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| --- | --- |
| CHANGE REQUEST | |
| Meeting ID:\* | SDS #59 |
| Source:\* | Andreas Kraft, DT, [Andreas.Kraft@t-systems.com](mailto:Andreas.Kraft@t-systems.com)  Andre Dutra, DT, [andre.dias-dutra@telekom.de](mailto:andre.dias-dutra@telekom.de)  Andreas Neubacher, DT, [Andreas.Neubacher@magenta.at](mailto:Andreas.Neubacher@magenta.at)  Miguel Angel Reina Ortega, ETSI, [MiguelAngel.ReinaOrtega@etsi.org](mailto:MiguelAngel.ReinaOrtega@etsi.org)  Poornima Shandilya, CDOT, [poornima@cdot.in](mailto:poornima@cdot.in) |
| Date:\* | 2023-03-31 |
| Reason for Change/s:\* | Adding “subscribedTo” attribute to notifications (TS-0004) |
| 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-0004 v.4.14.0 |
| Clauses \* | 6.3.5.13, |
| 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

The *notificationContentType* attribute in the <subscription> resource type defines the notification representation that is sent to its notification target(s). Various representations are specified, and one of them is “modified attributes” that only lists the attributes that have been modified in an UPDATE or blocking UPDATE request.

The problem is that with this representation the receiver of a notification cannot determine from the notification content alone which resource has been modified. The only reference that is submitted is the monitoring <subscription>’s resource ID that is part of the notification. The problem arises that the notification receiving AE, which may be responsible to handle notifications from many resources, must

a) either hold a mapping between <subscription> resources and their monitored resources, or

b) perform one extra RETRIEVE requests to the CSE to first retrieve the monitoring <subscription> to find out its monitored resource.

Option a) is unfavourable for the AE implementation and hosting, especially in a stateless Kubernetes or similar environment. Option b) would add extra load on the AE as well as the CSE and may have big impact on performance.

Also, with the changes that are proposed in the input contribution SDS-2022-0177R01 a <subscription> resource will be responsible for monitoring multiple resources. In this case the link between a subscription and the monitored resource cannot be made by just the <subscription>’s resource ID.

This change request proposes a new optional attribute *subscribedTo* for the *m2m:notification* common data type, which will contain the resource ID of the subscribed-to resource that causes a notification.

This optional attribute shall not be present in case a <crossResourceSubscription> causes a notification.

Change 1: Added subscribedTo to m2m:notification in clause 6.3.5.13

Change 2: Added to <sub> notification procedure in clause 7.5.1.1.2

Change 3: Added to <crs> notification procedure in clause 7.5.1.2.18

Change 4: Added short name for “subscribedTo” in clause 8.2.5

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

#### 6.3.5.13 m2m:notification

Table 6.3.5.13‑1: Type Definition of m2m:notification

|  |  |  |  |
| --- | --- | --- | --- |
| Element Path | **Element Data Type** | Multiplicity | Note |
| notificationEvent | (anonymous) | 0..1 |  |
| notificationEvent/representation | m2m:representation | 0..1 | See Table 6.3.5.62-1. |
| notificationEvent/operationMonitor | (anonymous) | 0..1 |  |
| notificationEvent/operationMonitor/operation | m2m:operation | 1 | m2m:operation  This element shall only be present if the operationMonitor parent element is present. Otherwise it shall not. |
| notificationEvent/operationMonitor/originator | m2m:ID | 1 | m2m:ID  This element shall only be present if the operationMonitor parent element is present. Otherwise it shall not. |
| notificationEvent/notificationEventType | m2m:notificationEventType | 1 | This element shall only be present if the notificationEvent parent element is present. Otherwise it shall not. |
| verificationRequest | xs:boolean | 0..1 |  |
| subscriptionDeletion | xs:boolean | 0..1 |  |
| subscriptionReference | xs:anyURI | 1 |  |
| creator | m2m:ID | 0..1 |  |
| notificationForwardingURI | xs:anyURI | 0..1 |  |
| notificationTarget | m2m:ID | 0..1 |  |
| targetRemovalRequest | xs:boolean | 0..1 |  |
| targetRemovalAllowance | xs:boolean | 0..1 |  |
| IPEDiscoveryRequest | (anonymous) | 0..1 |  |
| IPEDiscoveryRequest/originator | m2m:ID | 1 | This element shall only be present if the IPEDiscoveryRequest parent element is present. Otherwise it shall not. |
| IPEDiscoveryRequest/filterCriteria | m2m:filterCriteria | 1 | This element shall only be present if the IPEDiscoveryRequest parent element is present. Otherwise it shall not. |
| *AERegistrationPointChange* | xs:boolean | 0..1 |  |
| *AEReferenceIDChange* | xs:boolean | 0..1 |  |
| *trackingID1* | m2m:ID | 0..1 |  |
| *trackingID2* | m2m:ID | 0..1 |  |
| *subscribedTo* | m2m:ID | 0..1 |  |

