the time being. I will change the version number for R4

Change 9. What is the meaning of missingDataCurrentNr ? Is it always just the number of entires in the missingDataList?  If that's the case, what's the point in having it?

[MRO] No, it’s not the number of entries in the missingDataList. As explained in the description, missingDataList gives you the missingData points detected since last notification, and missingDataCurrentNr gives you the number of missingData points since the start of the timer.

R06 – Some small changes after discussions during the SDS call

R07 – Fixes for Peter’s comments and alignment with mirror

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

6.3.4.2.19 m2m:notificationEventType

Used for ***eventNotificationCriteria*** conditions and in the *notificationEvent*element.

**Table 6.3.4.2.19‑**0**: Interpretation of notificationEventType**

|  |  |  |
| --- | --- | --- |
| **Value** | **Interpretation** | **Note** |
| 1 | Update\_of\_Resource | Default |
| 2 | Delete\_of\_Resource |  |
| 3 | Create\_of\_Direct\_Child\_Resource |  |
| 4 | Delete\_of\_Direct\_Child\_Resource |  |
| 5 | Retrieve\_of\_Container\_Resource\_With\_No\_Child\_Resource | Context: A RETRIEVE request targets a subscribed-to <container> resource with the Result Content parameter set to either "child-resources" or "attributes+child-resources".  A notification is initiated if the <contentInstance> child resource is obsolete or not present in the targeted parent resource. |
| 6 | Trigger\_Received\_For\_AE\_Resource | Context: A notification is initiated when a Trigger is Received by a Registrar CSE targeting the AE-ID associated with the <*AE*> resource of a Registree AE. |
| 7 | Blocking\_Update |  |
| 8 | Report\_on\_\_missing\_data\_points | Context: A notification is initiated when a number of missing data points in a given duration are detected according to missingData attribute in <*subscription*> resource |

-------------------------------------------------- End of Change 1---------------------------------------

## ----------------------- Start of Change 2 --------------------------------------------

6.3.5.7 m2m:eventNotificationCriteria

Used for the *eventNotificationCriteria* attribute of the <subscription> resource.

**Table 6.3.5.7‑**0**: Type Definition of m2m:eventNotificationCriteria**

|  |  |  |  |
| --- | --- | --- | --- |
| **Element Path** | **Element Data Type** | **Multiplicity** | **Note** |
| createdBefore | m2m:timestamp | 0..1 |  |
| createdAfter | m2m:timestamp | 0..1 |  |
| modifiedSince | m2m:timestamp | 0..1 |  |
| unmodifiedSince | m2m:timestamp | 0..1 |  |
| stateTagSmaller | xs:positiveInteger | 0..1 |  |
| stateTagBigger | xs:nonNegativeInteger | 0..1 |  |
| expireBefore | m2m:timestamp | 0..1 |  |
| expireAfter | m2m:timestamp | 0..1 |  |
| sizeAbove | xs:nonNegativeInteger | 0..1 |  |
| sizeBelow | xs:positiveInteger | 0..1 |  |
| operationMonitor | m2m:operationMonitor | 0..n |  |
| attribute | m2m:attributeList | 0..1 |  |
| notificationEventType | m2m:notificationEventType | 0..5 |  |
| childResourceType | list of m2m:resourceType | 0..1 |  |
| missingData | m2m:missingData | 0..1 |  |
| filterOperation | m2m:filterOperation | 0..1 |  |

-------------------------------------------------- End of Change 2---------------------------------------

## ----------------------- Start of Change 3 --------------------------------------------

7.5.1.2.9 Notification for missing Time Series Data

When an AE wants to be informed of the number of missing data points in a given renewable time duration, the AE shall request the creation of a *<subscription>* resource and set the *missingData* in the *eventNotificationCriteria* conditions to specify the reporting policy. The *notificationEventType* element in the eventNotificationCriteria shall have a value of “Report on missing data points”. This enables the AE to keep track of the number of missing data points and the corresponding time-stamps over a predefined but renewable duration (i.e. the "window duration" of the *missingData*).

