**3GPP TSG-CT WG3 Meeting #135C3-243315**

**Hyderabad, IN, 27 - 31 May, 2024 (revision of C3-243abc)**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.543** | **CR** | **0007** | **rev** | **-** | **Current version:** | **18.0.0** |  |
|  |
| *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 |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Corrections on Npcf\_PDTQPolicyControl API |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | AIMLsys |  | ***Date:*** | 2024-05-10 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | * The PTDQ in the specification needs to be corrected to PDTQ.
* The PDTQ Reference ID can be used to identify the created Individual PDTQ policy resource, hence, this CR proposes to update the resource URI structure to replace the pdtqPolicyId with pdtqRefId.
* There is no need to define an independent attribute in the data model for PDTQ Reference ID.
* According to clause 5.2.5.9.2 in TS 23.502, the PDTQ policies are required in the response of the create message.
 |
|  |  |
| ***Summary of change:*** | * Update PTDQ to PDTQ.
* Update the resource URI structure to replace the pdtqPolicyId with pdtqRefId.
* Remove the "pdtqRefId" attribute from the PdtqPolicyData data type.
* Update the presence condition and description of "pdtqPolicies" attribute.
 |
|  |  |
| ***Consequences if not approved:*** | Errors in the specification. |
|  |  |
| ***Clauses affected:*** | 5.2.2.2.2, 5.2.2.4.2, 6.1.3.1, 6.1.3.3.2, 6.1.6.1, 6.1.6.2.2, 6.1.6.2.7, 6.1.6.3.2, A.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:*** | The CR introduces backward compatible corrections to the OpenAPI file for Npcf\_PDTQPolicyControl API. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

##### 5.2.2.2.2 Retrieval of PDTQ policies

This procedure is used by the NF service consumer to request PDTQ policies from the PCF, as defined in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [14].

Figure 5.2.2.2.2-1 illustrates retrieval of PDTQ policies.



Figure 5.2.2.2.2-1: Retrieval of PDTQ policies

In order to get PDTQ policies, the NF service consumer shall invoke the Npcf\_PDTQPolicyControl\_Create service operation by sending an HTTP POST request to the URI representing a "PDTQ policies" collection resource of the PCF (as shown in figure 5.2.2.2.2-1, step 1). The NF service consumer shall include in a body of the HTTP POST request a PdtqPolicyData data type which shall contain:

a) an ASP identifier in the "aspId" attribute;

b) an expected number of UEs in the "numOfUes" attribute;

c) a list of desired time windows in the "desTimeInts" attribute;

d) requested QoS requirements provided as a QoS Reference in the "qosReference" attribute or as a QoS parameter set in the "qosParamSet" attribute that shall contain one or more of the following individual QoS parameters:

1) Priority Level in the "priorLevel" attribute;

2) Maximum Burst Size:

A) if the Maximum Burst Size value is greater than 4095 Bytes in the "extMaxBurstSize" attribute; or

B) if the Maximum Burst Size value is lower than or equal to 4095 Bytes in the "maxBurstSize" attribute;

3) 5GS Delay in the "pdb" attribute;

4) Maximum Bitrate in downlink and/or uplink directions in the "maxBitRateDl" and/or "maxBitRateUl" attributes;

5) Guaranteed Flow Bitrate in downlink and/or uplink directions in the "gfbrDl" and/or "gfbrUl" attributes; and

6) Packet Error Rate in the "per" attribute,

and may contain:

a) a network area information (e.g. list of TAIs and/or list of NG-RAN nodes and/or list of cells identifiers) in the "nwAreaInfo" attribute;

b) an application identifier in the "appId" attribute;

c) a DNN corresponding to the ASP identifier, in the "dnn" attribute;

d) an S-NSSAI corresponding to the ASP identifier, in the "snssai" attribute;

e) alternative service requirements provided as:

1) one or more alternative QoS References in a prioritized order in the "altQosRefs" attribute; or

2) one or more alternative QoS Parameter Sets in a prioritized order in the "altQosParamSets" attribute which shall contain one or more of the following individual QoS parameters:

A) 5GS Delay in the "pdb" attribute;

B) Guaranteed Flow Bitrate in downlink and/or uplink directions in the "gfbrDl" and/or "gfbrUl" attributes; and

C) Packet Error Rate in the "per" attribute; and

f) a notification URI in the "notifUri" attribute and a request to enable a PDTQ warning notification for the planned data transfer with QoS requirements in the "warnNotifReq" attribute.