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

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 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 the *notification*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 content of 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 a timeSeriesNotification (Refer to clause 6.3.5.69 for timeSeriesNotification description).

In addition to the procedure described above, if the *primitiveProfileID* attribute of the <subscription> resource is configured with the resource identifier of a <primitiveProfile> resource, then the Originator shall apply the <primitiveProfile> resource to the request parameters of the Notify request primitive by adding, replacing or deleting any applicable request parameters defined in the *additions* or *deletions* attributes of the referenced <primitiveProfile> resource.

If *notificationContentType* is set to "Modified Attributes" or "All Attributes", the Originator shall also apply the referenced <primitiveProfile> resource to the representation of the subscribed-to resource or the child resource of the subscribed-to resource that is included in the content of the notification, if applicable. Before doing this the Originator shall make the following checks:

* Check that the primitive profile’s *resourceTypes* and *resourceIDs* attributes match the subscribed-to resource or the child resource of the subscribed-to resource that is included in the content of the notification.
* Check that the primitive profile’s *operations* attribute includes the Notify operation and the *releaseVersions* attribute matches the release version indicator of the notification.
* Check that the *applicability* attribute includes the value “NOTIFICATIONS\_FROM\_CSE”.

If all these checks are successful, the Originator shall apply the <primitiveProfile> resource to the resource attributes included in the content of the notification by adding, replacing or deleting resource attributes defined in the *additions* and *deletions* attribute of the <primitiveProfile> resource.

In addition to the procedures above and if *notificationContentType* is either set to “Modified Attributes”, “Trigger Payload” or “TimeSeries notification” then the *subscribedTo* attribute of the notification shall contain the resource ID of the subscribed-to resource. Otherwise, the *subscribedTo* attribute shall not be present.

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 and the *rateLimit* attribute:

* See details in oneM2M TS-0001 [6], clause 10.2.10.7.
* If both the *batchNotify* and *primitiveProfileID* attributes of the <subscription> resource are configured, the Originator shall attempt to apply the referenced <primitiveProfile> resource to the individual notifications embedded within an aggregated notification using the same procedure as described in Step 2.1. In addition, the Originator shall also apply the primitive profile to the request parameters of the aggregated notification request primitive by adding, replacing or deleting any applicable request parameters defined in the *additions* or *deletions* attributes of the referenced <primitiveProfile> resource

NOTE: The use of some attributes such as *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. Any cached Notify request primitives are 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 any cached Notify request primitives 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 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 3 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 7.5.1.2.18 Cross-Resource Notification

When the <crossResourceSubscription> Hosting CSE receives a notification from the Host of a <subscription> indicated in *regularResourcesAsTarget* or *subscriptionResourcesAsTarget* the <crossResourceSubscription> Hosting CSEshall perform the following steps:

1. The Hosting CSE shall send a notification response to the <subscription> resource Hosting CSE.
2. Aggregate notifications using the time window mechanism indicated by *timeWindowType* attribute of the <crossResourceSubscription> resource to determine if a cross-resource notification shall be issued:

a) The Hosting CSE shall store the received notification until the current time window expires. When the current time window expires, the Hosting CSE shall discard stored notifications:

i) If *timeWindowType* is PERIODICWINDOW then a new time window shall be started when the current time window expires.

ii) If *timeWindowType* is SLIDINGWINDOW then a new time window shall be started when the next notification is received.