***Originator(Hosting CSE):***

No change from the procedures in clause Error: Reference source not found except the following addition in Step1.0:

When the first missing data point is detected (i.e. a detection of the first discontinuous time-stamp), following the creation of the subscription, the Hosting CSE shall start a timer associated with that subscription and start counting the number of the missing data points. The timer is set according to the *duration* in the subscription’s *missingData* condition. The reporting policy is governed by the rules below:

If the total number of missing data points becomes equal to the *number* specified in *missingData* conditionbefore the timer expires, a Notify request shall be sent with a *timeSeriesNotification* element in the *notificationEvent*/*representation* element of a notification. The missing data points counter shall continue counting while the timer continues to run (since it did not expire). A similar NOTIFY request shall be sent for each subsequent missing data point detected until the timer expires (see next bullet for behavior when the timer expires).

If the timer expires, the missing data points counter is reset back to 0. The timer is restarted upon detection of next missing data.

The reset of the timer and the missing data points counter upon timer expiry shall continue until such time as the subscription is cancelled or terminated.

If no missing data points have been detected at all during the life time of a subscription, then no timer shall be started at all. But once a timer is started triggered by the first missing data point, then the above rules in the previous bullets shall apply.

No change for the remaining steps from the procedures in clause Error: Reference source not found.

-------------------------------------------------- End of Change 3---------------------------------------

## ----------------------- Start of Change 4 --------------------------------------------

<xs:complexType name="notification">

<xs:sequence>

<xs:element name="notificationEvent" minOccurs="0">

<xs:complexType >

<xs:sequence>

<xs:element name="representation" type="m2m:representation" minOccurs="0"/>

<xs:element name="operationMonitor" minOccurs="0">

<xs:complexType>

<xs:sequence>

<xs:element name="operation" type="m2m:operation" minOccurs="0"/>

<xs:element name="originator" type="m2m:ID" minOccurs="0"/>

</xs:sequence>

</xs:complexType>

</xs:element>

<xs:element name="notificationEventType" type="m2m:notificationEventType" minOccurs="1"/>

</xs:sequence>

</xs:complexType>

</xs:element>

-------------------------------------------------- End of Change 4---------------------------------------

## ----------------------- Start of Change 5 --------------------------------------------

7.4.8.2.1 Create

***Originator:***

No change from the generic procedures in clause Error: Reference source not found.

If *missingData* condition specifies the duration value greater than the *periodicInterval* attribute of the <timeSeries> resource no notification on missing data points will be generated.

***Receiver:***

The following are additional Hosting CSE procedures to the generic resource handling procedures (Error: Reference source not found in clause Error: Reference source not found). The additional procedures shall be inserted from Recv-6.2 to Recv-6.5 as below.

Recv-6.3 The following step is in addition to the procedures defined in clause 7.3.3.15:

Check if the Originator has privileges for retrieving the subscribed-to resource. If the Originator does not have the privilege, the Hosting CSE shall return the response primitive with ***Response Status Code*** indicating "ORIGINATOR\_HAS\_NO\_PRIVILEGE" error.

Recv-6.4 The following steps are in addition to the procedures defined in clause 7.3.3.3:

1. Check if the subscribed-to resource, addressed in the ***To*** parameter in the Request, is subscribable. Subscribable resource types are defined in TS-0001 [Error: Reference source not found]; they have <subscription> resource types as their child resources. If it is not subscribable, the Hosting CSE shall return the Notify response primitive with a ***Response Status Code*** indicating "TARGET\_NOT\_SUBSCRIBABLE" error instead of the ***Response Status Code*** "INVALID\_CHILD\_RESOURCE\_TYPE".
2. Check if the *notificationEventType* is set to "Blocking\_Update".

