**3GPP TSG-CT3 Meeting #127-e C3-231032**

**E-Meeting, 17th – 21st April 2023**

**Source: Ericsson, Huawei**

**Title: Pseudo-CR on General clauses and Resource structure of Npcf\_PDTQPolicyControl API**

**Spec: 3GPP TS 29.543 V0.0.0**

**Agenda item: 18.31**

**Document for: Agreement**

**1. Introduction**

TS 29.543 is introduced under AIMLsys work item for the specification of new Data Transfer Policy Control Services.

**2. Reason for Change**

The general clauses, Resource structure and Notification of the new Npcf\_PDTQPolicyControl API need to be specified.

**3. Conclusions**

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 29.543 V0.0.0.

\*\*\* First 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 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 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[7] 3GPP TR 21.900: "Technical Specification Group working methods".

[8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

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

[10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

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

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

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

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

[20] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

\*\*\* Next Change \*\*\*

### 6.1.1 Introduction

The PDTQ Policy Control shall use the Npcf\_PDTQPolicyControl API.

The API URI of the Npcf\_PDTQPolicyControl API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName>shall be "npcf-pdtq-policy-control".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

\*\*\* Next Change \*\*\*

#### 6.1.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Npcf\_PDTQPolicyControl API is contained in clause A.2.

\*\*\* Next Change \*\*\*

##### 6.1.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

JSON object used in the HTTP PATCH request shall be encoded according to "JSON Merge Patch" and shall be signalled by the content type "application/merge-patch+json", as defined in IETF RFC 7396 [19].

\*\*\* Next Change \*\*\*

#### 6.1.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.1.3.1-1 depicts the resource URIs structure for the Npcf\_PDTQPolicyControl API.



Figure 6.1.3.1-1: Resource URI structure of the Npcf\_PDTQPolicyControl API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

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| --- | --- | --- | --- |
| Resource purpose/name | Resource URI (relative path after API URI) | HTTP method or custom operation | Description (service operation) |
| PDTQ policies | /pdtq-policies | POST | Creates a new Individual PDTQ policy resource. |
| Individual PDTQ policy | /pdtq-policies/{pdtqPolicyId} | GET | Reads an Individual PDTQ policy resource. |
| PATCH | Modifies an existing Individual PDTQ policy resource. |
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Editor's Note: Support of the PUT method to update an existing Individual PDTQ policy resource e.g. to renegotiate the different time window as indicated in 3GPP TS 23.503 [14] is FFS.

\*\*\* Next Change \*\*\*

#### 6.1.3.2 Resource: PDTQ policies (Collection)

\*\*\* Next Change \*\*\*

##### 6.1.3.2.1 Description

The PDTQ policies resource represents all PDTQ policies that exist in the PDTQ Policy Control service at a given PCF instance.

\*\*\* Next Change \*\*\*

##### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/npcf-pdtq-policy-control/<apiVersion>/pdtq-policies**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
|  |  |  |

\*\*\* Next Change \*\*\*

###### 6.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| n/a |  |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PdtqPolicyData | M | 1 | Contains information for the creation of a new Individual PDTQ policy resource. |

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| PdtqPolicyData | M | 1 | 201 Created | Successful case.An Individual PDTQ policy resource is created and a representation of that resource is returned. |
| NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. |

Editor's Note: Redirection cases and API specific error cases are FFS.

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Table 6.1.3.2.3.1-4: Headers supported by the 201 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure:{apiRoot}/npcf-pdtq-policy-control/<apiVersion>/pdtq-policies/{pdtqPolicyId} |

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##### 6.1.3.2.4 Resource Custom Operations

None.

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\*\*\* Next Change \*\*\*

#### 6.1.3.3 Resource: Individual PDTQ policy (Document)

##### 6.1.3.3.1 Description

The Individual PDTQ policy resource represents the planned data transfer with QoS requirements policy that exist in the PDTQ Policy Control service at a given PCF instance.