1. When notifications from all target <subscription> resources occur within the required time window the Hosting CSE shall compose a cross-resource notification in a notification data object with type m2m:notification:
2. Set the *subscriptionReference* element to the URI of the <crossResourceSubscription> resource.
3. 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 <crossResourceSubscription> resource shall be deleted as described in 7.4.58.2.4.
4. Send the notification to the notificationURI using the procedure defined in clause 7.5.1.2.2. The *subscribedTo* attribute shall not be included in the notification.
5. "Wait for Response primitive" procedure.

The **Subscriber or Notification Targets** which receive cross-resource notifications from the Hosting CSE shall perform the following steps in order:

1. "Create a success response" procedure defined in clause 7.3.3.12.
2. "Send the Response primitive" procedure.

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 3 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 4 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 8.2.5 Complex data types members

In protocol bindings complex data type member names shall be translated into short names of Table 8.2.5-1.

Table 8.2.5‑1: Complex data type member short names

| Member Name | | Occurs in | | | Short Name | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| createdBefore | | filterCriteria, eventNotificationCriteria | | | ***crb*** | | |
| createdAfter | | filterCriteria, eventNotificationCriteria | | | ***cra*** | | |
| modifiedSince | | filterCriteria, eventNotificationCriteria | | | ***ms*** | | |
| unmodifiedSince | | filterCriteria, eventNotificationCriteria | | | ***us*** | | |
| stateTagSmaller | | filterCriteria, eventNotificationCriteria | | | ***sts*** | | |
| stateTagBigger | | filterCriteria, eventNotificationCriteria | | | ***stb*** | | |
| expireBefore | | filterCriteria, eventNotificationCriteria | | | ***exb*** | | |
| expireAfter | | filterCriteria, eventNotificationCriteria | | | ***exa*** | | |
| labels | | filterCriteria, eventNotificationCriteria | | | ***lbl\**** | | |
| labelsQuery | | filterCriteria | | | ***lbq*** | | |
| resourceType | | filterCriteria, accessControlObjectDetails | | | ***ty\**** | | |
| sizeAbove | | filterCriteria, eventNotificationCriteria | | | ***sza*** | | |
| sizeBelow | | filterCriteria, eventNotificationCriteria | | | ***szb*** | | |
| contentType | | filterCriteria | | | ***cty*** | | |
| limit | | filterCriteria | | | ***lim*** | | |
| attribute | | filterCriteria, eventNotificationCriteria | | | ***atr*** | | |
| contentFilterSyntax | | filterCriteria | | | ***cfs*** | | |
| contentFilterQuery | | filterCriteria | | | ***cfq*** | | |
| level | | filterCriteria | | | ***lvl*** | | |
| offset | | filterCriteria | | | ***ofst*** | | |
| geoQuery | | filterCriteria | | | ***gq*** | | |
| geometryType | | geoQuery | | | ***gmty*** | | |
| geometry | | geoQuery | | | ***geom*** | | |
| geoSpatialFunction | | geoQuery | | | ***gsf*** | | |
| notificationEventType | | eventNotificationCriteria, notificationEvent | | | ***net*** | | |
| operationMonitor | | eventNotificationCriteria, notificationEvent | | | ***om*** | | |
| representation | | notificationEvent | | | ***rep*** | | |
| filterUsage | | filterCriteria | | | ***fu\**** | | |
| eventCatType | | eventCat | | | ***ect*** | | |