If the subscribed-to resource already has a subscription with this *notificationEventType* the Hosting CSE shall return the response primitive with ***Response Status Code*** indicating "BLOCKING\_SUBSCRIPTION\_ALREADY\_EXISTS" error if more than one notification of this type could be sent.

If there is more than one *notificationURI* specified, the Hosting CSE shall return the response primitive with ***Response Status Code*** indicating "BAD\_REQUEST" error.

If any resource-specific attributes of the <subscription> resource other than *eventNotificationCriteria* or *notificationURI* are specified the Hosting CSE shall return the primitive with ***Response Status Code*** indicating "BAD\_REQUEST" error.

If any condition tag of the *eventNotificationCriteria* attribute other than *attribute* condition tag is specified, the Hosting CSE shall return the response primitive with ***Response Status Code*** indicating "BAD\_REQUEST" error.

1. Check if the *notificationEventType* is set to “Report on mising data points” and *missingData* attribute is not provided, the request shall be rejected with ***Response Status Code*** indicating "BAD\_REQUEST" error***.***
2. Check if the missingData element of eventNotificationCriteria is provided.
   1. if the subscribed-to resource, ***To*** parameter in the Request is not <timeSeries>, the request shall be rejected with ***Response Status Code*** indicating "BAD\_REQUEST" error.***.***
3. If any of the *notificationURI* entries are not the Originator, the Hosting CSE may send a Subscription Verification request primitive to each of them as described in clause 7.5.1.2.3.

a) If the Hosting CSE cannot send one or more Subscription Verification request primitives, the Hosting CSE shall return the Create <subscription> response primitive with a ***Response Status Code*** indicating "a\_INITIATION\_FAILED" error.

b) If the Hosting CSE sent all the Subscription Verification request primitives, the Hosting CSE shall check if each Notify response primitive contains a ***Response Status Code*** indicating "OK". If not, the Hosting CSE shall return the Create <subscription> response primitive containing the ***Response Status Code*** indicating "SUBSCRIPTION\_VERIFICATION\_INITIATION\_FAILED" error.

1. If the *associatedCrossResourceSub* is provided, check that the Hosting CSE ID value in the *associatedCrossResourceSub* is the same as the ***From*** parameter of the request. If not, return the response primitive with a ***Response Status Code*** indicating "BAD\_REQUEST".
2. If the Originator provides a value of *childResourceType* which is not a valid child of the subscribed-to resource, the request shall be rejected with ***Response Status Code*** indicating “BAD\_REQUEST” error***.***
3. If both the *notificationEventType* and *operationMonitor* are present in the Request, the request shall be rejected with ***Response Status Code*** indicating "BAD\_REQUEST" error***.***
4. If the *notificationContentType* is invalid for a given operation (refer to oneM2M TS-0001 [Error: Reference source not found] Table 9.6.8-4: Default and allowed values of *notificationContentType*) the request shall be rejected with ***Response Status Code*** indicating "BAD\_REQUEST" error***.***

Recv-6.5: The following steps are in addition to the procedures defined in clause 7.3.3.5:

1. If the Originator does not provide *notificationContentType*, the Hosting CSE shall set it according to the default shown in oneM2M TS-0001 [Error: Reference source not found] Table 9.6.8-4: Default and allowed values of *notificationContentType.*
2. If the *notificationURI* is not the Originator, the Hosting CSE shall set the Originator’s ID as the <subscription> resource's *creator* attribute.
3. If the *batchNotify* attribute is present in the Request but *batchNotify*/*duration* is not provided by the Originator, the Hosting CSE shall set the value of *batchNotify*/*duration* to the default duration as given by the M2M Service Provider.

-------------------------------------------------- End of Change 5---------------------------------------

## ----------------------- Start of Change 6 --------------------------------------------

7.4.8.2.3 Update

***Originator:***

The following change from the generic procedures in clause Error: Reference source not found.