NOTE 1: The PCF can be configured to map the ASP identifier to a target DNN and S-NSSAI if the NF service consumer did not provide the DNN, S-NSSAI to the PCF.

Upon the reception of the HTTP POST request from the NF service consumer indicating a PDTQ policies request, the PCF:

a) shall invoke the Nudr\_DataRepository\_Query service operation, as described in 3GPP TS 29.504 [16] and 3GPP TS 29.519 [17], to request from the UDR all existing PDTQ policies;

b) may invoke the Nnwdaf\_EventsSubscription\_Subscribe service operation and/or the Nnwdaf\_AnalyticsInfo\_Request service operation as described in 3GPP TS 29.520 [18], to get from the NWDAF the Network Performance analytics or the DN Performance analytics;

NOTE 2: Whether the PCF subscribes to Network Performance analytics or DN Performance analytics is based on PCF configuration.

c) shall determine one or more acceptable PDTQ policy based on:

1) information provided by the NF service consumer; and

2) other available information (e.g. the network analytics related to "Network Performance" or "DN Performance", the existing PDTQ policies, the network policy);

d) shall create a PDTQ Reference ID;

e) shall send to the NF service consumer a "201 Created" response to the HTTP POST request, as shown in figure 5.2.2.2.2-1, step 2. The PCF shall include in the "201 Created" response a Location header field containing the URI of the created "Individual PDTQ policy" resource, and the response body with a PdtqPolicyData data type which shall contain:

1) acceptable PDTQ policy/ies in the "pdtqPolicies" attribute. For each included PDTQ policy, the PCF shall provide:

A) an identity of a PDTQ policy represented as an integer value greater than zero in the "pdtqPolicyId" attribute; and

B) recommended time window in the "recTimeInt" attribute; or

f) if the PCF cannot successfully fulfil the received HTTP POST request due to the internal PCF error or due to the error in the HTTP POST request, shall send the HTTP error response as specified in clause 6.1.7.

If the PCF included in the PdtqPolicyData data type:

- more than one PDTQ policy, the PCF shall wait for an indication about selected PDTQ policy from the NF service consumer as described in clause 5.2.2.3.2; or

- only one PDTQ policy, the PCF shall invoke the Nudr\_DataRepository\_Update service operation, as described in 3GPP TS 29.504 [16] and 3GPP TS 29.519 [17], to update the UDR with the selected PDTQ policy, the corresponding PDTQ Reference ID, the expected number of UEs, the list of desired time windows, the QoS Reference or individual QoS parameters, whether the AF accepts PDTQ policy renegotiation and, if available, the network area information and the alternative service requirements listed in a prioritized order for the provided ASP identifier.

\*\*\* 2nd Change \*\*\*

##### 5.2.2.4.2 Sending the PDTQ warning notification

This procedure is used by the PCF to provide a list of new candidate PDTQ policies to the NF service consumer due to a network performance or DN performance degradation, as defined in clause 4.16.15.2.2 of 3GPP TS 23.502 [3] and clause 6.1.2.7 of 3GPP TS 23.503 [14].

Figure 5.2.2.4.2-1 illustrates a PDTQ warning notification from the PCF.



