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| CHANGE REQUEST |
| Meeting ID:\* | ARC 37.1 |
| Source:\* | Bob Flynn, Convida Wireless; Bob.Flynn@convidawireless.com |
| Date:\* | 2018-10-03 |
| Reason for Change/s:\* | Updates related to <crossResourceSubscription> |
| CR against: Release\* | Rel 3 |
| CR against: WI\* | [ ]  Active <Work Item number> [x]  MNT maintenance / < Work Item number(optional)>WI-0055Is this a mirror CR? Yes [ ]  No [x] 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-0001 V3.13.0 |
| Clauses \* | 9.6.58, 9.6.59, 10.2.10.1, 10.2.10.27, 9.6.1.1 |
| 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 |
| Impacted other TS/TR(s) | <TS/TR number>, <Version Number>, and <Description on which aspect should be reflected in this TS/TR> |
| 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 2017 (Do not modify) |

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# Introduction

This contribution addresses changes that were made to <crossResourceSubscription> while working on the protocol level contributions.

Basic concept for these changes is that while this resource re-uses the main concepts of <subscription> resources, it is not intended to have all of the uses of the <subscription> resource this does not prohibit underlying subscriptions from using all of the features, just the top level <crossResourceSubscription> does not have them all.

Change 1: Remove *notificationContentType*

Notification is an indication that ALL of the subscription conditions of the relevant <subscription> resources occurred. Since there are multiple subscriptions, use of this attribute becomes ambiguous in terms of what information it contains.

Change 2: Remove Resource Type *subscriptionLinkDeletion*

This was a new procedure to keep <crossResourceSubscription> synchronized with link in <subscription> resource. We were able to use the existing procedures to implement this synchronization.

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

### 9.6.58 Resource Type *crossResourceSubscription*

The <*crossResourceSubscription*> resource represents a cross-resource subscription over a set of target resources which could be existing *<subscription>* and/or other subscribable oneM2M resources. The Hosting CSE shall generate a cross-resource notifications only when expected changes occur on a designated number of target resources concurrently within a time window. The <*crossResourceSubscription*> resource shall specify the involved target resources in order to generate cross-resource notification.

The <*crossResourceSubscription*> resource shall contain the child resources specified in Table 9.6.58-1.

Table 9.6.58-1: Child resources of <*crossResourceSubscription*> resource

| Child Resources of <*crossResourceSubscription*> | Child Resource Type | Multiplicity | Description |
| --- | --- | --- | --- |
| *notificationSchedule* | *<schedule>* | 0..1 | See clause 9.6.9. |
| *[variable]* | *<notificationTargetMgmtPolicyRef>* | 0..n | See clause 9.6.31. |
| *nstr* | *<notificationTargetSelfReference>* | 1 | See clause 9.6.34. |
|  |  |  |  |

The <*crossResourceSubscription*> resource shall contain the attributes specified in Table 9.6.58-2.