| eventCatNo | | eventCat | | | ***ecn*** | | |
| number | | batchNotify, missingData | | | ***num*** | | |
| duration | | batchNotify, missingData | | | ***dur*** | | |
| notification | | aggregatedNotification,  Request Primitive Content | | | ***sgn*** | | |
| notificationEvent | | notification | | | ***nev*** | | |
| verificationRequest | | notification | | | ***vrq*** | | |
| subscriptionDeletion | | notification | | | ***sud*** | | |
| subscriptionReference | | notification | | | ***sur*** | | |
| creator | | notification | | | ***cr\**** | | |
| notificationForwardingURI | | notification | | | ***nfu\**** | | |
| notificationTarget | | notification | | | ***ntt*** | | |
| targetRemovalRequest | | notification | | | ***trr*** | | |
| targetRemovalAllowance | | notification | | | ***tra*** | | |
| IPEDiscoveryRequest | | notification | | | ***idr*** | | |
| AERegistrationPointChange | | notification | | | ***aerp*** | | |
| AEReferenceIDChange | | notification | | | ***aerid*** | | |
| trackingID1 | | notification | | | ***tid1*** | | |
| trackingID2 | | notification | | | ***tid2*** | | |
| subscribedTo | | notification | | | ***sut*** | | |
| filterCriteria | | IPEDiscoveryRequest | | | ***fc\**** | | |
| operation | | operationMonitor, dynAuthDasRequest | | | ***op\**** | | |
| operations | | operationMonitor, filterCriteria, primitiveProfile | | | ***ops*** | | |
| originator | | operationMonitor, IPEDiscoveryRequest, dynAuthDasRequest | | | ***or\**** | | |
| action | | actionStatus, e2eQosPolicy | | | ***acn\**** | | |
| status | | actionStatus, e2eQosPolicy | | | ***sus\**** | | |
| childResource | | All except execInstance, announced resource, management resources from firmware | | | ***ch*** | | |
| accessControlRule | | privileges, selfPrivileges | | | ***acr*** | | |
| accessControlOriginators | | accessControlRule | | | ***acor*** | | |
| accessControlOperations | | accessControlRule | | | ***acop*** | | |
| accessControlContexts | | accessControlRule | | | ***acco*** | | |
| accessControWindow | | accessControlContexts | | | ***actw*** | | |
| accessControlIpAddresses | | accessControlContexts | | | ***acip*** | | |
| ipv4Addresses | | accessControlIpAddress | | | ***ipv4*** | | |
| ipv6Addresses | | accessControlIpAddress | | | ***ipv6*** | | |
| accessControlLocationRegion | | accessControlContexts | | | ***aclr*** | | |
| countryCode | | accessControlLocationRegion | | | ***accc*** | | |
| circRegion | | accessControlLocationRegion | | | ***accr*** | | |
| accessControlEvalCriteria | | accessControlContexts | | | ***acec*** | | |
| accessControlLimit | | accessControlContexts | | | ***acl*** | | |
| name | | attribute, anyArgType, mgmtLinkRef, childResourceRef, contentRef, listOfAttributes | | | ***nm\**** | | |
| specializationType | | childResourceRef, accessControlObjectDetails | | | ***spty\**** | | |
| containerDefinition | | specializationType | | | ***cnd\**** | | |
| mgmtDefinition | | specializationType | | | ***mgd\**** | | |
| value | | attribute, listOfAttributes | | | ***val*** | | |
| type | | anyArgType, childResourceRef, mgmtLinkRef, location | | | ***typ*** | | |
| maxNrOfNotify | | rateLimit | | | ***mnn*** | | |
| timeWindow | | rateLimit | | | ***tww*** | | |
| scheduleEntry | | scheduleElement | | | ***sce*** | | |
| aggregatedNotification | | Request Primitive Content | | | ***agn*** | | |