##### 6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/npcf-pdtq-policy-control/<apiVersion>/pdtq-policies/{pdtqPolicyId}**

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1. |
| pdtqPolicyId | string | Identifies the individual PDTQ policy resource in the PCF.To enable the value to be used as part of a URI, the string shall only contain allowed characters according to the "lower-with-hyphen" naming convention defined in clause 5.1.3 of 3GPP TS 29.501 [5] and rules for a path segment defined in IETF RFC 3986 [20]. |

##### 6.1.3.3.3 Resource Standard Methods

###### 6.1.3.3.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| n/a |  |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structures and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.1.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| PdtqPolicyData | M | 1 | 200 OK | A representation of an Individual PDTQ policy resource is returned. |
| NOTE: The mandatory HTTP error status code for the GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. |

Editor's Note: Redirection cases and API specific error cases are FFS.

###### 6.1.3.3.3.2 PATCH

This method shall support the URI query parameters specified in table 6.1.3.3.3.2-1.

Table 6.1.3.3.3.2-1: URI query parameters supported by the PATCH method on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| n/a |  |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.3.2-3.

Table 6.1.3.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PdtqPolicyPatchData | M | 1 | Contains modifications that shall be applied on the existing Individual PDTQ policy resource. |

Table 6.1.3.3.3.2-3: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| PdtqPolicyData | M | 1 | 200 OK | The Individual PDTQ policy resource is modified and a representation of that resource is returned. |
| n/a |  |  | 204 No Content | The Individual PDTQ policy resource is modified. |
| NOTE: The mandatory HTTP error status code for the PATCH method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. |

Editor's Note: Redirection cases and API specific error cases are FFS.

\*\*\* Next Change \*\*\*

### 6.1.4 Custom Operations without associated resources

No custom operation is defined in this Release of the specification.

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\*\*\* Next Change \*\*\*

#### 6.1.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

Table 6.1.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description (service operation) |
|  |  |  |  |
| PDTQ warning notification | {notifUri} | POST | Provides a PDTQ warning notification. |

\*\*\* Next Change \*\*\*

#### 6.1.5.2 PDTQ warning notification

\*\*\* Next Change \*\*\*

##### 6.1.5.2.1 Description

The PDTQ warning notification is used by the PCF to notify the NF service consumer about changed conditions for a planned data transfer with QoS requirements e.g. that a network performance in the area of interest goes below the criteria set by the operator.

\*\*\* Next Change \*\*\*

###### 6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-2.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| Notification | M | 1 | Provides a PDTQ warning notification. |

Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | The reception of a PDTQ warning notification is acknowledged. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. |

Editor's Note: Redirection cases and API specific error cases are FFS.

\*\*\* Next Change \*\*\*

### 6.1.7 Error Handling

\*\*\* Next Change \*\*\*

#### 6.1.7.1 General

For the Npcf\_PDTQPolicyControl API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Npcf\_PDTQPolicyControl API.

\*\*\* Next Change \*\*\*

#### 6.1.7.2 Protocol Errors

No specific procedures for the Npcf\_PDTQPolicyControl service are specified.

\*\*\* Next Change \*\*\*

#### 6.1.7.3 Application Errors

The application errors defined for the Npcf\_PDTQPolicyControl service are listed in table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
|  |  |  |

\*\*\* Next Change \*\*\*

### 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Npcf\_PDTQPolicyControl API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
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\*\*\* Next Change \*\*\*

### 6.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Npcf\_PDTQPolicyControl API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF service consumer, prior to consuming services offered by the Npcf\_PDTQPolicyControl API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Npcf\_PDTQPolicyControl service.

The Npcf\_PDTQPolicyControl API defines a single scope "npcf-pdtq-policy-control" for the entire service, and it does not define any additional scopes at resource or operation level.

\*\*\* End of Changes \*\*\*