If *missingData* condition specifies the duration value greater than the *periodicInterval* attribute of the <timeSeries> resource no notification on missing data points will be generated.Orig-1.0: The originator shall not specify *notificationEventType* set to "Blocking\_Update".

***Receiver:***

The following are additional Hosting CSE procedures to the generic resource handling procedures in clause Error: Reference source not found.

Recv-6.4: The following steps are in addition to the procedures defined in clause 7.3.3.4:

1. Check if the *notificationEventType* in the request is set to "Blocking\_Update". If so, the request shall be rejected with a "BAD\_REQUEST" ***Response Status Code***.
2. Check if the *notificationEventType* in the request is set to “Report on missing data points” and *missingData* attribute is not set in the target resource or provided in the request, the request shall be rejected with ***Response Status Code*** indicating "BAD\_REQUEST" error***.***
3. Check if the missing data is provided.
   1. if the subscribed-to resource, ***To*** parameter in the Request is not <timeSeries>, the request shall be rejected with ***Response Status Code*** indicating "BAD\_REQUEST" error***.***
4. If the Originator provides a value of *childResourceType* which is not a valid child of thesubscribed-to resource, the request shall be rejected with ***Response Status Code*** indicating “BAD\_REQUEST” error.

1. If the UPDATE operation would result in both *operationMonitor* and *notificationEventType* being present in the resource, the request shall be rejected with ***Response Status Code*** indicating “BAD\_REQUEST” error***.***
2. Check if a new *associatedCrossResourceSub* is provided. If so, check that the Hosting CSE ID value in the *associatedCrossResourceSub* is the same as the ***From*** parameter of the request.
3. If the *notificationContentType* is invalid for a given operation (refer to oneM2M TS-0001 [Error: Reference source not found] Table 9.6.8-4: Default and allowed values of *notificationContentType*) the request shall be rejected with ***Response Status Code*** indicating “BAD\_REQUEST” error***.***

Recv-6.5. The following step is in addition to the procedures defined in clause 7.3.3.7:

1. If a <crossResourceSubscription> Hosting CSE ID is removed from *associatedCrossResourceSub*, the Hosting CSE shall send a Notify request for Subscription Deletion, using the procedures in clause 7.5.1.2.4, to the <crossResourceSubscription> Hosting CSE*.*

-------------------------------------------------- End of Change 6---------------------------------------

## ----------------------- Start of Change 7 --------------------------------------------

6.3.4.2.18 m2m:notificationContentType

**Table 6.3.4.2.18‑1: Interpretation of notificationContentType**

|  |  |  |
| --- | --- | --- |
| **Value** | **Interpretation** | **Note** |
| 1 | All Attributes |  |
| 2 | Modified Attributes |  |
| 3 | ResourceID |  |
| 4 | Trigger Payload |  |
| 5 | TimeSeries notification |  |
| NOTE: See clause 7.4.8 "Resource Type subscription". | | |

-------------------------------------------------- End of Change 7---------------------------------------

## ----------------------- Start of Change 8 --------------------------------------------

6.3.5.62 m2m:representation

Used for the *representation* element in the *notificationEvent* element of a notification. Table 6.3.5.62‑1 defines what shall be included in the representation element depending on the value of the *notificationContentType* of the <subscription> resource which triggered the notification.

**Table 6.3.5.62‑1: Elements used for representation element**

|  |  |  |
| --- | --- | --- |
| **Value of notificationContentType** | **Name of Global Element** | **Defined in** |
| 1, 2 | m2m:<resourceType>  {other namespace identifier}:<resourceType> | CDT-<resourceType>-v3\_22\_0.xsd |
| 3 | m2m:URI | CDT-responsePrimitive-v3\_22\_0.xsd |
| 4 | m2m:triggerPayload | CDT-triggerPayload-v3\_22\_0.xsd |
| 5 | m2m:timeSeriesNotification | CDT-timeSeriesNotification-v3\_22\_0.xsd |

The XML representation element shall include a root element which is associated with an XSD Global Element. The root element shall be prefixed with a namespace prefix identifier (e.g. *m2m:*) specified in the associated XSD which defines the respective Global Element. The *representation*element allows the inclusion of namespaces other than m2m.