| attributeList | | Request Primitive Content | | | ***atrl*** | | |
| securityInfo | | Request Primitive Content, Response Primitive Content | | | ***seci*** | | |
| timeSyncBeaconNotification | | | Request Primitive Content | | | ***tsbn*** | |
| aggregatedResponse | | Response Primitive Content | | | ***agr*** | | |
| aggregatedRequestPrimitives | | Response Primitive Content | | | ***agrp*** | | |
| resource | | Response Primitive Content | | | ***rce*** | | |
| URIList | | Response Primitive Content | | | ***uril*** | | |
| debugInfo | | Response Primitive Content | | | ***dbg*** | | |
| queryResult | | Response Primitive Content | | | ***qres*** | | |
| anyArg | | resetArgsType, rebootArgsType, uploadArgsType, downloadArgsType, softwareInstallArgsType softwareUpdateArgsType, softwareUninstallArgsType, execReqArgsListType | | | ***any*** | | |
| fileType | | downloadArgsType | | | ***ftyp*** | | |
| URI | | resourceWrapper, dynAuthTokenReqInfo, resourcePermissions | | | ***uri*** | | |
| resourcePermission | | resourcePermissions | | | ***rpm*** | | |
| setOfACRs | | resourcePermissions | | | ***sacr*** | | |
| URL | | downloadArgsType | | | ***url\**** | | |
| username | | uploadArgsType, downloadArgsType, softwareUpdateArgsType, softwareUninstallArgsType | | | ***unm*** | | |
| password | | uploadArgsType, downloadArgsType, softwareUpdateArgsType, softwareUninstallArgsType | | | ***pwd*** | | |
| filesize | | downloadArgsType | | | ***fsi*** | | |
| targetFile | | downloadArgsType | | | ***tgf*** | | |
| delaySeconds | | downloadArgsType | | | ***dss*** | | |
| successURL | | downloadArgsType | | | ***surl*** | | |
| startTime | | downloadArgsType | | | ***stt*** | | |
| completeTime | | downloadArgsType | | | ***cpt*** | | |
| UUID | | softwareInstallArgsType softwareUpdateArgsType, softwareUninstallArgsType | | | ***uuid*** | | |
| executionEnvRef | | softwareInstallArgsType softwareUpdateArgsType, softwareUninstallArgsType | | | ***eer*** | | |
| version | | softwareUninstallArgsType, tokenClaimSet | | | ***vr\**** | | |
| reset | | execReqArgsListType | | | ***rst*** | | |
| reboot | | execReqArgsListType | | | ***rbo\**** | | |
| upload | | execReqArgsListType | | | ***uld*** | | |
| download | | execReqArgsListType | | | ***dld*** | | |
| softwareInstall | | execReqArgsListType | | | ***swin*** | | |
| softwareUpdate | | execReqArgsListType | | | ***swup*** | | |
| softwareUninstall | | execReqArgsListType | | | ***swun*** | | |
| tracingOption | | deliveryMetaData | | | ***tcop*** | | |
| tracingInfo | | deliveryMetaData | | | ***tcin*** | | |
| responseTypeValue | | responseTypeInfo | | | ***rtv*** | | |
| notificationURI | | responseTypeInfo | | | ***nu*** | | |
| timeOfDay | | deletionContexts | | | ***tod*** | | |
| locationRegions | | deletionContexts | | | ***lr*** | | |
| URIReference | | contentRef | | | ***urir*** | | |
| semanticsFilter | | filterCriteria | | | ***smf*** | | |
| missingData | | eventNotificationCriteria | | | ***md*** | | |
| tokenID | | tokenClaimSet, dynAuthLocalTokenIdAssignments | | | ***tkid*** | | |
| holder | | tokenClaimSet | | | ***tkhd\**** | | |
| issuer | | tokenClaimSet | | | ***tkis\**** | | |
| notBefore | | tokenClaimSet | | | ***tknb\**** | | |
| notAfter | | tokenClaimSet | | | ***tkna\**** | | |
| tokenName | | tokenClaimSet | | | ***tknm\**** | | |
