**3GPP TSG-SA5 Meeting #130-e *S5-202086***

**Online, , 20th Apr 2020 - 28th Apr 2020**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **28.532** | **CR** | **0108** | **rev** | **1** | **Current version:** | **16.3.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | YANG-Push Notifications |
|  |  |
| ***Source to WG:*** | Ericsson Hungary Ltd |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | eNRM |  | ***Date:*** | 2020-04-09 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | An NRM solution set includes a modeling methodology, a set of models, a way to manipulate these models (operations) and a way to carry existing 3GPP CM notifications.The YANG/Netconf solution set needs a mapping for the the notifications : notifyMOICreation, notifyMOIDeletion, notifyMOIAttributeValueChanges. A notification mapping is proposed using the principles and methodology followed by Netconf and YANG, based on RFC 8641. |
|  |  |
| ***Summary of change:*** | Netconf/YANG SS for notifyMOICreation, notifyMOIDeletion, notifyMOIAttributeValueChanges. |
|  |  |
| ***Consequences if not approved:*** |  |
|  |  |
| ***Clauses affected:*** | 2, 12.1.3.X, 12.1.3.X.1 , 12.1.3.X.2 , 12.1.3.X.3 , 12.1.3.X.4 , 12.1.3.X.5 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | The YANG module module \_3gpp-common-https-notif has been validated with “pyang –strict” without errors.The proposed changes are visible in ETSI Forge at <https://forge.etsi.org/rep/3GPP/SA5/data-models/merge_requests/29> |
|  |  |
| ***This CR's revision history:*** |  |

|  |
| --- |
| **1st Change** |

2 References

- The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.526: "Telecommunication management; Life Cycle Management (LCM) for mobile networks that include virtualized network functions; Procedures".

[3] 3GPP TS 28.541: "Management and orchestration ; 5G Network Resource Model (NRM); Stage 2 and stage3".

[4] ITU-T Recommendation X.733 (02/92): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[5] 3GPP TS 28.531: "Management and orchestration ; Provisioning; ".

[6] 3GPP TS 28.554: "Management and orchestration ; 5G end to end Key Performance Indicators (KPI)".

[7] 3GPP TS 22.261: "Technical Specification Group Services and System Aspects; Service requirements for the 5G system; Stage 1".

[8] 3GPP TS 23.501: "Technical Specification Group Services and System Aspects; System Architecture for the 5G System; Stage 2".

[9] 3GPP TS 23.003: "Technical Specification Group Core Network and Terminals; Numbering, addressing and identification".

[10] ETSI GS NFV-IFA 013 V2.4.1 (2018-02) "Network Function Virtualization (NFV); Management and Orchestration; Os-Ma-nfvo Reference Point - Interface and Information Model Specification".

[11] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[12] ETSI GS NFV-IFA 015 (V2.4.1): "Network Function Virtualisation (NFV); Management and Orchestration; Report on NFV Information Model".

[13] 3GPP TS 28.533: "Management and orchestration; Architecture framework"

[14] ITU-T Recommendation X.734 (1992): "Information technology - Open Systems Interconnection - Systems management: Event report management function".

[15] 3GPP TS 32.158: "Management and orchestration; Design rules for REpresentational State Transfer (REST) Solution Sets (SS)".

[16] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP); Information Service (IS)".

[17] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[18] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[19] 3GPP TS 32.401: "Telecommunication management; Perfomance Measurement (PM); Concept and requirements".

[20] ISO 8601:2004: "Data elements and interchange formats – Information interchange – Representation of dates and times".

[21] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://docs.onap.org/en/latest/_downloads/2c2b5962df52a0c1f2862f3bba3d67c7/CommonEventFormat_30.1_ONAP.json>, accessed 21.03.2019.

[22] Figure Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the figure: <https://docs.onap.org/en/latest/submodules/vnfsdk/model.git/docs/files/ves7_1spec.html?highlight=heartbeatIntervalChange#resource-structure>, accessed 21.03.2019).

[23] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://docs.onap.org/en/latest/submodules/vnfsdk/model.git/docs/files/VESEventListener_7_0_1.html?highlight=ves%207#naming-standards-for-eventname>, accessed 11.04.2019).

[24] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://docs.onap.org/en/latest/submodules/vnfsdk/model.git/docs/files/VESEventListener_7_0_1.html?highlight=ves%207#datatype-commoneventheader>, accessed 11.04.2019).

[25] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects ".

[26] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".

[27] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".

[28] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".

[29] W3C REC-xml-names-19990114: "Namespaces in XML".

[30] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: https://onap.readthedocs.io/en/latest/submodules/vnfrqts/requirements.git/docs/Chapter8/ves7\_1spec.html#datatype-heartbeatfields, accessed 06.11.2019).