Figure 5.2.2.4.2-1: PDTQ warning notification

When the PCF gets the notification from the NWDAF, that the network performance or DN performance in the requested area of interest reaches the reporting threshold as described in 3GPP TS 29.520 [18] and if the PDTQ warning notification is enabled, the PCF may try to renegotiate the affected PDTQ policies with the affected AFs. To do this, the PCF retrieves all the PDTQ policies together with their additionally stored AF provided information for PDTQ policy decision (e.g. their corresponding list of desired time windows, the number of UEs, etc.) from the UDR, identifies the PDTQ policy(ies) that are not desirable anymore due to the degradation of the network performance or DN performance and tries to calculate one or more new candidate PDTQ policies based on the AF provided information, the PDTQ policies retrieved from the UDR and the current network performance or DN performance. If the PCF does not find any new candidate PDTQ policy, the previously negotiated PDTQ policy shall be kept and no interaction with the NF service consumer shall occur.

If one or more new candidate PDTQ policies are calculated, the PCF shall invoke the Npcf\_PDTQPolicyControl\_Notify service operation by sending the HTTP POST request with a PDTQ warning notification to the NF service consumer.

The PCF shall include in a body of the HTTP POST request a "Notification" data type which shall contain:

- the list of candidate PDTQ policies in the "candPolicies" attribute.

NOTE: The AF might, or might not select a new PDTQ policy from the offered candidate list when receives the PDTQ warning notification.

Upon the reception of the HTTP POST request from the PCF, the NF service consumer shall acknowledge that request by sending an HTTP response message with the corresponding status code:

- if the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4];

- if the HTTP POST request from the PCF is accepted, the NF service consumer shall acknowledge the receipt of the notification with a "204 No Content" response to HTTP POST request, as shown in figure 5.2.2.4.2-1, step 2; or

- if the HTTP POST request from the PCF is not accepted, the NF service consumer shall send an HTTP error response as specified in clause 6.1.7.

\*\*\* 3rd 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

|  |  |  |  |
| --- | --- | --- | --- |
| 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/{pdtqRefId} | GET | Reads an Individual PDTQ policy resource. |
| PATCH | Modifies an existing Individual PDTQ policy resource. |

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. |

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/{pdtqRefId} |

\*\*\* 4th Change \*\*\*

##### 6.1.3.3.2 Resource Definition

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

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. |
| pdtqRefId | 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]. |

\*\*\* 5th Change \*\*\*

#### 6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Npcf\_PDTQPolicyControl service based interface protocol.

Table 6.1.6.1-1: Npcf\_PDTQPolicyControl specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| AltQosParamSet | 6.1.6.2.4 | Contains the alternative QoS requirements expressed as the list of individual QoS parameter sets. |  |
| Notification | 6.1.6.2.7 | Contains the PDTQ notification information. |  |
| PdtqPolicy | 6.1.6.2.5 | Describes a PDTQ policy. |  |
| PdtqPolicyData | 6.1.6.2.2 | Describes an Individual PDTQ policy resource. |  |
| PdtqPolicyPatchData | 6.1.6.2.6 | Represents modifications of an Individual PDTQ policy resource. |  |
| PdtqReferenceId | 6.1.6.3.2 | Represents a PDTQ Reference ID. |  |
| QosParameterSet | 6.1.6.2.3 | Contains the QoS requirements expressed as one or more individual QoS parameters. |  |

Table 6.1.6.1-2 specifies data types re-used by the Npcf\_PDTQPolicyControl service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Npcf\_PDTQPolicyControl service based interface.

