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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present document specifies the stage 3 protocol and data model for the Policy Control Event Exposure Service of the 5G System. It provides stage 3 protocol definitions, message flows and specifies the API for the Npcf Event Exposure service.

The 5G System stage 2 architecture and the procedures are specified in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4].

The 5G System stage 3 call flows are provided in 3GPP TS 29.513 [8].

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

The Policy Control Event Exposure Service is provided by the Policy Control Function (PCF). This service exposes policy control events observed at the PCF.

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] OpenAPI: "OpenAPI 3.0.0 Specification", https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md.

[8] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".

[9] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[10] 3GPP TS 29.507: "5G System; Access and Mobility Policy Control Service; Stage 3".

[11] 3GPP TS 29.525: "5G System; UE Policy Control Service; Stage 3".

[12] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[13] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[14] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[15] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[16] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[17] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[18] IETF RFC 7807: "Problem Details for HTTP APIs".

[19] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[20] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[21] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[22] 3GPP TR 21.900: "Technical Specification Group working methods".

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].

example: text used to clarify abstract rules by applying them literally.

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].

AF	Application Function
API	Application Programming Interface
DNN	Data Network Name
ePDG	evolved Packet Data Gateway
GPSI	Generic Public Subscription Identifier
HTTP	Hypertext Transfer Protocol
NEF	Network Exposure Function
NF	Network Function
NRF	Network Repository Function
PCF	Policy Control Function
RFSP	RAT Frequency Selection Priority
S-NSSAI	Single Network Slice Selection Assistance Information
SUPI	Subscription Permanent Identifier
URSP	UE Route Selection Policy

4 Npcf_EventExposure Service

4.1 Service Description

4.1.1 Overview

The Policy Event Exposure Service, as defined in 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4], is provided by the Policy Control Function (PCF).

This service:

- allows NF service consumers to subscribe, modify and unsubscribe for policy control events; and
- notifies NF service consumers with a corresponding subscription about observed events on the PCF.

The types of observed events include:

- PLMN identifier notification; and
- Access type change.

The target of the event reporting may include a group of UE(s) or any UE (i.e. all UEs). When the event occurs, to which the NF service consumer has subscribed to, the PCF reports the requested information to the NF service consumer based on the event reporting information definition requested by the NF service consumer (see 3GPP TS 23.502 [3], subclause 4.15.1).

4.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Policy and Charging related 5G architecture and signalling flows are also described in 3GPP TS 29.513 [8].

The Policy Event Exposure Service (Npcf_EventExposure) is part of the Npcf service-based interface exhibited by the Policy Control Function (PCF).

The only known NF service consumer of the Npcf_EventExposure service is the Network Exposure Function (NEF).

The Npcf_EventExposure service is provided by the PCF and consumed by the NEF, as shown in figure 4.1.2-1 for the SBI representation model and in figure 4.1.2-2 for reference point representation model.

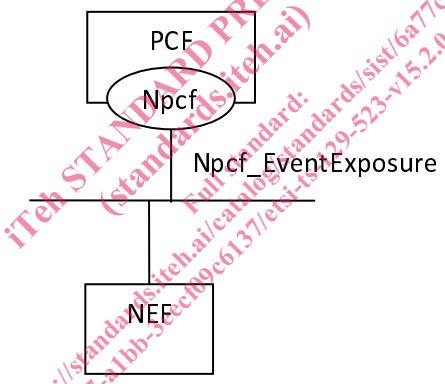

Figure 4.1.2-1: Npcf_EventExposure service Architecture, SBI representation

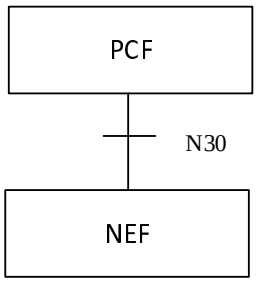

Figure 4.1.2-2: Npcf_EventExposure service Architecture, reference point representation

4.1.3 Network Functions

4.1.3.1 Policy Control Function (PCF)

The PCF (Policy Control Function) is a functional element that encompasses policy control decision and flow based charging control functionalities as defined in 3GPP TS 29.512 [9], access and mobility policy decisions for the control of the UE Service Area Restrictions and RAT/RFSP control as defined in 3GPP TS 29.507 [10] and UE Policy decisions for the control of Access network discovery and selection policy and UE Route Selection Policy (URSP) as defined in 3GPP TS 29.525 [11].

The policy control decision and flow based charging control functionalities enable the PCF to provide network control regarding the service data flow detection, gating, QoS and flow based charging (except credit management) towards the SMF/UPF. The PCF offers these capabilities to the NF service consumers (e.g. the AF and NEF) as defined in 3GPP TS 29.514 [12] and 3GPP TS 29.214 [13].

The Policy Event Exposure Service enables the PCF to report policy control events observed in one or more PCF services to NF service consumers.