Table 9.6.58-2: Attributes of <*crossResourceSubscription*> resource

| Attributes of <*crossResourceSubscription*> | Multiplicity | RW/RO/WO | Description |
| --- | --- | --- | --- |
| *resourceType* | 1 | RO | See clause 9.6.1.3. |
| *resourceID* | 1 | RO | See clause 9.6.1.3. |
| *resourceName* | 1 | WO | See clause 9.6.1.3. |
| *parentID* | 1 | RO | See clause 9.6.1.3. |
| *expirationTime* | 1 | RW | See clause 9.6.1.3.  |
| *accessControlPolicyIDs* | 0..1 (L) | RW | See clause 9.6.1.3. |
| *labels* | 0..1 (L) | RW | See clause 9.6.1.3. |
| *creationTime* | 1 | RO | See clause 9.6.1.3. |
| *lastModifiedTime* | 1 | RO | See clause 9.6.1.3. |
| *stateTag* | 1 | RO | See clause 9.6.1.3. |
| *announceTo* | 0..1 (L) | RW | See clause 9.6.1.3. |
| *announcedAttribute* | 0..1 (L) | RW | See clause 9.6.1.3. |
| *dynamicAuthorizationConsultationIDs* | 0..1 (L) | RW | See clause 9.6.1.3. |
| *creator* | 1 | RO | See clause 9.6.1.3. |
| *expirationCounter* | 0..1 | RW | See clause 9.6.8. |
| *notificationURI* | 1 (L) | RW | See clause 9.6.8. |
|  |  |  |  |
| *notificationEventCat* | 0..1 | RW | See clause 9.6.8. |
| *subscriberURI* | 0..1 | WO | See clause 9.6.8. |
| *regularResourcesAsTarget* | 0..1(L) | RW | This attribute indicates a list of regular resources (i.e. normal resources rather than *<subscription>* resources), which shall be used as the target resource for this cross-resource subscription. Here, the regular resource is referred to as any subscribable oneM2M resources.  |
| *subscriptionResourcesAsTarget* | 0..1(L) | RW | This attribute indicates a list of existing *<subscription>* resources, which shall be used as the target resource for this cross-resource subscription.  |
| *timeWindowType* | 1 | RW | This attribute indicates the type of time window mechanisms (e.g. *timeWindowType*=1 stands for periodic time window without any overlapping and *timeWindowType*=2 represents sliding time window where current time window will be slided to become next time window when a cross-resource notification is generated for instance) which will be used to determine the generation of a cross-resource notification.  |
| *timeWindowSize* | 1 | RW | This attribute indicates the size or time duration (e.g. in seconds) of the time window, based on which cross-resource notifications shall be generated. Note that the maximum window size (e.g. 60 seconds) may be enforced by the Hosting CSE for a subscriber; if the *timeWindowSize* indicated or requested by a subscriber is larger than the maximum window size, the Hosting CSE may reject the subscriber’s request for cross-resource subscription.  |
| *eventNotificationCriteriaSet* | 0..1(L) | RW | This attribute lists *eventNotificationCriteria* for each regular target resource as indicated in *regularResourcesAsTarget* attribute and involved in a cross-resource subscription. If there is only one *eventNotificationCriteria* contained in this attribute, it shall be applied to all target resources as indicated by *regularResourcesAsTarget* attribute. If only *subscriptionResourcesAsTarget* attribute appears (i.e. no *regularResourcesAsTarget* attribute), *eventNotificationCriteriaSet* shall not be needed. See clause 9.6.8 for the description of *eventNotificationCriteria*. |

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

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

##

9.6.59 VOID

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

### -----------------------Start of change 3-------------------------------------------

#### 10.2.10.1 Introduction

An Originator may create a *<subscription>* resource as a child resource of a subscribed-to resource on a Hosting CSE in order to instruct the Hosting CSE to send notifications to the Subscriber(s) of the subscribed-to resource when the subscribed-to resource is modified. After successful *<subscription>* resource creation, the Hosting CSE shall notify the Subscriber(s)of a modification of the subscribed-to resource that meets conditions configured in the *<subscription>* resource.

A subscription shall be represented by a *<subscription>* resource (see clause 9.6.8). This allows manipulation of the subscription in a resource oriented manner, e.g. the conditions of a subscription may be modified by modifying a *<subscription>* resource, or a resource subscriber may unsubscribe by deleting the *<subscription>* resource.

The following clauses describe procedures for Creation, Retrieval, Update and Deletion of a *<subscription>* resource.

The following clauses also describe procedures for Creation, Retrieval, Update, and Deletion of a *<crossResourceSubscription>* resource, and the procedure for generating cross-resource notification.

### -----------------------End of change 3-------------------------------------------

### -----------------------Start of change 4-------------------------------------------

### -----------------------End of change 4-------------------------------------------

### -----------------------Start of change 5-------------------------------------------

#### 9.6.1.1 Resource Type Summary

Table 9.6.1.1-1 introduces the normal and virtual resource types and their related child or parent resource types. Details of each resource type follow in the remainder of this clause.

Table 9.6.1.1-1 lists each specified ordinary – i.e. not announced – resource type. An addition of suffix "Annc" to the respective resource type identifier indicates the associated announced resource type. Resource types that can occur as child resources of announced resources are summarized in Table 9.6.26.1-1 "Announced Resource Types".