Table 6.1.6.1-2: Npcf\_PDTQPolicyControl re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| 5QiPriorityLevel | 3GPP TS 29.571 [21] | Represents the 5QI Priority Level (see clauses 5.7.3.3 and 5.7.4 of 3GPP TS 23.501 [2]) within the range 1 to 127. |  |
| ApplicationId | 3GPP TS 29.571 [21] | Contains the application identifier. |  |
| BitRate | 3GPP TS 29.571 [21] | Represents the bitrate in kbits per second. |  |
| Dnn | 3GPP TS 29.571 [21] | Identifies a Data Network Name. |  |
| ExtMaxDataBurstVol | 3GPP TS 29.571 [21] | Represents the Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [2]), expressed in Bytes.Minimum = 4096. Maximum = 2000000. |  |
| MaxDataBurstVol | 3GPP TS 29.571 [21] | Represents the Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [2]), expressed in Bytes.Minimum = 1. Maximum = 4095. |  |
| NetworkAreaInfo | 3GPP TS 29.554 [22] | Describes a network area information in which the NF service consumer requests the number of UEs. |  |
| PacketDelBudget | 3GPP TS 29.571 [21] | Represents the Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP TS 23.501 [2]), expressed in milliseconds. |  |
| PacketErrRate | 3GPP TS 29.571 [21] | Represents the Packet Error Rate (see clause 5.7.3.5 and 5.7.4 of 3GPP TS 23.501 [2]), expressed as a "scalar x 10-k" where the scalar and the exponent k are each encoded as one decimal digit. |  |
| ProblemDetails | 3GPP TS 29.571 [21] | Used in error responses to provide more detailed information about an error. |  |
| RedirectResponse | 3GPP TS 29.571 [21] | Contains redirection related information. |  |
| Snssai | 3GPP TS 29.571 [21] | Identifies a Single Network Slice Selection Assistance Information. |  |
| SupportedFeatures | 3GPP TS 29.571 [21] | Used to negotiate the applicability of the optional features defined in table 6.1.8-1. |  |
| TimeWindow | 3GPP TS 29.122 [23] | Specifies a time interval. |  |
| Uri | 3GPP TS 29.571 [21] | String providing an URI. |  |

\*\*\* 6th Change \*\*\*

##### 6.1.6.2.2 Type: PdtqPolicyData

Table 6.1.6.2.2-1: Definition of type PdtqPolicyData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| altQosParamSets | array(AltQosParamSet) | O | 1..N | This IE contains the alternative QoS requirements expressed as the list of individual QoS parameter sets in a prioritized order.The lower the index of the array for a given entry, the higher the priority.(NOTE 4) |  |
| altQosRefs | array(string) | O | 1..N | This IE contains the alternative QoS requirements expressed as the list of QoS References in a prioritized order.The lower the index of the array for a given entry, the higher the priority.(NOTE 3) |  |
| appId | ApplicationId | O | 0..1 | This IE contains an application identifier. |  |
| aspId | string | M | 1 | This IE contains an identity of an application service provider. |  |
| desTimeInts | array(TimeWindow) | M | 1..N | This IE contains a list of desired time windows for PDTQ. |  |
| dnn | Dnn | O | 0..1 | This IE identifies a DNN. A full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.(NOTE 1) |  |
| notifUri | Uri | O | 0..1 | This IE contains an URI of the recipient of the PDTQ notification. |  |
| nwAreaInfo | NetworkAreaInfo | O | 0..1 | This IE represents a network area information in which the NF service consumer requests a number of UEs. |  |
| numOfUes | integer | M | 1 | This IE indicates a number of UEs. |  |
| pdtqPolicies | array(PdtqPolicy) | C | 1..N | This IE contains PDTQ policies.Shall be present in the response of the create message. |  |
|  |  |  |  |  |  |
| qosParamSet | QosParameterSet | C | 0..1 | This IE contains the requested QoS requirements expressed as one or more individual QoS parameters.(NOTE 2) |  |
| qosReference | string | C | 0..1 | This IE contains the requested QoS requirements expressed as the QoS Reference which represents a pre-defined QoS information.(NOTE 2) |  |
| selPdtqPolicyId | integer | O | 0..1 | This IE contains the identity of the selected PDTQ policy.(NOTE 5) |  |
| snssai | Snssai | O | 0..1 | This IE identifies a slice. |  |
| suppFeat | SupportedFeatures | O | 0..1 | This IE represents a list of Supported features used as described in clause 6.1.8. |  |
| warnNotifReq | boolean | O | 0..1 | This IE indicates whether the PDTQ warning notification is enabled or disabled.true: enabled;false: disabled (default). |  |
| NOTE 1: The PCF uses the DNN as received from the NF service consumer without applying any transformation. To successfully perform DNN matching, in a specific deployment a DNN shall always be encoded either with the full DNN (e.g., because there are multiple Operator Identifiers for a Network Identifier) or the DNN Network Identifier only. The NF service consumer may include the DNN Operator Identifier based on local configuration.NOTE 2: Either the "qosReference" attribute or the "qosParamSet" attribute shall be included.NOTE 3: The "altQosRefs" attribute may be included only if the ""qosReference" attribute is included.NOTE 4: The "altQosParamSets" attribute may be included only if the "qosParamSet" attribute is included.NOTE 5: The value "0" indicates that no PDTQ policy is selected. |