4.1.3.2 NF Service Consumers

The Network Exposure Function (NEF) is a functional element that supports the following functionalities:

- The NEF securely exposes network capabilities and events provided by 3GPP NFs to AF.
- The NEF provides a means for the AF to securely provide information to 3GPP network and can authenticate, authorize and assist in throttling the AF.
- The NEF translates the information received from the AF to the one sent to internal 3GPP NFs, and vice versa.
- The NEF supports exposing information (collected from other 3GPP NFs) to the AF.

4.2 Service Operations

4.2.1 Introduction

Service operations defined for the Npcf_EventExposure Service are shown in table 4.2.1-1.

Table 4.2.1-1: Npcf_EventExposure Service Operations

Service Operation Name	Description	Initiated by
Npcf_EventExposure_Subscribe	This service operation is used by an NF service consumer to subscribe for event notifications on a specified policy control event for a group of UE(s) or any UE, or to modify a subscription.	NF service consumer (NEF)
Npcf_EventExposure_Unsubscribe	This service operation is used by an NF service consumer to unsubscribe from event notifications.	NF service consumer (NEF)
Npcf_EventExposure_Notify	This service operation is used by the PCF to report UE related policy control event(s) to the NF service consumer which has subscribed to the event report service.	PCF

4.2.2 Npcf_EventExposure_Subscribe service operation

4.2.2.1 General

This service operation is used by an NF service consumer to subscribe for policy events notifications on a specified context for a group of UE(s) or any UE, or to modify an existing subscription.

The following are the types of events for which a subscription can be made:

- PLMN identifier notification; and
- Change of Access Type.

The following procedures using the Npcf_EventExposure_Subscribe service operation are supported:

- creating a new subscription;
- modifying an existing subscription.

4.2.2.2 Creating a new subscription

Figure 4.2.2.2-1 illustrates the creation of a subscription.

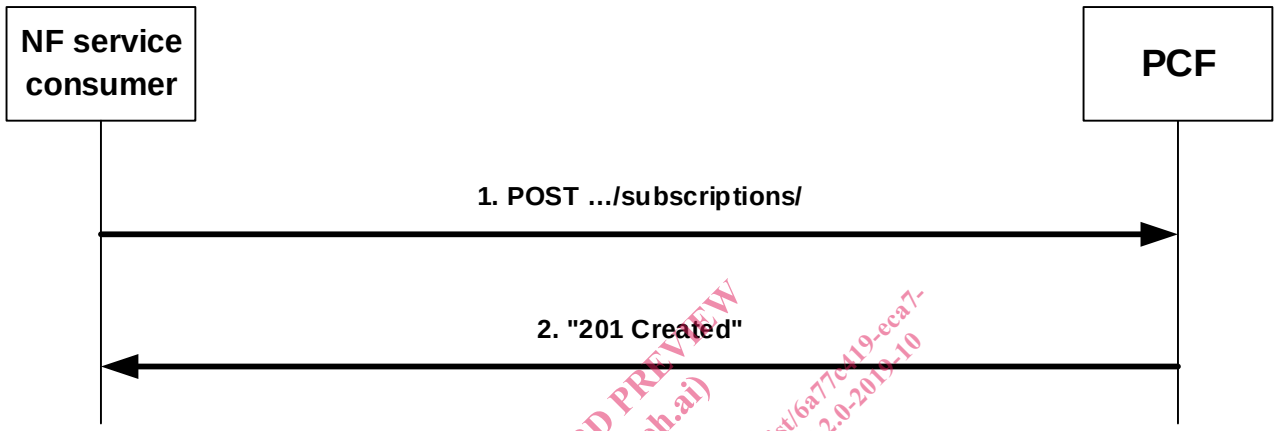

Figure 4.2.2.2-1: Creation of a subscription

To subscribe to event notifications, the NF service consumer shall send an HTTP POST request with: "{apiRoot}/npcf-eventexposure/v1/subscriptions/" as request URI as shown in figure 4.2.2.2-1, step 1, and the "PcEventExposureSubsc" data structure as request body.

The "PcEventExposureSubsc" data structure shall include:

- identification of the policy events to subscribe as "eventSubs" attribute;
- indication of the UEs to which the subscription applies via:
  a) identification of a group of UE(s) via a "groupId" attribute; or
  b) identification of any UE by ommitting the "groupId" attribute.
- a URI where to receive the requested notifications as "notifUri" attribute; and
- a Notification Correlation Identifier assigned by the NF service consumer for the requested notifications as "notifId" attribute.

The "PcEventExposureSubsc" data structure may include:

- description of the event reporting information as "eventsRepInfo", which may include:
  a) event notification method (periodic, one time, on event detection) as "notifMethod" attribute;
  b) Maximum Number of Reports as "maxReportNbr" attribute;
  c) Monitoring Duration as "monDur" attribute;
  d) repetition period for periodic reporting as "repPeriod" attribute; and/or
  e) immediate reporting indication as "immRep" attribute.