| audience | | tokenClaimSet | | | ***tkau\**** | | |
| permissions | | tokenClaimSet | | | ***tkps\**** | | |
| extension | | tokenClaimSet | | | ***tkex\**** | | |
| permission | | tokenPermissions | | | ***pm*** | | |
| resourceIDs | | tokenPermission | | | ***ris*** | | |
| privileges | | tokenPermission, setOfPermissions | | | ***pv\**** | | |
| roleIDs | | tokenPermission | | | ***rids\**** | | |
| localTokenIdAssignment | | dynAuthLocalTokenIdAssignments | | | ***ltia*** | | |
| localTokenID | | dynAuthLocalTokenIdAssignment | | | ***lti*** | | |
| dasInfo | | dynAuthTokenReqInfo | | | ***dasi*** | | |
| securedDasRequest | | dynAuthTokenReqInfo | | | ***sdr*** | | |
| filterOperation | | filterCriteria, eventNotificationCriteria | | | ***fo*** | | |
| targetedResourceType | | dynAuthDasRequest | | | ***trt*** | | |
| originatorIP | | dynAuthDasRequest | | | ***oip\**** | | |
| ipv4Address | | dynAuthDasRequest, ipAddress | | | ***ip4*** | | |
| ipv6Address | | dynAuthDasRequest, ipAddress | | | ***ip6*** | | |
| originatorLocation | | dynAuthDasRequest | | | ***olo\**** | | |
| originatorRoleIDs | | dynAuthDasRequest | | | ***orid*** | | |
| requestTimestamp | | dynAuthDasRequest | | | ***rts*** | | |
| targetedResourceID | | dynAuthDasRequest | | | ***trid*** | | |
| proposedPrivilegesLifetime | | dynAuthDasRequest | | | ***ppl*** | | |
| roleIDsFromACPs | | dynAuthDasRequest | | | ***rfa*** | | |
| tokenIDs | | dynAuthDasRequest | | | ***tids*** | | |
| dynamicACPInfo | | dynAuthDasResponse | | | ***dai*** | | |
| grantedPrivileges | | dynAuthDasResponse | | | ***gp*** | | |
| privilegesLifetime | | dynAuthDasResponse | | | ***pl*** | | |
| tokens | | dynAuthDasResponse | | | ***tkns*** | | |
| securityInfoType | | securityInfo | | | ***sit*** | | |
| dasRequest | | securityInfo, dynAuthTokenReqInfo | | | ***dreq*** | | |
| dasResponse | | securityInfo | | | ***dres*** | | |
| dynAuthRelMapRequest | | securityInfo | | | ***darq*** | | |
| dynAuthRelMapResponse | | securityInfo | | | ***dars*** | | |
| esprimRandObject | | securityInfo | | | ***ero*** | | |
| esprimObject | | securityInfo | | | ***epo*** | | |
| escertkeMessage | | securityInfo | | | ***eckm*** | | |
| resourceRef | | listOfChildResourceRef | | | ***rrf*** | | |
| resourceRefList | | Response Primitive Content | | | ***rrl*** | | |
| esprimRandID | | originatorESPrimRandObject, receiverESPrimRandObject | | | ***esri*** | | |
| esprimRandValue | | originatorESPrimRandObject, receiverESPrimRandObject | | | ***esrv*** | | |
| esprimRandExpiry | | originatorESPrimRandObject, receiverESPrimRandObject | | | ***esrx*** | | |
| esprimKeyGenAlgID | | originatorESPrimRandObject | | | ***esk*** | | |
| esprimKeyGenAlgIDs | | receiverESPrimRandObject | | | ***esks*** | | |
| esprimProtocolAndAlgIDs | | originatorESPrimRandObject, receiverESPrimRandObject | | | ***espa*** | | |
| supportede2ESecFeatures | | e2eSecInfo | | | ***esf*** | | |
| certificates | | e2eSecInfo | | | ***escert*** | | |
| sharedReceiverESPrimRandObject | | e2eSecInfo | | | ***esro*** | | |
| networkAction | | backOffParameters | | | ***nwa*** | | |
| initialBackoffTime | | backOffParameters | | | ***ibt*** | | |
| additionalBackoffTime | | backOffParameters | | | ***abt*** | | |
| maximumBackoffTime | | backOffParameters | | | ***mbt*** | | |
| optionalRandomBackoffTime | | backOffParameters | | | ***rbt*** | | |