-------------------------------------------------- End of Change 8---------------------------------------

## ----------------------- Start of Change 9 --------------------------------------------

6.3.5.69 m2m:timeSeriesNotification

It defines the notification data object to be included in the *representation* element in the *notificationEvent* element of a notification for notifications generated for timeSeries. Table 6.3.5.69‑1 defines what shall be included in the timeSeriesNotification element:

**Table 6.3.5.69‑1: Elements of the timeSeriesNotification**

|  |  |  |  |
| --- | --- | --- | --- |
| **Element Path** | **Element Data Type** | **Multiplicity** | **Note** |
| missingDataList | m2m:missingDataList | 1 | It indicates the expected *dataGenerationTime* of missing data points detected since the last timeSeriesNotification |
| missingDataCurrentNr | xs:nonNegativeInteger | 1 | It indicates the number of missing data points detected since the start of the subscription’s timer |

-------------------------------------------------- End of Change 9---------------------------------------

## ----------------------- Start of Change 10 --------------------------------------------

7.5.1.2.2 Notification for <subscription> resources

When the notification message is forwarded or aggregated by transit CSEs, the Originator or a transit CSE shall check whether there are notification policies to enforce between subscription resource Hosting CSE and the notification target. In that case, the transit CSE as well as the Originator shall process Notify request primitive(s) by using the corresponding policy and send processed Notify request primitive(s) to the next CSE with notification policies related to the enforcement so that the transit CSE is able to enforce the policy defined by the subscriber. The notification policies related to the enforcement at this time is verified by using the subscription reference in the Notify request primitive. In the notification policies, the *latestNotify* attribute is only enforced in the transit CSE as well as the Originator.

If ***Event Category*** parameter is set to "latest" in the notification request primitive, the transit CSE as well as Originator shall cache the most recent Notify request. That is, if a new Notify request is received by the CSE with a subscription reference that has already been buffered for a pending Notify request, the newer Notify request will replace the buffered older Notify request.

***Originator:***

When an event is generated, the Originator shall execute the following steps in order:

Step 1.0 Check the *eventNotificationCriteria* attribute of the <subscription> resource associated with the modified resource:

If the *eventNotificationCriteria* attribute is set, then the Originator shall check whether the corresponding event matches with the event criteria. If multiple matching conditions of different types (i.e. different condition tags) are present in the *eventNotificationCriteria* attribute, then the combined condition shall be derived by applying the logical operation specified by the *filterOperation* condition. By default the logical AND operation shall be used if the *filterOperation* condition is not present.

If *notificationEventType* is not set within the *eventNotificationCriteria* attribute and the *operationMonitor* is also not present, the Originator shall use the default setting of "Update\_of\_Resource" to compare against the event.

If the *notificationEventType* has the value "Create\_of\_Direct\_Child\_Resource" or "Delete of Direct Child Resource" and the *childResourceType* condition is also present, then the matching event shall only be detected if one of the child resource types present in the list has been created or deleted, respectively. If the *childResourceType* condition is not present then a matching event is generated whenever any child resource is created or deleted.

If the *notificationEventType* has either an explicit or default value of "Update\_of\_Resource" and the *attribute* condition is also present then the matching event shall only be detected if one of the attributes in the list has been updated. If the *attribute* condition is not present then a matching event is generated whenever any attribute has been updated.

If the event matches, go to the step 2.0. Otherwise, the Originator shall discard the corresponding event.

If the *eventNotificationCriteria* attribute is not configured, the Originator shall use the default setting of "Update\_of\_Resource" for the *notificationEventType* and then continue with the step 2.0.

Step 2.0 The Originator shall check the notification policy as described in the below steps, but the notification policy may be checked in different order. After checking the notification policy in step 2.0 (i.e. from step 2.1 to step 2.6), then continue with step 3.0.