Among the resource types listed in Table 9.6.1.1-1, the following are termed "Content Sharing Resources" in oneM2M Specifications for the purpose of referring to any of those resource types:

* *container;*
* *contentInstance;*
* *flexContainer;*
* *timeSeries;*
* *timeSeriesInstance.*

Table 9.6.1.1-1: Resource Types

| Resource Type | Short Description | Child Resource Types | Parent Resource Types | Clause |
| --- | --- | --- | --- | --- |
| *accessControlPolicy* | Stores a representation of privileges. It is associated with resources that shall be accessible to entities external to the Hosting CSE. It controls "who" is allowed to do "what" and the context in which it can be used for accessing resources | *subscription, transaction* | *AE, AEAnnc, remoteCSE, remoteCSEAnnc, CSEBase* | 9.6.2 |
| *AE* | Stores information about the AE. It is created as a result of successful registration of an AE with the Registrar CSE | *subscription, container,* *flexContainer,**group, accessControlPolicy,* *pollingChannel, semanticDescriptor,**timeSeries, transaction, transactionMgmt,**triggerRequest, crossResourceSubscription, backgroundDataTransfer, semanticMashupInstance* | *CSEBase* | 9.6.5 |
| *container* | Shares data instances among entities. Used as a mediator that buffers data exchanged between AEs and/or CSEs. The exchange of data between AEs (e.g. an AE on a Node in a field domain and the peer-AE on the infrastructure domain) is abstracted from the need to set up direct connections and allows for scenarios where both entities in the exchange do not have the same reachability schedule | *container,* *flexContainer, contentInstance, subscription, latest, oldest，semanticDescriptor, timeSeries, transaction* | *AE, AEAnnc, container, containerAnnc, remoteCSE, remoteCSEAnnc,* *CSEBase,**flexContainer, flexContainerAnnc* | 9.6.6 |
| *contentInstance* | Represents a data instance in the *<container>* resource | *semanticDescriptor, transaction* | *Container, containerAnnc* | 9.6.7 |
| *flexContainer* | A template which allows to define specialized (customizable) versions of containers with a flexible and lightweight structure  | *container,* *flexContainer, subscription, semanticDescriptor, timeSeries, transaction* | *AE, AEAnnc, container, containerAnnc,* *flexContainer, flexContainerAnnc, remoteCSE, remoteCSEAnnc,* *CSEBase* | 9.6.35 |
| *CSEBase* | The structural root for all the resources that are residing on a CSE. Stores information about the CSE itself | *remoteCSE, remoteCSEAnnc, node, AE, container, group, accessControlPolicy, subscription, mgmtCmd, locationPolicy, statsConfig, statsCollect, request, delivery,**schedule,**notificationTargetPolicy,**flexContainer,**timeSeries, AEContactList, transaction, transactionMgmt, crossResourceSubscription, backgroundDataTransfer, semanticMashupJobProfile, semanticMashupInstance* | *None specified* | 9.6.3 |
| *delivery* | Forwards requests from CSE to CSE | *subscription, transaction* | *CSEBase* | 9.6.11 |
| *eventConfig* | Defines events that trigger statistics collection | *subscription, transaction* | *statsConfig* | 9.6.24 |
| *execInstance* | Contains all execution instances of the same Management Command | *subscription, transaction* | *mgmtCmd* | 9.6.17 |
| *fanOutPoint (V)* | Virtual resource containing target for group requestIt is used for addressing bulk operations to all the resources that belong to a group | *None specified* | *group* | 9.6.14 |
| *group* | Stores information about resources of the same type that need to be addressed as a Group. Operations addressed to a Group resource shall be executed in a bulk mode for all members belonging to the Group | *fanOutPoint,**subscription,**semanticFanOutPoint, semanticDescriptor, transaction* | *AE, AEAnnc, remoteCSE, remoteCSEAnnc, CSEBase* | 9.6.13 |
| *latest (V)* | Virtual resource that points to most recently created *<contentInstance>* and <*timeSeriesInstance*> child resource within a *<container>* *and a <timeSeries>* resource | *None specified* | *container, timeSeries* | 9.6.27 |
| *locationPolicy* | Includes information to obtain and manage geographical location. It is only referenced within a container, the *contentInstances* of the container provide location information | *subscription, transaction* | *CSEBase* | 9.6.10 |
