**3GPP TSG-CT3 Meeting #112e C3-205061\_r1**

**E-Meeting, 04th – 13th November 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.551** | **CR** | **0040** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Essential corrections and alignments | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SBIProtoc16 | | | | |  | ***Date:*** | | | 2020-10-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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 can be 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The following corrections and alignments are necessary:   * The "Resource URI" column of Table 5.1.3.1-1 should contain a "<relative URI below root>" instead of a full resource URI, as per the API TS skeleton provided in TS 29.501. * The empty brackets in Figure 4.2.2.2-1 and Figure 4.2.3.3-1 could hint that the HTTP 200 OK response body is empty. * The "Notifications overview" table and the "Target URI" clause need to be updated to align with the SBI TS skeleton provided in TS 29.501. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Update the "Resource URI" column of Table 5.3.1-1 by replacing the full resource URI with the associated "<relative URI below root>", i.e. by removing the part "{apiRoot}/<apiName>/<apiVersion>". * Update Figure 4.2.2.2-1 and Figure 4.2.3.3-1 to remove the brackets. * Update the "Notifications overview" table and the "Target URI" clause to align with the updated SBI TS skeleton provided in TS 29.501. * Additional editorial corrections and improvements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Necessary corrections are not applied. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 1, 4.1.1, 4.1.2, 4.1.3.1, 4.2.1, 4.2.2.1, 4.2.2.2, 4.2.3.1, 4.2.3.2, 4.2.3.3, 4.2.4.2, 4.2.5.1, 4.2.5.2, 5.3.1, 5.3.2.3.1, 5.3.5.1, 5.5.1, 5.5.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | This CR does not impact OpenAPI specifications files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev 1: Revert the changes Table 5.5.1-1 related to the PFD Change Notifications to solve the clash with CR C3-205151 (#0049). | | | | | | | | |

\* \* \* Start of changes \* \* \* \*

1 Scope

The present document provides the stage 3 specification of the PFD Management Service of the 5G system.

The stage 2 definition and related procedures of the PFD Management Service are contained in 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4]. The 5G System Architecture is defined in 3GPP TS 23.501 [2].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition of the 5G System are specified in 3GPP TS 29.500 [5] and 3GPP TS 29.501 [6].

The Packet Flow Description Function (PFDF) provides the PFD Management Service to NF consumers (i.e. Session Management Function). The PFDF is a functionality within the NEF.

\* \* \* Next changes \* \* \* \*

### 4.1.1 Overview

The PFD Management Service, as defined as defined in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4], is provided by the Packet Flow Description Function (PFDF).

The only known NF Service Consumer is the SMF.

This service:

- allows an SMF to subscribe to and unsubscribe from PFD changes;

- notifies an SMF about changes of PFDs; and

- allows an SMF to retrieve PFDs.

\* \* \* Next changes \* \* \* \*

4.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Policy and Charging related 5G architecture is also described in 3GPP TS 23.503 [4].

The PFD Management Service is provided by the PFDF to NF service consumers (e.g. SMF) and shown in the SBI representation model in Figure 4.1.2-1. The PFDF is a functionality within the NEF.

NEF

PFDF

SMF

Nnef\_PFDmanagement

**Figure 4.1.2-1: Reference Architecture for the Nnef\_PFDmanagement Service; SBI representation**

NEF

PFDF

SMF

N29

**Figure 4.1.2-2: Reference Architecture for the Nnef\_PFDmanagement Service; reference point representation**

\* \* \* Next changes \* \* \* \*

#### 4.1.3.1 Packet Flow Description Function (PFDF)

The Packet Flow Description Function (PFDF):

- provides PFDs associated with one or more Application Identifiers; and

- allows NF consumers to subscribe to and unsubscribe from notifications on changes of PFDs for Application Identifiers.

\* \* \* Next changes \* \* \* \*

4.2.1 Introduction

Service operations defined for the Nnef\_PFDmanagement Service are shown in table 4.2.1-1.

**Table 4.2.1-1: Nnef\_PFDmanagement Service Operations**

|  |  |  |
| --- | --- | --- |
| **Service Operation Name** | **Description** | **Initiated by** |
| Nnef\_PFDmanagement\_Fetch | Provides the PFDs for application identifier(s) to the NF service consumer. | SMF |
| Nnef\_PFDmanagement\_Subscribe | Allows NF service consumers to subscribe to notifications on events when the PFDs for application identifier(s) change. | SMF |
| Nnef\_PFDmanagement\_Notify | Notifies NF service consumers to update and/or delete the PFDs for application identifier(s). | PFDF |
| Nnef\_PFDmanagement\_Unsubscribe | Allows NF service consumers to unsubscribe from notifications on PFDs change events. | SMF |

\* \* \* Next changes \* \* \* \*

#### 4.2.2.1 General

The Nnef\_PFDmanagement\_Fetch service operation provides means for the NF service consumer to retrieve the PFDs for one or more application identifier(s).