\*\*\* 7th Change \*\*\*

##### 6.1.6.2.7 Type Notification

Table 6.1.6.2.7-1: Definition of type Notification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| candPolicies | array(PdtqPolicy) | M | 1..N | This IE contains a list of the candidate PDTQ policies from which the AF may select a new PDTQ policy. |  |

\*\*\* 8th Change \*\*\*

##### 6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

|  |  |  |  |
| --- | --- | --- | --- |
| Type Name | Type Definition | Description | Applicability |
| PdtqReferenceId | string | Represents a PDTQ Reference ID. |  |

\*\*\* 9th Change \*\*\*

# A.2 Npcf\_PDTQPolicyControl API

openapi: 3.0.0

info:

 title: Npcf\_PDTQPolicyControl API

 version: 1.0.0-alpha.6

 description: |

 PCF PDTQ Policy Control service.

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externalDocs:

 description: 3GPP TS 29.543 V18.0.0; 5G System; Data Transfer Policy Control Services; Stage 3.

 url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.543/'

servers:

 - url: '{apiRoot}/npcf-pdtq-policy-control/v1'

 variables:

 apiRoot:

 default: https://example.com

 description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:

 - {}

 - oAuth2ClientCredentials:

 - npcf-pdtq-policy-control

paths:

 /pdtq-policies:

 post:

 summary: Creates a new Individual PDTQ policy resource.

 operationId: CreatePDTQPolicy

 tags:

 - PDTQ policies (Collection)

 requestBody:

 description: >

 Contains information for the creation of a new Individual PDTQ policy resource.

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PdtqPolicyData'

 responses:

 '201':

 description: >

 Created, an Individual PDTQ policy resource is created and a representation of that

 resource is returned.

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PdtqPolicyData'

 headers:

 Location:

 description: >

 Contains the URI of the created Individual PDTQ policy resource,

 according to the structure

 {apiRoot}/npcf-pdtq-policy-control/v1/pdtq-policies/{pdtqRefId}

 required: true

 schema:

 type: string

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 callbacks:

 PDTQNotification:

 '{$request.body#/notifUri}':

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/Notification'

 responses:

 '204':

 description: >

 No Content, the reception of a PDTQ warning notification is acknowledged.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 /pdtq-policies/{pdtqRefId}:

 get:

 summary: Reads an Individual PDTQ policy resource.

 operationId: GetIndPDTQPolicy

 tags:

 - Individual PDTQ policy (Document)

 parameters:

 - name: pdtqRefId

 description: String identifying the individual PDTQ policy resource in the PCF.

 in: path

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK, a representation of an Individual PDTQ policy resource is returned.

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PdtqPolicyData'

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 patch:

 summary: Modifies an existing Individual PDTQ policy resource.

 operationId: ModifyIndPDTQPolicy

 tags:

 - Individual PDTQ policy (Document)

 parameters:

 - name: pdtqRefId

 description: String identifying the individual PDTQ policy resource in the PCF.

 in: path

 required: true

 schema:

 type: string

 requestBody:

 description: >

 Contains modifications that shall be applied on the existing Individual PDTQ

 policy resource.

 required: true

 content:

 application/merge-patch+json:

 schema:

 $ref: '#/components/schemas/PdtqPolicyPatchData'

 responses:

 '200':

 description: >

 OK, the Individual PDTQ policy resource is modified and a representation of

 that resource is returned.