| *mgmtCmd* | Management Command resource represents a method to execute management procedures required by existing management protocols | *execInstance,**subscription, transaction* | *CSEBase* | 9.6.16 |
| *mgmtObj* | Management Object resource represents management functions that provides an abstraction to be mapped to external management technology. It represents the node and the software installed in the node (see note) | *subscription, transaction, semanticDescriptor* | *node, mgmtObjAnnc* | 9.6.15Annex D |
| *m2mServiceSubscriptionProfile* | Data pertaining to the M2M Service Subscription | *serviceSubscribedNode,**subscription, transaction* | *CSEBase*  | 9.6.19 |
| *node* | Represents specific Node information | *mgmtObj,* *subscription, semanticDescriptor, schedule, transaction* | *CSEBase* | 9.6.18 |
| *notificationTargetMgmtPolicyRef* | Represents a list of notification targets and the deletion policy | *subscription, transaction* | *subscription* | 9.6.31 |
| *notificationTargetPolicy* | Represents a notification target deletion policy with pre-defined action and deletion rules | *subscription, policyDeletionRules, transaction* | *CSEBase* | 9.6.32 |
| *notificationTargetSelfReference (V)* | Virtual resource used to remove the Notification Target | *None specified* | *subscription* | 9.6.34 |
| *oldest (V)* | Virtual resource that points to first created *<contentInstance>* and <*timeSeriesInstance*> child resource within a *<container>* *and a <timeSeries>* resource | *None specified* | *container, timeSeries* | 9.6.28 |
| *pollingChannel* | Represent a channel that can be used for a request-unreachable entity | *pollingChannelURI* | *remoteCSE, AE* | 9.6.21 |
| *pollingChannelURI (V)* | Virtual resource used to perform service layer long polling of a resource Hosting CSE by a request-unreachable entity | *None specified* | *pollingChannel* | 9.6.22 |
| *policyDeletionRules* | Represents a set of rules which is associated with notification target removal policy | *subscription, transaction* | *notificationTargetPolicy* | 9.6.33 |
| *remoteCSE* | Represents a remote CSE for which there has been a registration procedure with the registrar CSE identified by the CSEBase resource | *container, containerAnnc,**contentInstanceAnnc* *flexContainer, flexContainerAnnc,**group, groupAnnc, accessControlPolicy, accessControlPolicyAnnc, subscription, pollingChannel,* *timeSeries,**timeSeriesAnnc, timeSeriesInstanceAnnc,**mgmtObjAnnc,**nodeAnnc,**AEAnnc,**locationPolicyAnnc, transaction, crossResourceSubscription, backgroundDataTransfer, semanticMashupJobProfile, semanticMashupJobProfileAnnc, semanticMashupInstance,**semanticMashupInstanceAnnc* | *CSEBase* | 9.6.4 |
| *request* | Expresses/access context of an issued Request | *subscription, transaction* | *CSEBase* | 9.6.12 |
| *schedule* | Contains scheduling information for delivery of messages | *subscription, transaction* | *subscription, CSEBase,* * *node*
 | 9.6.9 |
| *serviceSubscribedNode* | Node information | *subscription, transaction* | *m2mServiceSubscriptionProfile* | 9.6.20 |
| *statsCollect* | Defines triggers for the IN-CSE to collect statistics for applications | *subscription, transaction* | *CSEBase (in IN‑CSE)* | 9.6.25 |
| *statsConfig* | Stores configuration of statistics for applications | *eventConfig,**subscription, transaction* | *CSEBase (in IN‑CSE)* | 9.6.23 |
| *subscription* | Subscription resource represents the subscription information related to a resource. Such a resource shall be a child resource for the subscribe-to resource | *schedule, notificationTargetSelfReference, notificationTargetMgmtPolicyRef, transaction* | *accessControlPolicy, accessControlPolicyAnnc, AE, AEAnnc, container, containerAnnc, CSEBase, delivery, eventConfig, execInstance, group, groupAnnc, locationPolicy, locationPolicyAnnc, mgmtCmd, mgmtObj, mgmtObjAnnc, m2mServiceSubscriptionProfile, node, nodeAnnc, serviceSubscribedNode, remoteCSE, remoteCSEAnnc, request, schedule, scheduleAnnc,**semanticDescriptor, semanticDescriptorAnnc, statsCollect, statsConfig,**flexContainer, flexContainerAnnc,**timeSeries, timeSeriesAnnc* | 9.6.8 |
| *serviceSubscribedAppRule* | Represents a rule that defines allowed App-ID and AE-ID combinations that are acceptable for registering an AE on a Registrar CSE | *subscription, transaction* | *CSEBase* | 9.6.29 |
| *semanticDescriptor* | Stores semantic description pertaining to a resource and potentially sub-resources. | *subscription, transaction* | *AE, container, contentInstance, group, node, flexContainer, timeSeries, mgmtObj* | 9.6.30 |