Step 2.1 The Originator shall determine the type of the notification per the *notificationContentType* attribute. The possible values of for *notificationContentType* attribute are "Modified Attributes", "All Attributes", "ResourceID", "Trigger Payload" or “TimeSeries notification”. This attribute may be used jointly with *eventType* attribute in the *eventNotificationCriteria* to determine if it is the attributes/resourceID of the subscribed-to resource or the attributes/resourceID of the child resource of the subscribed-to resource that shall be returned in the notification:

If the value of *notificationContentType* is set to "Modified Attributes", the Notify request primitive shall include the partial resource containing modified attribute(s) only (Refer to clause 7.2.1.2 for response content description).

If the value of *notificationContentType* is set to "All Attributes", the Notify request primitive shall include the complete resource with all attributes (Refer to clause 7.2.1.2 for response content description).

If the value of *notificationContentType* is set to "ResourceID", the Notify request primitive shall include the URI of the resource (Refer to clause 7.2.1.2 for response content description).

If the value of *notificationContentType* is set to "Trigger Payload", the Notify request primitive shall include the trigger payload (Refer to clause 9.2.1 for trigger payload description).

If the value of *notificationContentType* is set to "TimeSeries notification", the Notify request primitive shall include the timeSeriesNotification (Refer to clause 6.3.5.69 for timeSeriesNotification description).

Step 2.2 Check the *notificationEventCat* attribute:

If the *notificationEventCat* attribute is set, the Notify request primitive shall employ the ***Event Category*** parameter as given in the *notificationEventCat* attribute. Then continue with the step 2.3.

If the *notificationEventCat* attribute is not configured, then continue with step 2.3.

Step 2.3 Check the *latestNotify* attribute:

If the *latestNotify* attribute is set, the Originator shall assign ***Event Category*** parameter of value "latest" of the notifications generated pertaining to the subscription created.

Step 2.4 Check the batching notifications policy:

See details in oneM2M TS-0001 [6], clause 10.2.10.7.

NOTE: The use of some attributes such as *rateLimit* and *preSubscriptionNotify* is not supported in the present document.

Step 2.5 Check the *notificationURI* attribute:

The Originator shall fetch the *notificationURI* attribute and set the value to the ***To*** parameter of the Notify request. When the *notificationURI* attribute contains more than one target, the Originator shall generate each Notify request per target.

If the *notificationURI* attribute includes the notification serialization indication, in form of key-value pair, e.g. "ct=json", after the delimiter "?", the Originator shall serialize the notification for the notification target in that serialization type. The delimiter with the serialization indication shall be removed when the target is set to the ***To*** parameter of the Notify request. Then continue with step 3.0.

Step 3.0 The Originator shall check the notification and reachability schedules, but the notification schedules may be checked in different order:

If the <subscription> resource associated with the modified resource includes a <notificationSchedule> child resource, the Originator shall check the time periods given in the *scheduleElement* attribute of the *<notificationSchedule>* child resource.

Also, the Originator shall check the reachability schedule associated with the Receiver by exploring its <schedule> resource. If reachability schedules are not present in a Node then that Entity is considered to be always reachable.

If notificationSchedule and reachability schedule indicate that message transmission is allowed, then proceed with step 5.0. Otherwise, proceed with step 4.0.

In particular, if the *notificationEventCat* attribute is set to 'immediate' and the <notificationSchedule> resource does not allow transmission, then go to step 5.0 and send the corresponding Notify request primitive by temporarily ignoring the Originator's notification schedule.