| backOffParametersSet | | backOffParameters | | | ***bops*** | | |
| dataLink | | listOfDataLinks | | | ***dali*** | | |
| attributeName | | dataLink | | | ***atn*** | | |
| dataContainerID | | dataLink | | | ***dcid*** | | |
| accessControlAuthenticationFlag | | accessControlRule | | | ***acaf*** | | |
| accessControlObjectDetails | | accessControlRule | | | ***acod*** | | |
| dataLinkEntry | | listOfDataLinks | | | ***dle*** | | |
| childResourceType | | accessControlObjectDetails, eventNotificationCriteria, filterCriteria | | | ***chty*** | | |
| parentResourceType | | filterCriteria | | | ***pty*** | | |
| childLabels | | filterCriteria | | | ***clbl*** | | |
| parentLabels | | filterCriteria | | | ***palb*** | | |
| childAttribute | | filterCriteria | | | ***catr*** | | |
| parentAttribute | | filterCriteria | | | ***patr*** | | |
| applyRelativePath | | filterCriteria | | | ***arp*** | | |
| sessionDescription | | sessionDescriptions | | | ***sdc*** | | |
| activityPattern | | activityPatternElements | | | ***apt*** | | |
| stationaryIndication | | activityPattern | | | ***sti*** | | |
| dataSizeIndicator | | activityPattern | | | ***dsi*** | | |
| eventNotificationCriteriaEntry | | eventNotificationCriteriaSet | | | ***encn*** | | |
| memberURI | | mashupMembers | | | ***muri*** | | |
| memberValue | | mashupMembers | | | ***mvl*** | | |
| coordinates | | location | | | ***crd*** | | |
| qosLevel | | e2eQosRequirements | | | ***qosl*** | | |
| resourceIDList | | e2eQosRequirements | | | ***ril*** | | |
| sessionSchedule | | e2eQosRequirements | | | ***ssch*** | | |
| numOfRequests | | e2eQosRequirements | | | ***nor*** | | |
| numOfBytes | | e2eQosRequirements | | | ***nob*** | | |
| accessControlUserIDs | | accessControlContexts | | | ***acui*** | | |
| timeSyncBeaconReference | | timeSyncBeaconNotification | | | ***tbr*** | | |
| currentTime | | timeSyncBeaconNotification | | | ***ctm\**** | | |
| timeOffset | | timeSyncBeaconNotification | | | ***tost*** | | |
| target | | setOfNotificationStatsInfo | | | ***tg\**** | | |
| requestsSent | | setOfNotificationStatsInfo | | | ***rqs*** | | |
| responsesReceived | | setOfNotificationStatsInfo | | | ***rsr*** | | |
| notificationEventCount | | | setOfNotificationStatsInfo | | | ***noec*** | |
| operator | | evalCriteria | | | ***optr*** | | |
| subject | | evalCriteria | | | ***sbjt*** | | |
| threshold | | evalCriteria | | | ***thld*** | | |
| contentString | | actionInput | | | ***cstr*** | | |
| resourceID | | actionInput | | | ***rsid*** | | |
| resourceAttributeID | | actionInput | | | ***raid*** | | |
| subjectResourceID | | softwareTriggerCriterion | | | ***srid*** | | |
| evalCriteria | | softwareTriggerCriterion | | | ***evcr*** | | |
| softwareTriggerCriterionEntry | | listOfSoftwareTriggerCriteria | | | ***stce*** | | |
| actionStatusEntry | | listOfActionStatuses | | | ***swid*** | | |
| accessControlAttributes | | accessControlRule | | | ***aca*** | | |
| evalCriteria | | stateTransition, listOfEvalCriteria | | | ***evc\**** | | |
| nextState | | stateTransition | | | ***nxst*** | | |
| stateTransition | | listOfStateTransitions | | | ***sttr*** | | |
| NOTE: \* marked short names have been already assigned in attribute Table 8.2.3-1 to Table 8.2.3-6. | | | | | | | |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 4 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*