| *semanticFanOutPoint* | Virtual resource used as target for semantic discovery aimed at a logical graph distributed over multiple *semanticDescriptor* resources, which belong to the corresponding *group* parent resource | *transaction* | *group* | 9.6.14a |
| *dynamicAuthorizationConsultation* | Represents consultation information used by a CSE when performing consultation-based dynamic authorization |  *transaction* | *AE, AEAnnc, remoteCSE, remoteCSEAnnc, CSEBase* | 9.6.40 |
| *timeSeries* | Stores and Shares Time Series Data instances among entities. | *timeSeriesInstance, subscription, semanticDescriptor,**latest, oldest, transaction* | *AE, AEAnnc, remoteCSE, remoteCSEAnnc, CSEBase,**container, containerAnnc, flexContainer, flexContainerAnnc* | 9.6.36 |
| *timeSeriesInstance* | Represents a Time Series Data instance in the *<timeSeries>* resource |  *transaction* | *timeSeries, timeSeriesAnnc* | 9.6.37 |
| *authorizationDecision* | Represents an access control decision point | *subscription, transaction* | *CSEBase* | 9.6.41 |
| *authorizationPolicy* | Represents an access control policy retrieval point | *subscription, transaction* | *CSEBase* | 9.6.42 |
| *authorizationInformation* | Represents an access control information point | *role**token**subscription, transaction* | *CSEBase* | 9.6.43 |
| *localMulticastGroup* | Stores local multicast group information of member hosting CSE. |  *transaction* | *CSEBase* | 9.6.44 |
| *AEContactList* | Contains information about a CSE that has resources that referencing an AE-ID | *AEContactListPerCSE, subscription* | *CSEBase* | 9.6.45 |
| *AEContactListPerCSE* | Contains information about a CSE that has resources that referencing an AE resource identifier for tracking purposes | *None specified* | *AEContactList* | 9.6.46 |
| *transactionMgmt* |  | *subscription* | *CSEBase, AE, remoteCSE* | 9.6.47 |
| *transaction* |  | *None specified* | *All non-virtual resource types with the exception of the following:**request, delivery, pollingChannel, transactionMgmt, transaction* | 9.6.48 |
| *triggerRequest* | Used by an AE to initiate, replace or recall a device trigger request  | *subscription* | *AE* | 9.6.49 |
| *ontologyRepository* | Represents the collection of the managed ontologies and the semantic validation service | *ontology, semanticValidation, subscription* | *CSEBase* | 9.6.50 |
| *ontology* | Store the representation of an ontology | *subscription* | *ontologyRepository* | 9.6.51 |
| *semanticValidation* | A virtual resource as the interface to perform semantic validation on the received <semanticDescriptor> resource against the referenced ontology. | *None specified* | *ontologyRepository* | 9.6.52 |
| *semanticMashupJobProfile* | Represents the profile and description of a semantic mashup service | *semanticMashupInstance, semanticDescriptor, subscription* | *CSEBase, remoteCSE* | 9.6.53 |
| *semanitcMashupInstance* | Represents a semantic mashup instance | *semanticMashupResult, semanticDescriptor, mashup, subscription* | *semanticMashupJobProfile, AE, remoteCSE, CSEBase* | 9.6.54 |
| *mashup* | A virtual resource use to trigger the calculation and generation of new mashup result | *Not specified* | *semanticMashupInstance* | 9.6.55 |
| *semanticMashupResult* | Represent semantic mashup results | *semanticDescriptor, subscription* | *semanticMashupInstance* | 9.6.56 |
| *multimediaSession* | Stores a representation of a multimedia session information requested by a registering AE | *subscription*  | *AE* | 9.6.57 |
| *crossResourceSubscription* | represents the cross-resource subscription information related to multiple subscribed-to resources. Such a resource shall include a list of subscribed-to resources as its attribute, or shall be created as a child resource of a <group> resource where member resources shall be the subscribed-to resources.  | *schedule, notificationTargetSelfReference, notificationTargetMgmtPolicyRef,*  | *CSEBase, remoteCSE, AE* | 9.6.58 |
|  |  |  |  |  |
| *backgroundDataTransfer* | Stores information for a background data transfer request | *None specified* | *AE, remoteCSE, CSEBase* | 9.6.60 |
| NOTE: See clause 9.6.12 for a summary of specializations of *<mgmtObj>.* |

### -----------------------End of change 5-------------------------------------------