Step 4.0 Check the *pendingNotification* attribute:

If the *pendingNotification* attribute is set, then the Originator shall cache pending Notify request primitives according to the *pendingNotification* attribute. The possible values are 'sendLatest' and 'sendAllPending'. If the value of pendingNotification is set to 'sendLatest', the most recent Notify request primitive shall be cached by the Originator and it shall set the ***Event Category*** parameter to "latest". If *pendingNotification* is set to 'sendAllPending', all Notify request primitives shall be cached by the Originator. If the *pendingNotification* attribute is not configured, the Originator shall discard the corresponding Notify request primitive. The processed Notify request primitive by the *pendingNotification* attribute is sent to the Receiver once message transmission becomes possible (see the step 6.0).

Step 5.0 Check the *expirationCounter* attribute:

If the *expirationCounter* attribute is set, then it shall be decreased by one when the Originator successfully sends the Notify request primitive. If the counter equals to zero('0'), the corresponding <subscription> resource shall be deleted. Then end the 'Compose Notify Request Primitive' procedure.

If the *expirationCounter* attribute is not configured, then end the 'Compose Notify Request Primitive' procedure.

When message transmission becomes possible, the Originator shall execute the following steps in order:

Step 6.0 If the *pendingNotification* attribute is set, the Originator shall send the processed Notify request primitive by the *pendingNotification* attribute and then continue with the step 7.0

Step 7.0 Check the *expirationCounter* attribute:

If the *expirationCounter* attribute is set, then its value shall be decreased by one when the Originator successfully sends the Notify request primitive. If the counter meets zero, the corresponding <subscription> resource shall be deleted. Then end the 'Compose Notify Request Primitive' procedure.

If the *expirationCounter* attribute is not configured, then end the 'Compose Notify Request Primitive' procedure.

***Receiver:***

When the Hosting CSE receives a Notify request primitive, the Hosting CSE shall check validity of the primitive parameters. In case the Receiver is a transit CSE which forwards or aggregates Notify request primitives before sending to the subscriber or other transit CSEs, upon receiving the Notify request primitive with the ***Event Category*** parameter set to "latest", the Receiver shall identify the latest Notify request primitive with the same subscription reference while storing Notify request primitives locally. When the Receiver as a transit CSE needs to send pending Notify request primitives, it shall send the latest Notify request primitive. When the Receiver as a transit CSE needs to send Notify request primitives, it shall use one of the serializations specified in the subscriber or other transit CSE *contentSerialization* attribute. If there is no *contentSerialization* value specified the transit CSE may use any serialization format.

-------------------------------------------------- End of Change 10---------------------------------------

## ----------------------- Start of Change 11 -------------------------------------------

8.2.7 TimeSeries notification fields

TimeSeries notification fields shall be translated into short names of Table 8.2.7‑1.

**Table 8.2.7‑1: TimeSeries notification field short names**

| **Member Name** | **Short Name** |
| --- | --- |
| *timeSeriesNotification (root element)* | ***tsn*** |
| *missingDataList* | ***mdlt\**** |
| *missingDataCurrentNr* | ***mdc\**** |
| NOTE: \* marked short names have been already assigned in attribute Table 8.2.3-5. | |

-------------------------------------------------- End of Change 11---------------------------------------

## ----------------------- Start of Change 12 -------------------------------------------

“CDT-enumerationTypes-v3\_22\_0.xsd”

<xs:simpleType name="notificationEventType">

<xs:annotation>

<xs:documentation>Used in the notificationEventType element of eventNotificationCriteria attribute of subscription resource