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PdtqPolicyData'

 '204':

 description: No Content, the Individual PDTQ policy resource is modified.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 npcf-pdtq-policy-control: Access to the Npcf\_PDTQPolicyControl API

 schemas:

# Structured data types

 PdtqPolicyData:

 description: Describes an Individual PDTQ policy resource.

 type: object

 required:

 - aspId

 - desTimeInts

 - numOfUes

 oneOf:

 - required: [qosReference]

 - required: [qosParamSet]

 properties:

 altQosParamSets:

 description: >

 Contains the alternative QoS requirements expressed as the list of individual

 QoS parameter sets in a prioritized order. The lower the index of the array for

 a given entry, the higher the priority.

 type: array

 items:

 $ref: '#/components/schemas/AltQosParamSet'

 minItems: 1

 altQosRefs:

 description: >

 Contains the alternative QoS requirements expressed as the list of QoS References

 in a prioritized order. The lower the index of the array for a given entry, the

 higher the priority.

 type: array

 items:

 type: string

 minItems: 1

 appId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'

 aspId:

 description: Contains an identity of an application service provider.

 type: string

 desTimeInts:

 description: Contains a list of desired time windows for PDTQ.

 type: array

 items:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

 minItems: 1

 dnn:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

 notifUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 nwAreaInfo:

 $ref: 'TS29554\_Npcf\_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'

 numOfUes:

 description: Indicates a number of UEs.

 type: integer

 pdtqPolicies:

 description: Contains PDTQ policies.

 type: array

 items:

 $ref: '#/components/schemas/PdtqPolicy'

 minItems: 1

 qosParamSet:

 $ref: '#/components/schemas/QosParameterSet'

 qosReference:

 description: >

 Contains the requested QoS requirements expressed as the QoS Reference which

 represents a pre-defined QoS information.

 type: string

 selPdtqPolicyId:

 description: Contains the identity of the selected PDTQ policy.

 type: integer

 snssai:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

 suppFeat:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 warnNotifReq:

 description: >

 Indicates whether the PDTQ warning notification is enabled (true) or

 disabled (false). Default value is false.

 type: boolean

 default: false

 QosParameterSet:

 description: >

 Contains the QoS requirements expressed as one or more individual QoS parameters.

 type: object

 properties:

 extMaxBurstSize:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/ExtMaxDataBurstVol'

 gfbrDl:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

 gfbrUl:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

 maxBitRateDl:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

 maxBitRateUl:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

 maxBurstSize:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/MaxDataBurstVol'

 pdb:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketDelBudget'

 per:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketErrRate'

 priorLevel:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/5QiPriorityLevel'

 AltQosParamSet:

 description: >

 Contains the alternative QoS requirements expressed as the list of individual QoS

 parameter sets.

 type: object

 properties:

 gfbrDl:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

 gfbrUl:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'

 pdb:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketDelBudget'

 per:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketErrRate'

 PdtqPolicy:

 description: Describes a PDTQ policy.

 type: object

 required:

 - pdtqPolicyId

 - recTimeInt

 properties:

 pdtqPolicyId:

 description: Contains an identity of a PDTQ policy.

 type: integer

 recTimeInt:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

 PdtqPolicyPatchData:

 description: Represents modifications of an Individual PDTQ policy resource.

 type: object

 properties:

 notifUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 selPdtqPolicyId:

 description: Contains the identity of the selected PDTQ policy.

 type: integer

 warnNotifReq:

 description: >

 Indicates whether the PDTQ warning notification is enabled (true) or

 disabled (false).

 type: boolean

 Notification:

 description: Contains the PDTQ notification information.

 type: object

 required:

 - candPolicies

 properties:

 candPolicies:

 description: >

 Contains a list of the candidate PDTQ policies from which the AF may select a new

 PDTQ policy.

 type: array

 items:

 $ref: '#/components/schemas/PdtqPolicy'

 minItems: 1

# Simple data types

 PdtqReferenceId:

 description: Represents a PDTQ Reference ID.

 type: string

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