The following procedures using the Nnef\_PFDmanagement\_Fetch service operation are supported:

- Retrieval of PFDs.

\* \* \* Next changes \* \* \* \*

#### 4.2.2.2 Retrieval of PFDs

This procedure, as shown in Figure 4.2.2.2-1, is used to retrieve PFDs for an application identifier from the PFDF.



Figure 4.2.2.2-1: Retrieval of PFDs

1. The NF service consumer (e.g. SMF) shall send a GET request to the resource representing the PFDs for the requested application identifier(s):

- for PFDs of an individual application identifier, the request URI shall be set to "{apiRoot}/nnef‑pfdmanagement/v1/applications/{appId}"; and

- for PFD of a collection of application identifiers, the request URI shall be set to "{apiRoot}/nnef‑pfdmanagement/v1/applications/", with query parameters indicating the requested application identifier(s).

2. On success, an HTTP "200 OK" response shall be returned, with the payload body containing a representation of a "Individual application PFD" resource or a "PFD of applications" resource for the requested application identifier(s). If the PFD(s) of one or more requested application identifier(s) are not provided in the response, the NF service consumer (e.g. SMF) shall remove the PFD(s) of these requested application identifier(s).  
  
On failure, one of the HTTP status codes listed in table 5.3.2.3.1-3 or table 5.3.3.3.1-3 shall be returned. For "404 Not Found", the NF service consumer shall remove:

- all the PFD(s) existing in the NF service consumer if the request is for PFD(s) of all application identifiers;

- the PFD(s) of the requested application identifier(s) if the request is for PFD(s) of an individual application identifier or a set of application identifiers.

\* \* \* Next changes \* \* \* \*

#### 4.2.3.1 General

The Nnef\_PFDmanagement\_Subscribe service operation enables the NF service consumer to subscribe to notifications on events when the PFDs for application identifier(s) change.

The following procedures using the Nnef\_PFDmanagement\_Subscribe service operation are supported:

- Subscription for event notifications on PFDs change;

- Subscription update for event notifications on PFD change.

\* \* \* Next changes \* \* \* \*

#### 4.2.3.2 Subscription for event notifications on PFDs change

This procedure, as shown in Figure 4.2.3.2-1, is used to subscribe to notifications on events when the PFDs for application identifier(s) change.



Figure 4.2.3.2-1: Creation of a subscription for event notifications on PFDs change

1. The NF service consumer (i.e. SMF) shall send a POST request to the request URI representing the collection of PFD subscriptions resource "{apiRoot}/nnef‑pfdmanagement/v1/subscriptions". The request payload body shall include:

- subscribed application identifier(s) optionally, and;

- an URI where to receive the requested notifications as "notifyUri" attribute.

2. If the request is accepted, the PFDF shall:

- create a new subscription;

- assign a subscriptionId;

- store the subscription; and

- send an HTTP "201 Created" response, with The payload body containing a representation of the created subscription, and the Location header containing the resource URI of the created subscription "{apiRoot}/nnef-pfdmanagement/v1/subscriptions/{subscriptionId}".

Otherwise, one of the HTTP status codes listed in table 5.3.4.3.1-3 shall be returned.

\* \* \* Next changes \* \* \* \*

#### 4.2.3.3 Subscription update for event notifications on PFDs change

This procedure, as shown in Figure 4.2.3.3-1, is used to update an existing subscription to notifications on events when the PFDs for application identifier(s) change.



Figure 4.2.3.3-1: Update of a subscription for event notifications on PFDs change

1. If the feature PfdChgSubsUpdate is supported, the NF service consumer (i.e. SMF) shall send a PUT request to the resource URI representing the targeted PFD subscription resource "{apiRoot}/nnef‑pfdmanagement/v1/subscriptions/{subscriptionId}". The request payload body shall include:

- subscribed application identifier(s) optionally; and;

- an URI where to receive the requested notifications as "notifyUri" attribute.

2. If the feature PfdChgSubsUpdate is supported and the request is accepted, the PFDF shall:

- update the subscription; and

- send an HTTP "200 OK" response, with the payload body containing a representation of the updated subscription.

Otherwise, one of the HTTP status codes listed in table 5.3.5.3.1-3 shall be returned.

\* \* \* Next changes \* \* \* \*

#### 4.2.4.2 Notification of PFD change



Figure 4.2.4.2-1: Notification of PFD change

1. The PFDF shall send a POST request to the NF service consumer (e.g. SMF) targeting the URI "{notifyUri}", where {notifyUri} is the notification URI provided during the creation of the subscription resource, as specified in subclause 5.6.2.3. The payload body of the POST request shall contain one or more PfdChangeNotification data structure(s).

2 If the notification is accepted, the NF service consumer shall reply with:

- "204 No Content" indicating the successful provisioning of all PFDs; or

- "200 OK" and the payload body of the response shall contain "PfdChangeReport" data structure with detailed information of failed application(s).

Otherwise, one of the HTTP status codes listed in table 5.5.2.3.1-3 shall be returned.

\* \* \* Next changes \* \* \* \*

#### 4.2.5.1 General

The Nnef\_PFDmanagement\_Unsubscribe service operation is used by the NF service consumer to unsubscribe from notifications on PFD change events.

The following procedures using the Nnef\_PFDmanagement\_Unsubscribe service operation are supported:

- Unsubscribe from event notifications on PFDs change.

\* \* \* Next changes \* \* \* \*

#### 4.2.5.2 Unsubscribe from event notifications on PFDs change



Figure 4.2.5.2-1: Unsubscribe from event notifications on PFDs change

1. The NF Service Consumer (e.g. SMF) shall send a DELETE request to the resource URI representing the individual PFD subscription. The request body shall be empty.

2. If the request is accepted, an HTTP "204 No Content" response shall be returned. The response body shall be empty.  
  
Otherwise, one of the HTTP status codes listed in table 5.3.5.3.1-3 shall be returned.

\* \* \* Next changes \* \* \* \*

5.3.1 Resource Structure

****

**Figure 5.3.1-1: Resource URI structure of the Nnef\_PFDmanagement API**

Table 5.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method or custom operation** | **Description** |
| PFD of applications | /applications | GET | Nnef\_PFDmanagement\_Fetch.  Retrieve PFDs for all applications or for one or multiple applications using query parameters. |
| Individual application PFD | /applications/{appId} | GET | Nnef\_PFDmanagement\_Fetch.  Retrieve the PFD for an application. |
| PFD subscriptions | /subscriptions | POST | Nnef\_PFDmanagement\_Subscribe.  Subscribe the notification of PFD changes. |
| Individual PFD subscription | /subscriptions/{subscriptionId} | PUT | Update a subscription to PFD change notifications. |
| Individual PFD subscription | /subscriptions/{subscriptionId} | DELETE | Nnef\_PFDmanagement\_Unsubscribe.  Delete a subscription to PFD change notifications. |

\* \* \* Next changes \* \* \* \*

5.3.2.3.1 GET

This method shall support the URI query parameters specified in table 5.3.2.3.1-1.

**Table 5.3.2.3.1-1: URI query parameters supported by the GET method on this resource**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Data type** | **P** | **Cardinality** | **Description** |
| application-ids | array(ApplicationId) | M | 1..N | The requested application identifier(s) for which PFD(s) shall be returned. |
| supported-features | SupportedFeatures | O | 0..1 | To filter irrelevant responses related to unsupported features. |

This method shall support the request data structures specified in table 5.3.2.3.1-2 and the response data structures and response codes specified in table 5.3.2.3.1-3.

**Table 5.3.2.3.1-2: Data structures supported by the GET Request Body on this resource**

|  |  |  |  |
| --- | --- | --- | --- |
| **Data type** | **P** | **Cardinality** | **Description** |
| n/a |  |  |  |

**Table 5.3.2.3.1-3: Data structures supported by the GET Response Body on this resource**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data type** | **P** | **Cardinality** | **Response**  **codes** | **Description** |
| array(PfdDataforApp) | M | 0..N | 200 OK | The PFDs for one or more application identifier(s) provided in the request URI are returned. |
| NOTE: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [5] for the GET method shall also apply. | | | | |

\* \* \* Next changes \* \* \* \*

#### 5.3.5.1 Description

This resource represents an individual PFD subscription created by an NF service consumer of the Nnef\_PFDmanagement service.

\* \* \* Next changes \* \* \* \*

### 5.5.1 General

Notifications shall comply to subclause 6.2 of 3GPP TS 29.500 [5] and subclause 4.6.2.3 of 3GPP TS 29.501 [6].

Table 5.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description (service operation) |
| PFD Change Notification | {notifyUri}/notify | POST | Notification of PFD change. |

\* \* \* Next changes \* \* \* \*

#### 5.5.2.2 Target URI

The Notification URI **"{notifyUri}/notify"** shall be used with the URI variables defined in table 5.5.2.2-1.

Table 5.5.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notifyUri | Uri | The Notification Uri as assigned within the PFD subscriptions resource and described within the PfdSubscription data type (see table 5.6.2.3-1). |

\* \* \* End of changes \* \* \* \*