[31] 3GPP TS 32.111-2: " Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[32] IETF RFC 6241 "Network Configuration Protocol (NETCONF)".

[33] 3GPP TS 32.160 " Management and orchestration; Management service template ".

[34] IETF RFC 7950 "The YANG 1.1 Data Modeling Language".

[35] OpenAPI: "OpenAPI 3.0.1 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.1.md>.

[36] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[37] IETF RFC 7396: "JSON Merge Patch".

[x1] RFC 8641 "Subscription to YANG Notifications for Datastore Updates"

[x2] RFC 7951 "JSON Encoding of Data Modeled with YANG"

[x3] RFC 8341 "Network Configuration Access Control Model"

|  |
| --- |
| **2nd Change** |

#### 12.1.3.X Mapping of notifications

##### 12.1.3.X.1 Introduction

The mapping of these notifications for the YANG/Netconf solution set is based on the 3GPP TS 32.160 [33] clause 6.2 and on the “push-change-update” notification as defined by RFC 8641 [x1]. "push-change-update" is augmented by the module "\_3gpp-common-https-notif" with additional data items. Changes related to multiple Managed Objects may be combined into a single notification message following the RFC 8641 [x1] encoding rules.

The notifications shall be carried in a RestFul manner.

- Notifications shall be carried over the HTTP protocol over TLS using the POST method

- HTTP result codes shall be used

- Notifications shall use a URI to address the receiver/consumer.

- Notification data shall be encoded as JSON data according to RFC 7951 [x2].

- Outgoing notifications will be subject to access control as specified in RFC8641 [x1] section “Receiver Authorization”. The user-id used by Network Configuration Access Control Model [x3], is that of the receiver and is derived from the certificate presented by the receiver.

Following IETF practice the push-change-update notification shall be wrapped in a generic notification header including eventtime

{

 "ietf-https-notif:notification" : {

 "eventTime" : "1956-10-23T00:01:00Z",

 "ietf-yang-push:push-change-update" : {

 -- content of the notification as defined by RFC 8641 --

 }

 }

}

The push-change-update notification notification may be encapsulated in a VES event.

##### 12.1.3.X.2 Notification notifyMOICreation

This IS notification notifies the subscribed consumers that a new Managed Object Instance has been created. Creating a MOI in the Yang/Netconf Solution set means creating the list entry representing the MOI including creating the YANG data nodes representing its attributes.

The IS notification parameters are mapped to SS equivalents according to table 12.1.3.X.2-1.

Table 12.1.3.X.2-1: Mapping of IS notifyMOICreation parameters to SS equivalents

|  |  |  |  |
| --- | --- | --- | --- |
| **IS notification parameter name** | **SS parameter name** | **SQ** | **Remark** |
| objectClass | Part of the/push-change-update/datastore-changes/yang-patch/edit/target element | M |  |
| objectInstance | Identified by /push-change-update/datastore-changes/yang-patch/edit/target element | M |  |
| notificationId | /push-change-update/datastore-changes/yang-patch/patch-id | M |  |
| notificationType | Represented by an element under <notification> element/push-change-update/datastore-changes/yang-patch/edit/operation | M | The information that this is a push-change-update can be found under the notification element. Whether this represent a notifyMOICreation, notifyMOIDeletion or notifyMOIAttributeValueChange can be found in /push-change-update/datastore-changes/yang-patch/edit/operation  |
| eventTime | /Notification/eventTime | M |  |
| systemDN | /push-change-update/systemDN | O |  |
| correlatedNotifications | /push-change-update/correlatedNotifications | O |  |
| additionalText | /push-change-update/ datastore-changes/yang-patch/edit/additionalText | O |  |
| sourceIndicator | /push-change-update/datastore-changes/yang-patch/edit/sourceIndicator | O |  |
| attributeList | Contained inside the element /push-change-update/datastore-changes/yang-patch/edit/value | O |  |

##### 12.1.3.X.3 Notification notifyMOIDeletion

This IS notification notifies the subscribed consumers that an existing Managed Object Instance has been deleted. Deleting a MOI in the Yang/Netconf Solution set means deleting the list entry representing the MOI.

The IS notification parameters are mapped to SS equivalents according to table 12.1.3.X.3-1.

