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# Foreword

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# 1 Scope

The present document provides the stage 3 specification of the PFD Management Service of 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 the NF consumers (i.e. Session Management Function). The PFDF is functionality within the NEF.

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# 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 23.501: "System Architecture for the 5G System; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".
- [5] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [6] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [7] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [8] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [9] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.
- [10] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".
- [11] 3GPP TS 29.122: "T8 reference point for Northbound APIs".
- [12] 3GPP TS 29.251: "Gw and Gwn reference points for sponsored data connectivity".
- [13] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [14] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [15] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [16] IETF RFC 7807: "Problem Details for HTTP APIs".
- [17] 3GPP TR 21.900: "Technical Specification Group working methods".
- [18] IETF RFC 6733: "Diameter Base Protocol".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

JSON	JavaScript Object Notation
NEF	Network Exposure Function
NRF	Network Repository Function
PFD	Packet Flow Description
PFDF	Packet Flow Description Function
SBI	Service Based Interface
SMF	Session Management Function

---

## 4 Packet Flow Description Management Service

### 4.1 Service Description

#### 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 the changed PFDs; and
- allows an SMF to retrieve PFDs.

#### 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 the SMF and shown in the SBI representation model in Figure 4.1.2-1. PFDF is functionality within NEF.

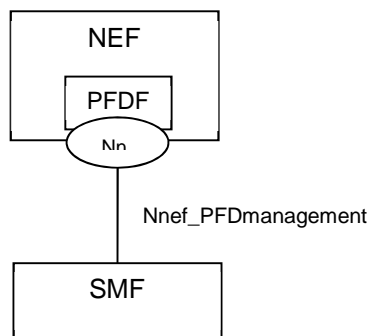


Figure 4.1.2-1: Reference Architecture for the Nnef\_PFDmanagement Service; SBI representation



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

## 4.1.3 Network Functions

### 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 the notification of changes of PFDs for Application Identifier.

### 4.1.3.2 NF Service Consumers

The SMF shall support:

- requesting and receiving the PFD(s) for one or more Application Identifiers.

## 4.2 Service Operations

### 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 the notification of events when the PFDs for application identifier change.	SMF
Nnef_PFDmanagement_Notify	Notifies NF service consumer to update and/or delete the PFDs for application identifier(s).	PFDF
Nnef_PFDmanagement_Unsubscribe	Allows NF service consumers to unsubscribe the notification of events.	SMF

## 4.2.2 Nnef\_PFDmanagement\_Fetch Service Operation

### 4.2.2.1 General

The Nnef\_PFDmanagement\_Fetch service operation provides a 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.

### 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. This procedure enables the NF service consumer to retrieve PFDs for an Application Identifier(s) from the PFDF when:

- a PCC rule with this application identifier is provided/activated by the PCF and the PFDs provided by the PFDF are not available at the NF service consumer; or
- the caching timer for an application identifier elapses and a PCC rule for this application identifier is still active.

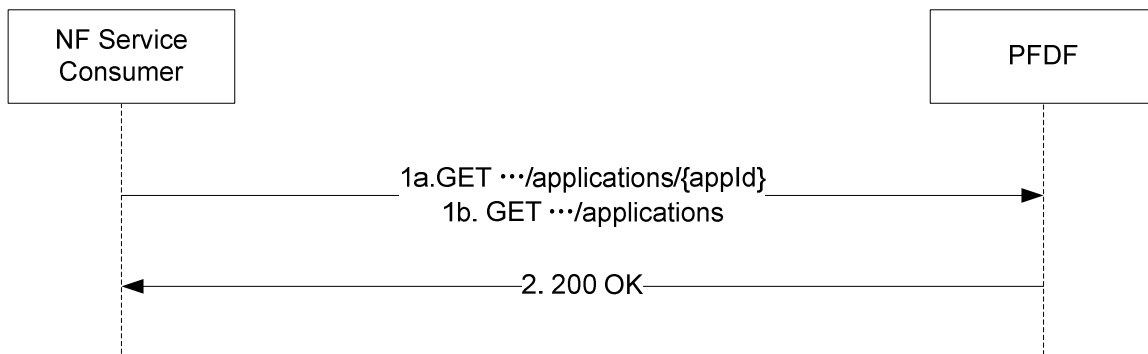
When the SMF removes the last PCC rule that refers to the corresponding application identifier, or when the caching timer expires and no PCC rule refers to the application identifier, the SMF may remove the PFD(s) related with the application identifier.

The PFDs retrieved from PFDF take precedence over any PFDs pre-configured in the SMF. If all PFDs retrieved from the PFDF are removed for an application identifier, the pre-configured PFDs shall be applied again for the application identifier.

The PFDF may provide caching time value together with the PFDs for an application identifier. The caching time value retrieved from the PFDF takes precedence over the default caching time value configured in the NF service consumer. If no caching time value is received from the PFDF, the configured default caching time value shall be applied.

NOTE 1: The NF service consumer(s) and the PFDF(s) within an operator network are configured with the same default caching time value to be applied for all application identifiers.

NOTE 2: The configuration of a caching time value per application identifier in the PFDF is based on the SLA between the operator and the ASP.