and in the Notification data object</xs:documentation>

</xs:annotation>

<xs:restriction base="xs:integer">

<!-- Update\_of\_Resource -->

<xs:enumeration value="1" />

<!-- Delete\_of\_Resource -->

<xs:enumeration value="2" />

<!-- Create\_of\_Direct\_Child\_Resource -->

<xs:enumeration value="3" />

<!-- Delete\_of\_Direct\_Child\_Resource -->

<xs:enumeration value="4" />

<!-- Retrieve\_of\_Container\_Resource\_With\_No\_Child\_Resource -->

<xs:enumeration value="5" />

<!-- Trigger\_Received\_For\_AE\_Resource -->

<xs:enumeration value="6" />

<!-- Blocking\_Update -->

<xs:enumeration value="7" />

<!—- Report on missing data points-->

<xs:enumeration value="8" />

</xs:restriction>

</xs:simpleType>

<xs:simpleType name="notificationContentType">

<xs:annotation>

<xs:documentation></xs:documentation>

</xs:annotation>

<xs:restriction base="xs:integer">

<!-- All attributes -->

<xs:enumeration value="1" />

<!-- Modified attributes -->

<xs:enumeration value="2" />

<!-- ResourceID -->

<xs:enumeration value="3" />

<!-- Trigger Payload -->

<xs:enumeration value="4" />

<!—- TimeSeries notification -->

<xs:enumeration value="5" />

</xs:restriction>

</xs:simpleType>

-------------------------------------------------- End of Change 12---------------------------------------

## ----------------------- Start of Change 13 -------------------------------------------

Code for new XSD file CDT-timeSeriesNotification-v3\_22\_0.xsd:

<?xml version="1.0" encoding="UTF-8"?>

<!--

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-->

<xs:schema xmlns="http://www.w3.org/2001/XMLSchema" targetNamespace="http://www.onem2m.org/xml/protocols"

xmlns:m2m="http://www.onem2m.org/xml/protocols" elementFormDefault="unqualified" xmlns:xs="http://www.w3.org/2001/XMLSchema">

<xs:include schemaLocation="CDT-commonTypes-v3\_22\_0.xsd" />

<xs:element name="timeSeriesNotification">

<xs:complexType>

<xs:sequence>

<xs:element name="missingDataList" type="m2m:missingDataList"/>

<xs:element name="missingDataCurrentNr" type="xs:nonNegativeInteger"/>

</xs:sequence>

</xs:complexType>

</xs:element>

</xs:schema>

-------------------------------------------------- End of Change 13---------------------------------------

## ----------------------- Start of Change 14 -------------------------------------------

“CDT-commonTypes-v3\_22\_0.xsd”

<xs:complexType name="eventNotificationCriteria">

<xs:sequence>

<xs:element name="createdBefore" type="m2m:timestamp" minOccurs="0" />

<xs:element name="createdAfter" type="m2m:timestamp" minOccurs="0" />

<xs:element name="modifiedSince" type="m2m:timestamp" minOccurs="0" />

<xs:element name="unmodifiedSince" type="m2m:timestamp" minOccurs="0" />

<xs:element name="stateTagSmaller" type="xs:positiveInteger" minOccurs="0" />

<xs:element name="stateTagBigger" type="xs:nonNegativeInteger" minOccurs="0" />

<xs:element name="expireBefore" type="m2m:timestamp" minOccurs="0" />

<xs:element name="expireAfter" type="m2m:timestamp" minOccurs="0" />

<xs:element name="sizeAbove" type="xs:nonNegativeInteger" minOccurs="0" />

<xs:element name="sizeBelow" type="xs:positiveInteger" minOccurs="0" />

<xs:element name="operationMonitor" type="m2m:operationMonitor" minOccurs="0" maxOccurs="unbounded" />

<xs:element name="attribute" type="m2m:attributeList" minOccurs="0" maxOccurs="1" />

<xs:element name="notificationEventType" type="m2m:notificationEventType" minOccurs="0" maxOccurs="5" />

<xs:element name="childResourceType" minOccurs="0" maxOccurs="1" >

<xs:simpleType>

<xs:restriction>

<xs:simpleType>

<xs:list itemType="m2m:resourceType" />

</xs:simpleType>

<xs:minLength value="1" />

</xs:restriction>

</xs:simpleType>

</xs:element>

<xs:element name="missingData" type="m2m:missingData" minOccurs="0" />

<xs:element name="filterOperation" type="m2m:filterOperation" minOccurs="0" />

</xs:sequence>

</xs:complexType>

-------------------------------------------------- End of Change 14---------------------------------------