Table 12.1.3.X.3-1: Mapping of IS notifyMOIDeletion parameters to SS equivalents

|  |  |  |  |
| --- | --- | --- | --- |
| **IS notification parameter name** | **SS parameter name** | **SQ** | **Remark** |
| objectClass | Part of the/push-change-update/datastore-changes/yang-patch/edit/target element | M |  |
| objectInstance | Identified by /push-change-update/datastore-changes/yang-patch/edit/target element | M |  |
| notificationId | /push-change-update/datastore-changes/yang-patch/patch-id | M |  |
| notificationType | Represented by an element under <notification> element/push-change-update/datastore-changes/yang-patch/edit/operation | M | The information that this is a push-change-update can be found under the notification element. Whether this represent a notifyMOICreation, notifyMOIDeletion or notifyMOIAttributeValueChange can be found in /push-change-update/datastore-changes/yang-patch/edit/operation  |
| eventTime | /Notification/eventTime | M |  |
| systemDN | /push-change-update/systemDN | O |  |
| correlatedNotifications | /push-change-update/correlatedNotifications | O |  |
| additionalText | /push-change-update/ datastore-changes/yang-patch/edit/additionalText | O |  |
| sourceIndicator | /push-change-update/datastore-changes/yang-patch/edit/sourceIndicator | O |  |
| attributeList | Not supported, not needed | O |  |

##### 12.1.3.X.4 Notification notifyMOIAttributeValueChange

This IS notification notifies the subscribed consumers about changes of one or several attributes of a Managed Object Instance in the NRM.

The IS notification parameters are mapped to SS equivalents according to table 12.1.3.X.4-1.

Table 12.1.3.X.4-1: Mapping of IS notifyMOIAttributeValueChange parameters to SS equivalents

|  |  |  |  |
| --- | --- | --- | --- |
| **IS notification parameter name** | **SS parameter name** | **SQ** | **Remark** |
| objectClass | Part of the/push-change-update/datastore-changes/yang-patch/edit/target element | M |  |
| objectInstance | Identified by /push-change-update/datastore-changes/yang-patch/edit/target element | M |  |
| notificationId | /push-change-update/datastore-changes/yang-patch/patch-id | M |  |
| notificationType | Represented by an element under <notification> element/push-change-update/datastore-changes/yang-patch/edit/operation | M | The information that this is a push-change-update can be found under the notification element. Whether this represent a notifyMOICreation, notifyMOIDeletion or notifyMOIAttributeValueChange can be found in /push-change-update/datastore-changes/yang-patch/edit/operation  |
| eventTime | /Notification/eventTime | M |  |
| systemDN | /push-change-update/systemDN | O |  |
| correlatedNotifications | /push-change-update/correlatedNotifications | O |  |
| additionalText | /push-change-update/ datastore-changes/yang-patch/edit/additionalText | O |  |
| sourceIndicator | /push-change-update/datastore-changes/yang-patch/edit/sourceIndicator | O |  |
| attributeValueChange | Contained inside the element /push-change-update/datastore-changes/yang-patch/edit/value | M |  |

##### 12.1.3.X.5 Module \_3gpp-common-https-notif.yang

module \_3gpp-common-https-notif {

 yang-version 1.1;

 namespace urn:3gpp:sa5:\_3gpp-common-https-notif;

 prefix hnot3gpp;

 import ietf-yang-push { prefix yp; }

 import \_3gpp-common-yang-types { prefix types3gpp ; }

 organization "3gpp SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "The model defines an extension to IETF YANG-Push (RFC8641)

 to add 3GPP specific data to the push-change-update notification";

 reference "3GPP TS 28.532

 Generic management services";

 revision 2020-04-10 { reference CR-0108; }

 augment "/yp:push-change-update" {

 description "Augment the notification with 3GPP specific data.";

 leaf systemDN {

 type types3gpp:DistinguishedName ;

 description "It shall carry the DN of management service providers.";

 }

 list correlatedNotifications {

 leaf source {

 type types3gpp:DistinguishedName ;

 description "The entity emiting the notification as used in

 /push-change-update/systemDN." ;

 }

 leaf-list notificationId {

 type string;

 description "Id of a correlated notification as used in

 /push-change-update/datastore-changes/yang-patch/patch-id." ;

 }

 }

 }

 augment "/yp:push-change-update/yp:datastore-changes/yp:yang-patch/yp:edit" {

 description "Augment the notification with 3GPP specific data that maybe

 different for each change/edit.";

 leaf additionalText {

 type string ;

 description "It can contain further information in text on the

 event of the ManagedEntity(s).";

 }

 leaf sourceIndicator {

 type enumeration {

 enum RESOURCE\_OPERATION {

 value 1;

 description "The notification was generated in response to an

 internal operation of the resource.";

 }

 enum Management\_OPERATION {

 value 2 ;

 description "The notification was generated in response to a

 management operation applied across the managed object boundary

 external to the managed object.";

 }

 enum SON\_OPERATION {

 value 3 ;

 description "The notification was generated as result of a SON

 (Self Organising Network) process like self-configuration,

 self-optimization, self-healing etc. .";

 }

 enum UNKNOWN {

 value 4 ;

 description "It is not possible to determine the source of the

 operation.";

 }

 }

 description "Source of the operation that led to the generation of

 this notification";

 }

 }

}

|  |
| --- |
| **End of Change** |