**Figure 4.2.2.2-1: Retrieval of PFDs**

1. The NF service consumer (i.e. SMF) shall send a GET request to the resource representing the PFD for application identifier(s) to be required:
  - for PFD of individual application identifier, the request URI shall include "{apiRoot}/nnef-pfdmanagement/v1/applications/{appld}" (as shown in figure 4.2.2.2-1, step 1a); and
  - for PFD of a collection of application identifiers, the request URI shall include "{apiRoot}/nnef-pfdmanagement/v1/applications" (as shown in figure 4.2.2.2-1, step 1b) with query parameters indicating the requested application identifier(s).
2. On success, "200 OK" shall be returned; the payload body of GET response shall contain a representation of "Individual application PFD" resource or "PFD of applications" resource for the requested application identifier(s). The NF service consumer shall replace the stored PFD(s) retrieved from the PFD with the new received PFD(s) for the requested application identifier(s). If the resource of one or more requested application identifier(s) is not provided in the response, the NF service consumer shall remove the PFD(s) of the requested application identifier(s) which is not included in the response and re-apply the pre-configured PFDs.

On failure, one of the HTTP status code 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 the PFD(s) of the requested application identifier(s) in the NF service consumer and re-apply the pre-configured PFDs.

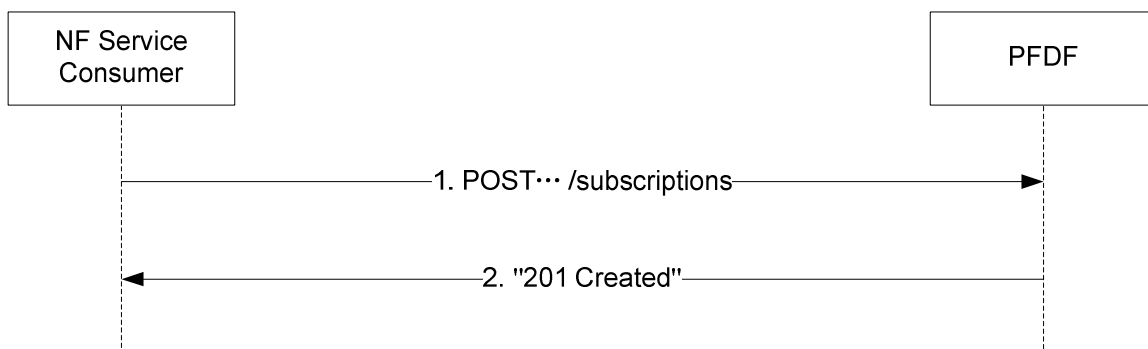
### 4.2.3 Nnef\_PFDmanagement\_Subscribe Service Operation

#### 4.2.3.1 General

The Nnef\_PFDmanagement\_Subscribe service operation enables NF service consumer to subscribe the notification of events when the PFDs for application identifier change.

#### 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 the notification of events when the PFDs for application identifier change.



**Figure 4.2.3.2-1: Creation of a subscription**

1. The NF service consumer (i.e. SMF) shall send a POST request to the request URI representing the PFD subscriptions resource "{apiRoot}/nnef-pfdmanagement/v1/subscriptions". The NF service consumer shall include the PfdSubscription data type in the request payload body. Within the PfdSubscription data type, the NF service consumer shall include:
  - an URI where to receive the requested notifications as "notifyUri" attribute;
 may include:
  - subscribed application identifier(s) within the "applicationIds" attribute.
2. If the request is accepted, the PFDF shall:
  - create a new subscription;
  - assign an subscriptionId;
  - store the subscription; and
  - send the response with "201 Created". The payload body shall contain a representation of the created subscription, and the Location header shall contain the URI of the created subscription "{apiRoot}/nnef-pfdmanagement/v1/subscriptions/{subscriptionId}".

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

NOTE: The PFDs that have been provisioned to the PFDF before the NF service consumer performs the subscription are not notified to the NF service consumer as a result of this subscription, but the NF service consumer can retrieve them before performing the subscription by invoking Nnef\_PFDmanagement\_Fetch Service Operation.

## 4.2.4 Nnef\_PFDmanagement\_Notify Service Operation

### 4.2.4.1 General

The Nnef\_PFDmanagement\_Notify service operation notifies the NF service consumer to update and/or delete the PFDs for application identifier(s).

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

- Management of PFDs.

### 4.2.4.2 Notification of PFD change

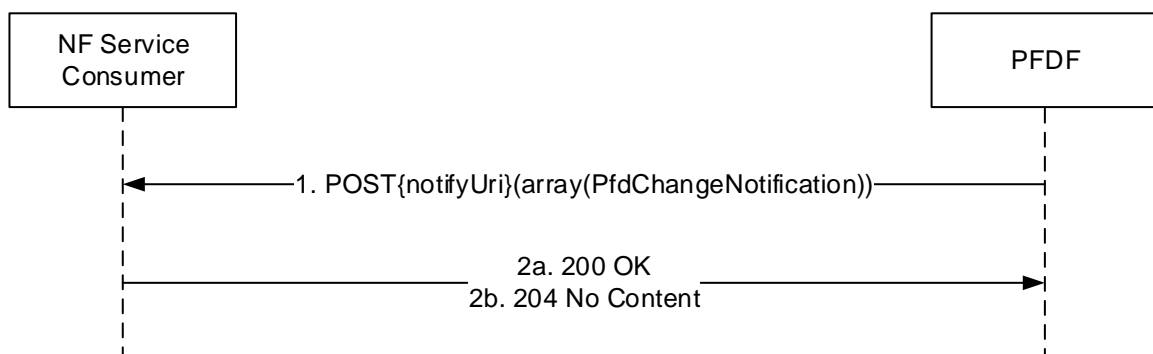


Figure 4.2.4.2-1: Notification of PFD change

1. The PFDF shall send a POST request to the NF service consumer (i.e. SMF) using the notifyUri provided during 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: