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Foreword

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1 Scope

The present specification provides the stage 3 definition of the Background Data Transfer (BDT) Policy Control Service (Npcf_BDTPolicyControl) of the 5G System.

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The stage 2 definition and related procedures for BDT Policy Control Service are specified in 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 [5].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [6] and 3GPP TS 29.501 [7].

The Policy Control Function (PCF) provides the BDT Policy Control Service. This service provides background data transfer policy negotiation function.

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 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".
- [6] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [7] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [8] IETF RFC 9113: "HTTP/2".
- [9] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [10] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [11] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".
- [12] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Data, Application Data and Structured Data for exposure; Stage 3".
- [13] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [14] 3GPP TS 29.122: "T8 reference point for Northbound APIs".
- [15] IETF RFC 7396: "JSON Merge Patch".
- [16] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

- [17] IETF RFC 9457: "Problem Details for HTTP APIs".
- [18] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [19] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [20] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [21] 3GPP TR 21.900: "Technical Specification Group working methods".
- [22] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

3 Definitions 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].

Background data transfer: feature that enables a 3rd party service provider to keep their costs lower by favouring time windows for data transfer to specific UEs in a geographical area during non-busy hours that are less costly and able to handle larger bitrates.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.501 [2], clause 3.1 apply:

5G System

Network Function

NF service

NF service operation

Service based interface

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 |
| ASP | Application Service Provider |
| BDT | Background Data Transfer |
| DNN | Data Network Name |
| JSON | JavaScript Object Notation |
| NEF | Network Exposure Function |
| NG-RAN | Next Generation - Radio Access Network |
| NRF | Network Repository Function |
| NWDAF | Network Data Analytics Function |
| PCF | Policy Control Function |
| SBI | Service Based Interface |
| S-NSSAI | Single Network Slice Selection Assistance Information |
| TAI | Tracking Area Identity |
| UDR | Unified Data Repository |

4 Background Data Transfer Policy Control Service

4.1 Service Description

4.1.1 Overview

The BDT Policy Control 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 enables the NF service consumer to negotiate policy for a future background data transfer and offers the following functionalities:

- get background data transfer policies based on the request from the NF service consumer;
- update background data transfer policies based on the selection provided by the NF service consumer; and
- provide background data transfer warning notification to trigger renegotiation of background data transfer policy.

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 29.513 [5].

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

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

The NEF accesses the BDT Policy Control Service at the PCF via the N30 Reference point. In the roaming scenario, the N30 reference point is located between the PCF and the NEF in the home network only.

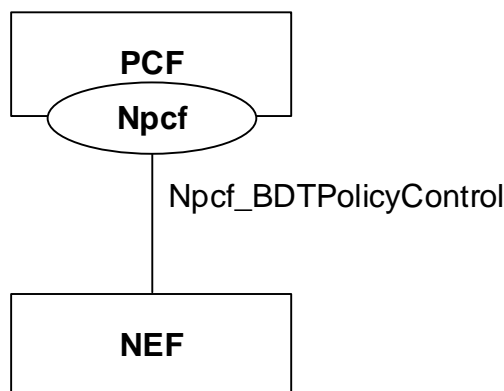


Figure 4.1.2-1: Reference Architecture for the Npcf_BDTPolicyControl Service; SBI representation

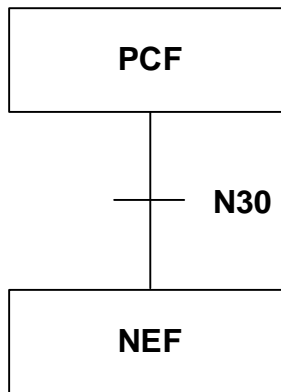


Figure 4.1.2-2: Reference Architecture for the Npcf_BDTPolicyControl Service; reference point representation

4.1.3 Network Functions

4.1.3.1 Policy Control Function (PCF)

The Policy Control Function (PCF):

- Provides background data transfer policies based on the request from the NF service consumer. The PCF determines, based on information provided by the NF service consumer and other available information (e.g. network policy, load status estimation for the requested time window, network area, etc.) one or more transfer policies.
- Updates background data transfer policy based on the selection provided by the NF service consumer.
- Sends the background data transfer warning notification to the NF service consumer.

4.1.3.2 NF Service Consumers

The Network Exposure Function (NEF):

- requests the PCF to provide background data transfer policies;
- provides the selected background data transfer policy to the PCF; and
- indicates to the PCF whether to provide a BDT warning notification.

4.2 Service Operations

4.2.1 Introduction

Table 4.2.1-1: Operations of the Npcf_BDTPolicyControl Service

| Service operation name | Description | Initiated by |
|------------------------------|--|--------------------------------|
| Npcf_BDTPolicyControl_Create | Creates a background data transfer policy based on the service requirements received from the NF service consumer. | NF service consumer (e.g. NEF) |
| Npcf_BDTPolicyControl_Update | Updates the PCF with the background data transfer policy selected by the NF service consumer. | NF service consumer (e.g. NEF) |
| Npcf_BDTPolicyControl_Notify | Sends the BDT notification to the NF service consumer. | PCF |

4.2.2 Npcf_BDTPolicyControl_Create service operation

4.2.2.1 General

The Npcf_BDTPolicyControl_Create service operation is used by an NF service consumer to create a BDT policy at the PCF.

The following procedure using the Npcf_BDTPolicyControl_Create service operation is supported:

- creation of a BDT policy.

4.2.2.2 Creation of a BDT Policy

This procedure is used by the NF service consumer to request the creation of a BDT policy at the PCF, as defined in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4].

Figure 4.2.2.2-1 illustrates creation of a BDT policy.

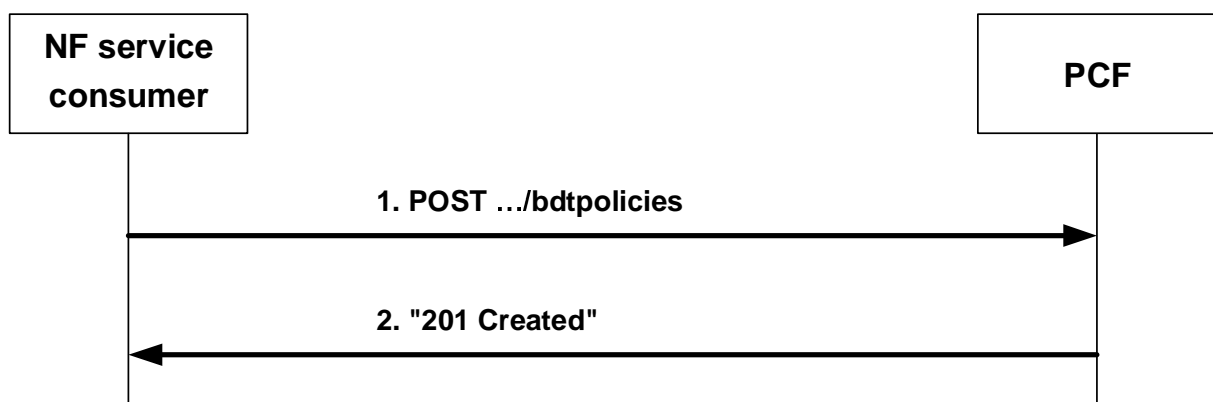


Figure 4.2.2.2-1: Creation of a BDT Policy

Upon reception of a Background Data Transfer request from the AF indicating a transfer policy request, the NF service consumer shall invoke the Npcf_BDTPolicyControl_Create service operation by sending an HTTP POST request to the URI representing a "BDT policies" collection resource of the PCF (as shown in figure 4.2.2.2-1, step 1). The NF service consumer shall include a "BdtReqData" data type in a content of the HTTP POST request. The "BdtReqData" data type shall contain:

- an ASP identifier in the "aspId" attribute;
- a volume of data per UE in the "volPerUe" attribute;
- an expected number of UEs in the "numOfUes" attribute;
- a desired time window in the "desTimeInt" attribute; and
- if "BdtNotification_5G" feature is supported a notification URI in the "notifUri" attribute,

and may include:

- a network area information (e.g. list of TAIs and/or NG-RAN nodes and/or cells identifiers) in the "nwAreaInfo" attribute;
- an identification of a group of UE(s) via an "interGroupId" attribute;
- a traffic descriptor of background data within the "trafficDes" attribute;
- if "BdtNotification_5G" feature is supported an indication whether BDT warning notification is requested in the "warnNotifReq" attribute; and
- a DNN and an S-NSSAI, corresponding to the ASP identifier, in the "dnn" attribute and the "snssai" attribute respectively.

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, the PCF shall send the HTTP error response as specified in clause 5.7.

Otherwise, upon the reception of the HTTP POST request from the NF service consumer indicating a BDT policy request, the PCF:

- may invoke the Nudr_DataRepository_Query service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12], to request from the UDR all stored transfer policies;

NOTE 1: In case only one PCF is deployed in the network, transfer policies can be locally stored in the PCF and the interaction with the UDR is not required.

- shall determine one or more acceptable transfer policies based on:
 - a) information provided by the NF service consumer; and
 - b) other available information (e.g. the existing transfer policies, network policy, load status estimation for the desired time window); and
- shall create a BDT Reference ID.

The PCF shall create an "Individual BDT Policy" resource and send to the NF service consumer a "201 Created" response to the HTTP POST request, as shown in figure 4.2.2.2-1, step 2. The PCF shall include in the "201 Created" response:

- a Location header field; and
- a "BdtPolicy" data type in the response content containing the BDT Reference ID in the "bdtRefId" attribute and acceptable transfer policy/ies in the "transPolicies" attribute.

The Location header field shall contain the URI of the created "Individual BDT Policy" resource i.e. "{apiRoot}/npcf-bdtpolicycontrol/v1/bdtpolicies/{bdtPolicyId}".

For each included transfer policy, the PCF shall provide:

- a transfer policy ID in the "transPolicyId" attribute;
- a recommended time window in the "recTimeInt" attribute; and
- a reference to charging rate for the recommended time window in the "ratingGroup" attribute,

and may provide a maximum aggregated bitrate for the uplink direction in the "maxBitRateUl" attribute and/or a maximum aggregated bitrate for the downlink direction in the "maxBitRateDl" attribute.

If the BdtNotification_5G feature is supported the PCF shall not assign value "0" for any transfer policy ID.

NOTE 2: As specified in clause 4.2.3.2, value "0" of transfer policy ID is reserved and indicates that no transfer policy is selected.

The PCF may map the ASP identifier into a target DNN and S-NSSAI based on local configuration if the NF service consumer did not provide the DNN and S-NSAAI to the PCF.

If the PCF included in the "BdtPolicy" data type:

- more than one transfer policy, the PCF shall wait for the transfer policy selected by the NF service consumer as described in clause 4.2.3; or
- only one transfer policy, the PCF may invoke the Nudr_DataRepository_Update service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12] clause 5.2.9.3.2, to update the UDR with the selected transfer policy, the corresponding BDT Reference ID, the volume of data per UE, the expected number of UEs and, if available, a network area information, the associated DNN and S-NSSAI for the provided ASP identifier, traffic descriptor of background data and if "BdtNotification_5G" feature is supported an indication whether BDT warning notification is requested.

NOTE 3: In case only one PCF is deployed in the network, transfer policies can be locally stored in the PCF and the interaction with the UDR is not required.

4.2.3 Npcf_BDTPolicyControl_Update service operation

4.2.3.1 General

The Npcf_BDTPolicyControl_Update service operation is used by an NF service consumer to update a BDT policy to the PCF.

The following procedure using the Npcf_BDTPolicyControl_Update service operation are supported:

- indication about selected transfer policy; and
- modification of a BDT warning notification request indication.

4.2.3.2 Indication about selected transfer policy

When the feature "PatchCorrection" is supported, this procedure is used by the NF service consumer to inform the PCF about selected transfer policy, as defined in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4], if the AF selected the transfer policy from the received transfer policy list after:

- retrieval of the BDT policies as described in clause 4.2.2; or
- reception of the BDT warning notification as described in clause 4.2.4.

Figure 4.2.3.2-1 illustrates an indication about selected transfer policy.

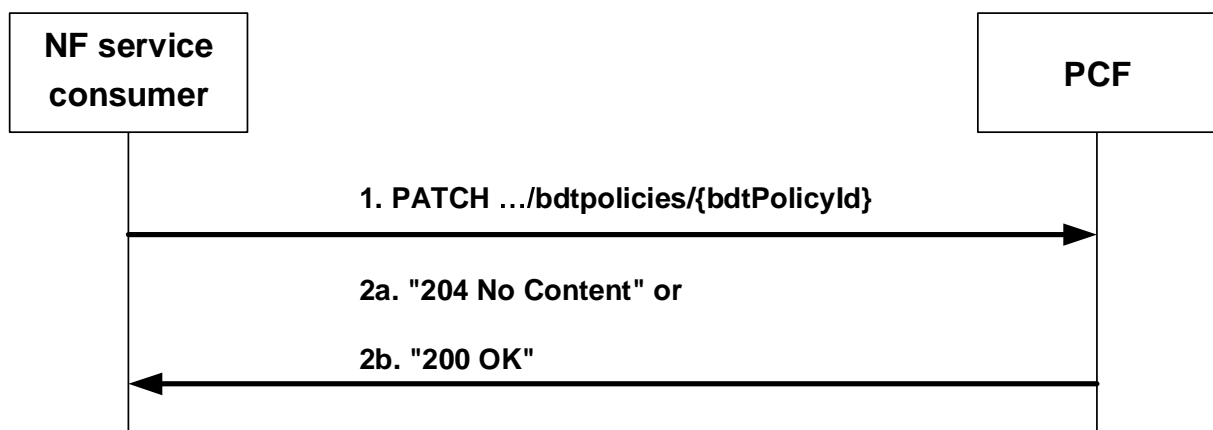


Figure 4.2.3.2-1: Indication about selected transfer policy

Upon reception of a Background Data Transfer request from the AF indicating transfer policy selection, the NF service consumer shall invoke the Npcf_BDTPolicyControl_Update service operation by sending an HTTP PATCH request to the PCF, as shown in figure 4.2.3.2-1, step 1. The NF service consumer shall set the request URI to "{apiRoot}/npcf-bdtpolicycontrol/v1/bdtpolicies/{bdtPolicyId}".

The NF service consumer shall include a "PatchBdtPolicy" data type in a content of the HTTP PATCH request. When the AF selects a transfer policy, the "PatchBdtPolicy" data type shall contain a "bdtPolData" attribute which shall encode the transfer policy ID of the selected transfer policy in the "selTransPolicyId" attribute. In the case of transfer policy re-negotiation and if the BdtNotification_5G feature is supported and the AF did not select any transfer policy, the NF service consumer shall set the "selTransPolicyId" attribute to value "0" to indicate no transfer policy is selected.

If the PCF cannot successfully fulfil the received HTTP PATCH request due to the internal PCF error or due to the error in the HTTP PATCH request, the PCF shall send the HTTP error response as specified in clause 5.7.

If the feature "ES3XX" is supported, and the PCF determines the received HTTP PATCH request needs to be redirected, the PCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [6].

Otherwise, upon the reception of the HTTP PATCH request from the NF service consumer, the PCF:

- in case of the initial transfer policy negotiation may invoke the Nudr_DataRepository_Update service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12] clause 5.2.9.3.2, to update the UDR with the

selected transfer policy, the corresponding BDT Reference ID, the volume of data per UE, the expected number of UEs and, if available, a network area information, the associated DNN and S-NSSAI for the provided ASP identifier, traffic descriptor of background data and if "BdtNotification_5G" feature is supported an indication whether BDT warning notification is requested; or

- in case of transfer policy re-negotiation may invoke:
 - a) if a transfer policy is selected the Nudr_DataRepository_Update service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12] clause 5.2.9.3.4, to update the UDR with the selected candidate transfer policy and set the "bdtStatus" attribute to value "VALID" within the BdtDataPatch data type; or
 - b) if no transfer policy is selected the Nudr_DataRepository_Delete service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12] clause 5.2.9.3.3, to remove the transfer policy from the UDR; and

NOTE: In case only one PCF is deployed in the network, transfer policies can be locally stored in the PCF and the interaction with the UDR is not required.

- shall send:
 - a) a "204 No Content" response (as shown in figure 4.2.3.2-1, step 2a); or
 - b) a "200 OK" response (as shown in figure 4.2.3.2-1, step 2b) with a "BdtPolicy" data type in the content, to the HTTP PATCH request to the NF service consumer.

4.2.3.3 Modification of BDT warning notification request indication

This procedure is used by an AF to modify a BDT warning notification request indication when the feature "BdtNotification_5G" and the feature "PatchCorrection" are supported.

Upon reception of a request from the AF to modify the BDT warning notification request indication, the NF service consumer shall invoke the Npcf_BDTPolicyControl_Update service operation by sending an HTTP PATCH request to the PCF, as described in clause 4.2.3.2. The NF service consumer shall indicate whether a BDT warning notification shall be enabled or disabled by including the "warnNotifReq" attribute in the "bdtReqData" attribute of the "PatchBdtPolicy" data type.

If the BDT warning notification is not required anymore the NF service consumer shall set the value of the "warnNotifReq" attribute to "false".

If the BDT warning notification is again required the NF service consumer shall set the value of the "warnNotifReq" attribute to "true".

Upon the reception of the HTTP PATCH request from the NF service consumer indicating a modification of the BDT warning notification request indication, the PCF shall:

- acknowledge that request by sending an HTTP response message as described in clause 4.2.3.2; and
- if the PCF invoked the Nudr_DataRepository_Update service operation during the initial transfer policy negotiation, invoke the Nudr_DataRepository_Update service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12] clause 5.2.9.3.4, to update the UDR with the modified BDT warning notification request indication.

4.2.4 Npcf_BDTPolicyControl_Notify service operation

4.2.4.1 General

The Npcf_BDTPolicyControl_Notify service operation is used by the PCF to send the BDT notification to the NF service consumer.

The following procedure using the Npcf_BDTPolicyControl_Notify service operation is supported:

- sending the BDT warning notification to the NF service consumer.

4.2.4.2 Sending the BDT warning notification

This procedure is used by the PCF to inform the NF service consumer that network performance in the area of interest goes below the criteria set by the operator, as defined in clause 6.1.2.4 of 3GPP TS 23.503 [4].

Figure 4.2.4.2-1 illustrates a BDT warning notification from the PCF.

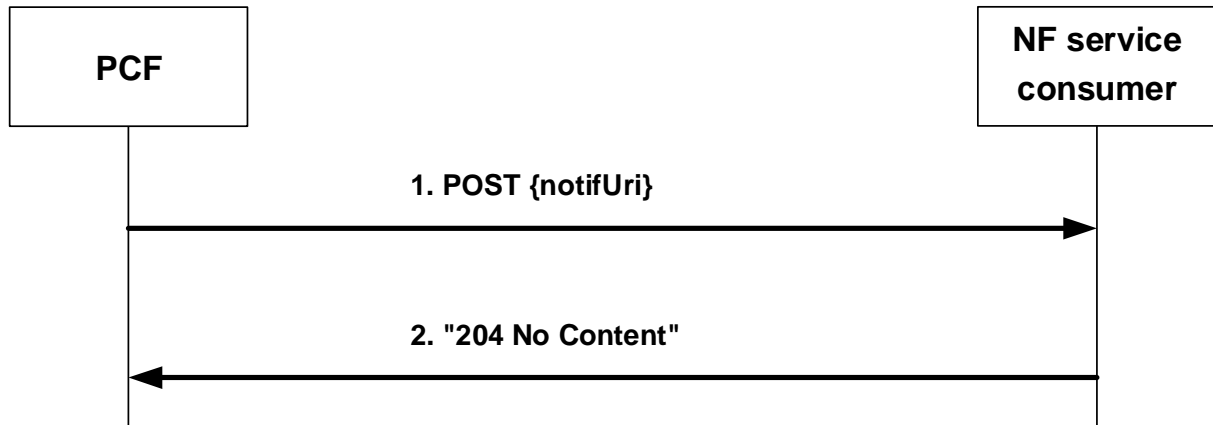


Figure 4.2.4.2-1: BDT warning notification

When the PCF knows that the network performance in the area of interest goes below the criteria set by the operator from the NWDAF as described in 3GPP TS 29.520 [22] and if the BDT warning notification is enabled, the PCF may try to re-negotiate the affected BDT policies with the affected AFs. To do this, the PCF retrieves all the background transfer policies together with their additionally stored AF provided information for BDT policy decision (e.g. their corresponding desired time window, the number of UEs, the volume of data per UE, etc.) from the UDR, identifies the BDT policy(ies) that are not desirable anymore due to the degradation of the network performance and tries to calculate one or more new candidate BDT policies based on the AF provided information, the background transfer policies retrieved from the UDR and the current network performance as follows:

- If the BDT policies retrieved from the UDR include the "bdtpStatus" attribute indicating the BDT policy is invalid, the PCF may calculate one or more new candidate BDT policies without considering the invalid BDT policy.
- If the PCF does not find any new candidate BDT policies, the previously negotiated BDT policy shall be kept and no interaction with the AF shall occur.

If one or more new candidate BDT policies are calculated, the PCF shall:

- if the PCF has not locally stored the background transfer policies, invoke the Nudr_DataRepository_Update service operation, as described in 3GPP TS 29.504 [11] and 3GPP TS 29.519 [12] clause 5.2.9.3.4, to invalidate the affected background transfer policy stored in the UDR by including the "bdtpStatus" attribute set to value "INVALID" within the BdtDataPatch data type; and
- invoke the Npcf_BDTPolicyControl_Notify service operation by sending the HTTP POST request with the BDT warning notification to the NF service consumer so that the NF service consumer can notify the AF.

The PCF shall include a "Notification" data type in a content of the HTTP POST request.

The "Notification" data type provided in the request body:

- shall contain the BDT Reference ID of the impacted transfer policy within the "bdtRefId" attribute;
- may contain the time window when the network performance will go below the criteria set by the operator within the "timeWindow" attribute;
- may contain the network area where the network performance will go below the criteria set by the operator within the "nwAreaInfo" attribute; and
- may contain the list of candidate transfer policies in the "candPolicies" attribute.

NOTE: The AF might select a new background transfer policy or might not select any new background transfer policy from the offered candidate list when receives the BDT 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 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 4.2.4.2-1, step 2.

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 5.7.

If the feature "ES3XX" is supported, and 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 [6].

5 Npcf_BDTPolicyControl API

5.1 Introduction

The BDT Policy Control Service shall use the Npcf_BDTPolicyControl API.

The API URI of the Npcf_BDTPolicyControl API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URI used in each HTTP request from the NF service consumer towards the PCF shall have the structure defined in clause 4.4.1 of 3GPP TS 29.501 [7], i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [7].
- The <apiName> shall be "npcf-bdtpolicycontrol".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.3.

5.2 Usage of HTTP

5.2.1 General

HTTP/2, IETF RFC 9113 [8], shall be used as specified in clause 5.2 of 3GPP TS 29.500 [6].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [6].

The OpenAPI [10] specification of HTTP messages and content bodies for the Npcf_BDTPolicyControl is contained in Annex A.

5.2.2 HTTP standard headers

5.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [6] for the usage of HTTP standard headers.

5.2.2.2 Content type

JSON, IETF RFC 8259 [9], 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 [6]. The use of the JSON format shall be signalled by the content type "application/json".

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 [15].

"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 9457 [17].

5.2.3 HTTP custom headers

The Npcf_BDTPolicyControl API shall support mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [6] and may support optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [6].

In this Release of the specification, no specific custom headers are defined for the Npcf_BDTPolicyControl API.

5.3 Resources

5.3.1 Resource Structure

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

Figure 5.3.1-1 depicts the resource URIs structure for the Npcf_BDTPolicyControl API.

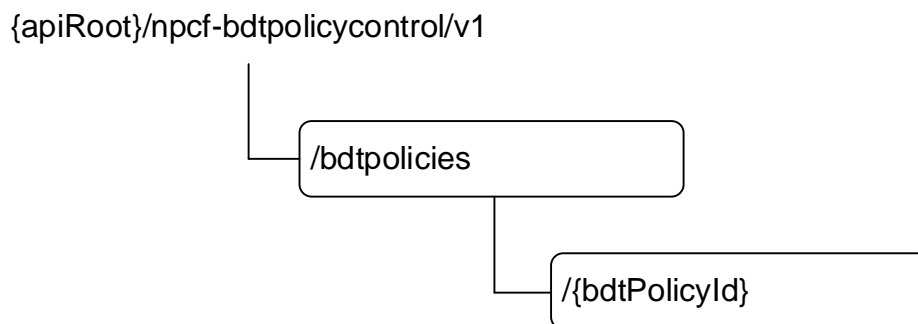


Figure 5.3.1-1: Resource URI structure of the Npcf_BDTPolicyControl API

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 |
|-----------------------|----------------------------|---------------------------------|--|
| BDT policies | /bdtpolicies | POST | Npcf_BDTPolicyControl_Create. Creates a new Individual BDT policy resource. |
| Individual BDT policy | /bdtpolicies/{bdtPolicyId} | GET | Reads an Individual BDT policy resource. |
| | | PATCH | Npcf_BDTPolicyControl_Update. Modifies an existing Individual BDT policy resource by selecting or reselecting a transfer policy. |

5.3.2 Resource: BDT policies (Collection)

5.3.2.1 Description

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

5.3.2.2 Resource definition

Resource URI: {apiRoot}/npcf-bdtpolicycontrol/v1/bdtpolicies

This resource shall support the resource URI variables defined in table 5.3.2.2-1.

Table 5.3.2.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|---------|-----------|-----------------|
| apiRoot | string | See clause 5.1. |

5.3.2.3 Resource Standard Methods

5.3.2.3.1 POST

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 POST method on this resource

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

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 POST Request Body on this resource

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

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

| Data type | P | Cardinality | Response Codes | Description |
|-----------|---|-------------|----------------|--|
| BdtPolicy | M | 1 | 201 Created | Successful case. The creation of an Individual BDT policy resource is confirmed and a representation of that resource is returned. |
| n/a | | | 303 See Other | The result of the HTTP POST request would be equivalent to the existing Individual BDT policy resource. The HTTP response shall contain a Location header field set to the URI of the existing individual BDT policy resource. |

NOTE: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [6] for the POST method shall also apply.

Table 5.3.2.3.1-4: 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-bdtpolicycontrol/v1/bdtpolicies/{bdtPolicyId}. |

Table 5.3.2.3.1-5: Headers supported by the 303 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|----------|-----------|---|-------------|--|
| Location | string | M | 1 | Contains the URI of the existing individual BDT policy resource. |

5.3.2.4 Resource Custom Operations

None.

5.3.3 Resource: Individual BDT policy (Document)

5.3.3.1 Description

The Individual BDT policy resource represents the transfer policies that exist in the BDT Policy Control service at a given PCF instance.

5.3.3.2 Resource definition

Resource URI: `{apiRoot}/npcf-bdtpolicycontrol/v1/bdtpolicies/{bdtPolicyId}`

This resource shall support the resource URI variables defined in table 5.3.3.2-1.

Table 5.3.3.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|-------------|-----------|--|
| apiRoot | string | See clause 5.1. |
| bdtPolicyId | string | Identifies the individual BDT 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 [7] and rules for a path segment defined in IETF RFC 3986 [16]. |

5.3.3.3 Resource Standard Methods

5.3.3.3.1 GET

This method shall support the URI query parameters specified in table 5.3.3.3.1-1.

Table 5.3.3.3.1-1: URI query parameters supported by the GET method on this resource

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

This method shall support the request data structures specified in table 5.3.3.3.1-2 and the response data structures and response codes specified in table 5.3.3.3.1-3.

Table 5.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 5.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|--|
| BdtPolicy | M | 1 | 200 OK | A representation of an Individual BDT policy resource is returned. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during resource retrieval. Applicable if the feature "ES3XX" is supported. (NOTE 3) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during resource retrieval. Applicable if the feature "ES3XX" is supported. (NOTE 3) |
| ProblemDetails | O | 0..1 | 404 Not Found | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [6] for the GET method shall also apply. | | | | |
| NOTE 2: Failure cases are described in clause 5.7. | | | | |
| NOTE 3: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]). | | | | |

Table 5.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target PCF (service) instance towards which the request is redirected. |

Table 5.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target PCF (service) instance towards which the request is redirected. |

5.3.3.3.2 PATCH

This method shall support the URI query parameters specified in table 5.3.3.3.2-1.

Table 5.3.3.3.2-1: URI query parameters supported by the PATCH method on this resource

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

This method shall support the request data structures specified in table 5.3.3.3.2-2 and the response data structures and response codes specified in table 5.3.3.3.2-3.

Table 5.3.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

| Data type | P | Cardinality | Description |
|----------------|---|-------------|---|
| PatchBdtPolicy | M | 1 | Contains modification instructions to be performed on the BdtPolicy data structure to select a transfer policy and in addition, may indicate whether the BDT warning notification is enabled or disabled. |

Table 5.3.3.3.2-3: Data structures supported by the PATCH Response Body on this resource

| Data type | P | Cardinality | Response Codes | Description |
|------------------|---|-------------|------------------------|---|
| BdtPolicy | M | 1 | 200 OK | Successful case. The Individual BDT Policy resource is modified and a representation of that resource is returned. |
| n/a | | | 204 No Content | Successful case. The Individual BDT Policy resource is modified. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during resource modification. Applicable if the feature "ES3XX" is supported. (NOTE 3) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during resource modification. Applicable if the feature "ES3XX" is supported. (NOTE 3) |
| ProblemDetails | O | 0..1 | 404 Not Found | (NOTE 2) |

NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [6] for the PATCH method shall also apply.

NOTE 2: Failure cases are described in clause 5.7.

NOTE 3: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]).

Table 5.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target PCF (service) instance towards which the request is redirected. |

Table 5.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target PCF (service) instance towards which the request is redirected. |

5.4 Custom Operations without associated resources

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

5.5 Notifications

5.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [6] and clause 4.6.2.3 of 3GPP TS 29.501 [7].

Table 5.5.1-1: Notifications overview

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

5.5.2 BDT Notification

5.5.2.1 Description

The BDT Notification is used by the PCF to notify the NF service consumer about changed conditions for background data transfer e.g. that a network performance in the area of interest goes below the criteria set by the operator.

5.5.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 5.5.2.2-1.

Table 5.5.2.2-1: Callback URI variables

| Name | Data type | Definition |
|----------|-----------|--|
| notifUri | Uri | It contains the URI of the recipient of BDT notification as assigned by the NF service consumer during the Create service operation and described within the BdtReqData (see table 5.6.2.3-1). |

5.5.2.3 Standard Methods

5.5.2.3.1 POST

This method shall support the URI query parameters specified in table 5.5.2.3.1-1.

Table 5.5.2.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 5.5.2.3.1-2 and the response data structures and response codes specified in table 5.5.2.3.1-3.

Table 5.5.2.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|--------------|---|-------------|----------------------------|
| Notification | M | 1 | Provides BDT notification. |

Table 5.5.2.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|--|
| n/a | | | 204 No Content | Successful case. The reception of the BDT notification is acknowledged. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during notification. Applicable if the feature "ES3XX" is supported. (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during notification. Applicable if the feature "ES3XX" is supported. (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [6] for the POST method shall also apply. | | | | |
| NOTE 2: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]). | | | | |

Table 5.5.2.3.1-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected. |

Table 5.5.2.3.1-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [6]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected. |

5.6 Data Model

5.6.1 General

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

Table 5.6.1-1 specifies the data types defined for the Npcf_BDTPolicyControl service based interface protocol.

Table 5.6.1-1: Npcf_BDTPolicyControl specific Data Types

| Data type | Section defined | Description | Applicability |
|--------------------|-----------------|--|--------------------|
| BdtPolicy | 5.6.2.2 | Represents an Individual BDT policy resource. | |
| BdtPolicyData | 5.6.2.4 | Describes an Individual BDT policy resource. | |
| BdtPolicyDataPatch | 5.6.2.6 | Contains modification instructions to be performed on the "bdtPolData" property of the BdtPolicy data structure to select a transfer policy. | |
| BdtReqData | 5.6.2.3 | Contains information for creation a new Individual BDT policy resource. | |
| BdtReqDataPatch | 5.6.2.12 | Describes the modifications to the BDT request data of an Individual BDT policy resource. | PatchCorrection |
| NetworkAreaInfo | 5.6.2.8 | Describes a network area information in which the NF service consumer requests the number of UEs. | |
| Notification | 5.6.2.10 | Contains the BDT notification information. | BdtNotification_5G |
| PatchBdtPolicy | 5.6.2.11 | Describes the modifications to the BDT Policy Data and BDT Policy Request data of an Individual BDT policy resource. | PatchCorrection |
| TransferPolicy | 5.6.2.5 | Describes a transfer policy. | |

Table 5.6.1-2 specifies data types re-used by the Npcf_BDTPolicyControl 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_BDTPolicyControl service based interface.

Table 5.6.1-2: Npcf_BDTPolicyControl re-used Data Types

| Data type | Reference | Comments | Applicability |
|-------------------|---------------------|--|--------------------|
| BdtReferenceld | 3GPP TS 29.122 [14] | Identifies transfer policy of background data transfer for provided ASP. | |
| BitRate | 3GPP TS 29.571 [13] | Specifies bitrate in kbits per second. | |
| Dnn | 3GPP TS 29.571 [13] | Identifies a Data Network Name. | |
| Ecgi | 3GPP TS 29.571 [13] | Represents an EUTRA cell identifier. | |
| GlobalRanNodeId | 3GPP TS 29.571 [13] | Represents an identity of the NG-RAN node. | |
| GroupId | 3GPP TS 29.571 [13] | Identifies a group of UEs. | |
| Ncgi | 3GPP TS 29.571 [13] | Represents an NR cell identifier. | |
| ProblemDetails | 3GPP TS 29.571 [13] | Used in error responses to provide more detailed information about an error. | |
| RedirectResponse | 3GPP TS 29.571 [13] | Contains redirection related information. | ES3XX |
| Snsai | 3GPP TS 29.571 [13] | Identifies a Single Network Slice Selection Assistance Information. | |
| SupportedFeatures | 3GPP TS 29.571 [13] | Used to negotiate the applicability of the optional features defined in table 5.8-1. | |
| Tai | 3GPP TS 29.571 [13] | Represents a tracking area identity. | |
| TimeWindow | 3GPP TS 29.122 [14] | Specifies a time interval. | |
| TrafficDescriptor | 3GPP TS 29.122 [14] | Represents a traffic descriptor. | |
| Uri | 3GPP TS 29.571 [13] | String providing an URI. | BdtNotification_5G |
| UsageThreshold | 3GPP TS 29.122 [14] | Represents a data volume expected to be transferred per UE. | |

5.6.2 Structured data types

5.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

5.6.2.2 Type BdtPolicy

Table 5.6.2.2-1: Definition of type BdtPolicy

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|---------------|---|-------------|---|---------------|
| bdtPolData | BdtPolicyData | C | 0..1 | Describes the authorization data of an Individual BDT Policy created by the PCF. It shall be present in the response to the POST request that requests a creation of an Individual BDT Policy resource and in the response to GET request. | |
| bdtReqData | BdtReqData | C | 0..1 | Identifies the service requirements of an Individual BDT Policy. It shall be present in the POST request that requests a creation of an Individual BDT Policy resource and in the response to GET request. | |

5.6.2.3 Type BdtReqData

Table 5.6.2.3-1: Definition of type BdtReqData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|-------------------|---|-------------|--|--------------------|
| aspId | AspId | M | 1 | This IE contains an identity of an application service provider. | |
| desTimeInt | TimeWindow | M | 1 | This IE indicates a desired time window for BDT. | |
| 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) | |
| interGroupId | GroupId | O | 0..1 | Represents an internal group identifier and identifies a group of UEs. | |
| notifUri | Uri | O | 0..1 | This IE indicates that the NF service consumer requests a BDT notification from the PCF. It contains an URI of the recipient of BDT notification. | BdtNotification_5G |
| nwAreaInfo | NetworkAreaInfo | O | 0..1 | This IE represents a network area information in which the NF service consumer requests a number of UEs. It may be present in the POST request that requests a creation of an Individual BDT Policy and in the response to GET request. | |
| numOfUes | integer | M | 1 | This IE indicates a number of UEs. | |
| snssai | Snssai | O | 0..1 | This IE identifies a slice. | |
| supFeat | SupportedFeatures | C | 0..1 | This IE represents a list of Supported features used as described in clause 5.8. It shall be supplied by the NF service consumer in the POST request that request a creation of an Individual BDT Policy resource. | |
| trafficDes | TrafficDescriptor | O | 0..1 | Contains the traffic descriptor of the background data. | |
| volPerUe | UsageThreshold | M | 1 | This IE indicates a data volume expected to be transferred per UE. | |
| warnNotifReq | boolean | O | 0..1 | This IE indicates whether the BDT warning notification is enabled or disabled. It may be present: - in the POST request that requests a creation of an Individual BDT Policy and in the corresponding response; and - in responses to GET and PATCH requests. true: enabled; false: disabled (default). | BdtNotification_5G |
| <p>NOTE: 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.</p> | | | | | |

5.6.2.4 Type BdtPolicyData

Table 5.6.2.4-1: Definition of type BdtPolicyData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|-----------------------|---|-------------|---|---------------|
| bdtRefId | BdtReferenceld | M | 1 | This IE indicates transfer policies of background data transfer for provided ASP. | |
| selTransPolicyId | integer | C | 0..1 | This IE contains the identity of the selected transfer policy. It shall be present in the response to the PATCH request that modifies an Individual BDT Policy resource to indicate a selected transfer policy. | |
| suppFeat | SupportedFeatures | C | 0..1 | This IE represents a list of Supported features used as described in clause 5.8. It shall be supplied by the PCF in the response to the POST request that requests a creation of an Individual BDT Policy resource. | |
| transPolicies | array(TransferPolicy) | M | 1..N | This IE contains transfer policies. It shall be supplied by the PCF in the response to the POST request that requests a creation of an Individual BDT Policy resource. | |

5.6.2.5 Type TransferPolicy

Table 5.6.2.5-1: Definition of type TransferPolicy

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|------------|---|-------------|---|---------------|
| maxBitRateDl | BitRate | O | 0..1 | This IE indicates a maximum aggregated bitrate in the downlink direction authorized by the PCF. | |
| maxBitRateUl | BitRate | O | 0..1 | This IE indicates a maximum aggregated bitrate in the uplink direction authorized by the PCF. | |
| ratingGroup | integer | M | 1 | This IE indicates a rating group for the recommended time window. | |
| recTimeInt | TimeWindow | M | 1 | This IE indicates a recommended time window of a transfer policy. | |
| transPolicyId | integer | M | 1 | This IE contains an identity of a transfer policy. | |

5.6.2.6 Type BdtPolicyDataPatch

Table 5.6.2.6-1: Definition of type BdtPolicyDataPatch

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|-----------|---|-------------|--|---------------|
| selTransPolicyId | integer | M | 1 | This IE contains an identity (i.e. the transPolicyId value) of a selected transfer policy. If the BdtNotification_5G feature is supported value "0" indicates that no transfer policy is selected. | |

5.6.2.7 Void

5.6.2.8 Type NetworkAreaInfo

Table 5.6.2.8-1: Definition of type NetworkAreaInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|------------------------|---|-------------|--|---------------|
| ecgis | array(Ecgi) | O | 1..N | This IE contains a list of E-UTRA cell identities. | |
| ncgis | array(Ncgi) | O | 1..N | This IE contains a list of NR cell identities. | |
| gRanNodeIds | array(GlobalRanNodeId) | O | 1..N | This IE contains a list of the NG-RAN nodes. The "n3IwId" attribute within the "GlobalRanNodeId" data type shall not be supplied. | |
| tais | array(Tai) | O | 1..N | This IE contains a list of tracking area identities. | |
| NOTE: The NetworkAreaInfo data type allows any combination of defined properties. | | | | | |

5.6.2.9 Void

5.6.2.10 Type Notification

Table 5.6.2.10-1: Definition of type Notification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------------------|---|-------------|---|---------------|
| bdtRefId | BdtReferenceId | M | 1 | This IE indicates transfer policies of background data transfer which the notification corresponds to. | |
| candPolicies | array(TransferPolicy) | O | 1..N | This IE contains a list of the candidate transfer policies from which the AF may select a new transfer policy due to a network performance is below the criteria set by the operator. | |
| nwAreaInfo | NetworkAreaInfo | O | 0..1 | This IE represents a network area where a network performance will go below the criteria set by the operator. | |
| timeWindow | TimeWindow | O | 0..1 | This IE indicates a time window when a network performance will go below the criteria set by the operator. | |

5.6.2.11 Type PatchBdtPolicy

Table 5.6.2.11-1: Definition of type PatchBdtPolicy

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|--------------------|---|-------------|--|---------------|
| bdtPolData | BdtPolicyDataPatch | O | 0..1 | Describes the updates in BDT policy data of an Individual BDT Policy resource, e.g., describes the selected BDT policy. | |
| bdtReqData | BdtReqDataPatch | O | 0..1 | Describes the updates in BDT policy request data of an Individual BDT Policy resource, e.g., describes the updates in warning notification requirements. | |

5.6.2.12 Type BdtReqDataPatch

Table 5.6.2.12-1: Definition of type BdtReqDataPatch

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------|---|-------------|--|--------------------|
| warnNotifReq | boolean | O | 0..1 | This IE indicates whether the BDT warning notification is enabled or disabled. | BdtNotification_5G |

5.6.3 Simple data types and enumerations

5.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

5.6.3.2 Simple data types

The simple data types defined in table 5.6.3.2-1 shall be supported.

Table 5.6.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|--|---------------|
| Aspld | string | This IE contains an identity of an application service provider. | |

5.7 Error handling

5.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [6].

For the Npcf_BDTPolicyControl API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [7].

Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [6] 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 [6].

In addition, the requirements in the following clauses shall apply.

5.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the Npcf_BDTPolicyControl API.

5.7.3 Application Errors

The application errors defined for the Npcf_BDTPolicyControl API are listed in table 5.7.3-1.

Table 5.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|--|------------------|---|
| BDT_POLICY_NOT_FOUND | 404 Not Found | The HTTP request is rejected because the specified Individual BDT policy resource does not exist. (NOTE 1) |
| NOTE 1: This application error is included in the responses to the GET and PATCH requests. | | |
| NOTE 2: Including a "ProblemDetails" data structure with the "cause" attribute in the HTTP response is optional unless explicitly mandated in the service operation clauses. | | |

5.8 Feature negotiation

The optional features in table 5.8-1 are defined for the Npcf_BDTPolicyControl API. They shall be negotiated using the extensibility mechanism defined in clause 6.6.2 of 3GPP TS 29.500 [6].

When requesting the PCF to create an Individual BDT policy resource the NF service consumer shall indicate the optional features the NF service consumer supports for the Npcf_BDTPolicyControl service by including the "suppFeat" attribute in the "BdtReqData" data type of the HTTP POST request.

The PCF shall determine the supported features for the created Individual BDT policy resource as specified in clause 6.6.2 of 3GPP TS 29.500 [6]. The PCF shall indicate the supported features in the HTTP response confirming the creation of the Individual BDT policy resource by including the "suppFeat" attribute in the "BdtPolicyData" data type.

Table 5.8-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|--------------------|---|
| 1 | BdtNotification_5G | This feature indicates the support of sending the BDT notification to the NF service consumer. This feature includes sending of the BDT warning notification to the NF service consumer. |
| 2 | ES3XX | Extended Support for 3xx redirections. This feature indicates the support of redirection for any service operation, according to Stateless NF procedures as specified in clauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [6] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [6]. |
| 3 | PatchCorrection | Indicates support of the correction to the PATCH method. When this feature is not supported, the interoperability between a NF service consumer and the PCF can only be ensured when it is not required the update of the Individual BDT policy resource. |

5.9 Security

As indicated in 3GPP TS 33.501 [18] and 3GPP TS 29.500 [6], the access to the Npcf_BDTPolicyControl API, based on local configuration, may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [19]), using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [20]) plays the role of the authorization server.

If OAuth2 authorization is used, an NF service consumer, prior to consuming services offered by the Npcf_BDTPolicyControl API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [20], 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_BDTPolicyControl service.

The Npcf_BDTPolicyControl API defines a single scope "npcf-bdtpolicycontrol" for OAuth2 authorization (as specified in 3GPP TS 33.501 [18]) for the entire API, and it does not define any additional scopes at resource or operation level.

Annex A (normative): OpenAPI specification

A.1 General

The present Annex contains an OpenAPI [10] specification of HTTP messages and content bodies used by the Npcf_BDTPolicyControl API.

This Annex shall take precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API.

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification file contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [21] and clause 5.3.1 of the 3GPP TS 29.501 [7] for further information).

A.2 Npcf_BDTPolicyControl API

openapi: 3.0.0

info:

```
title: Npcf_BDTPolicyControl Service API
version: 1.3.0
description: |
  PCF BDT Policy Control Service.
  © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.554 V18.3.0; 5G System; Background Data Transfer Policy Control Service.
url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.554/'
```

servers:

```
- url: '{apiRoot}/npcf-bdtpolicycontrol/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.
```

security:

```
- {}
- oAuth2ClientCredentials:
  - npcf-bdtpolicycontrol
```

paths:

```
/bdtpolicies:
  post:
    summary: Create a new Individual BDT policy
    operationId: CreateBDTPolicy
    tags:
      - BDT policies (Collection)
    requestBody:
      description: >
        Contains information for the creation of a new Individual BDT policy resource.
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/BdtReqData'
    responses:
      '201':
        description: Background data transfer policies offered to an ASP.
        content:
```

```

    application/json:
      schema:
        $ref: '#/components/schemas/BdtPolicy'
  headers:
    Location:
      description: >
        Contains the URI of the created individual BDT policy resource,
        according to the structure
        {apiRoot}/npcf-bdtpolicycontrol/v1/bdtpolicies/{bdtPolicyId}
      required: true
      schema:
        type: string
  '303':
    description: >
      See Other. The result of the POST request would be equivalent to the
      existing Individual BDT policy resource.
    headers:
      Location:
        description: Contains the URI of the existing individual BDT policy resource.
        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:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  callbacks:
    BdtNotification:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/Notification'
          responses:
            '204':
              description: No Content, a reception of the BDT notification was successful.
            '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'

/bdtpolicies/{bdtPolicyId}:
  get:
    summary: Read an Individual BDT policy
    operationId: GetBDTPolicy
    tags:
      - Individual BDT policy (Document)
    parameters:
      - name: bdtPolicyId
        description: String identifying the individual BDT policy resource in the PCF.
        in: path
        required: true
        schema:
          type: string
    responses:
      '200':
        description: Background data transfer policies offered to and selected by an ASP.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/BdtPolicy'
      '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: Update an Individual BDT policy
    operationId: UpdateBDTPolicy
    tags:
      - Individual BDT policy (Document)
    parameters:
      - name: bdtPolicyId
        description: String identifying the individual BDT policy resource in the PCF.
        in: path
        required: true
        schema:
          type: string
    requestBody:
      description: >
        Contains modification instruction to be performed on the BdtPolicy data
        structure to select a transfer policy and in addition, may indicate whether
        the BDT warning notification is enabled or disabled.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/PatchBdtPolicy'
    responses:
      '200':

```

```

description: >
  The Individual BDT Policy resource is modified and a representation of that
  resource is returned.
content:
  application/json:
    schema:
      $ref: '#/components/schemas/BdtPolicy'
'204':
  description: The Individual BDT 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-bdtpolicycontrol: Access to the Npcf_BDTPolicyControl API

```

schemas:

Structured data types

```

BdtPolicy:
  description: Represents an Individual BDT policy resource.
  type: object
  properties:
    bdtPolData:
      $ref: '#/components/schemas/BdtPolicyData'
    bdtReqData:
      $ref: '#/components/schemas/BdtReqData'

BdtReqData:
  description: >
    Contains service requirements for creation a new Individual BDT policy resource.
  type: object
  required:
    - aspId
    - desTimeInt
    - numOfUes
    - volPerUe
  properties:
    aspId:
      $ref: '#/components/schemas/AspId'
    desTimeInt:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'

```

```

interGroupId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
notifUri:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
nwAreaInfo:
  $ref: '#/components/schemas/NetworkAreaInfo'
numOfUes:
  description: Indicates a number of UEs.
  type: integer
volPerUe:
  $ref: 'TS29122_CommonData.yaml#/components/schemas/UsageThreshold'
snssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
suppFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
trafficDes:
  $ref: 'TS29122_ResourceManagementOfBdt.yaml#/components/schemas/TrafficDescriptor'
warnNotifReq:
  description: Indicates whether the BDT warning notification is enabled or disabled.
  type: boolean
  default: false

BdtPolicyData:
  description: Describes the authorization data of an Individual BDT policy resource.
  type: object
  required:
  - bdtRefId
  - transfPolicies
  properties:
    bdtRefId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/BdtReferenceId'
    transfPolicies:
      description: Contains transfer policies.
      type: array
      items:
        $ref: '#/components/schemas/TransferPolicy'
      minItems: 1
    selTransPolicyId:
      description: Contains an identity of the selected transfer policy.
      type: integer
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

PatchBdtPolicy:
  description: >
    Describes the updates in authorization data of an Individual BDT Policy created
    by the PCF.
  type: object
  properties:
    bdtPolData:
      $ref: '#/components/schemas/BdtPolicyDataPatch'
    bdtReqData:
      $ref: '#/components/schemas/BdtReqDataPatch'

BdtPolicyDataPatch:
  description: >
    A JSON Merge Patch body schema containing modification instruction to be performed
    on the bdtPolData attribute of the BdtPolicy data structure to select a transfer
    policy. Adds selTransPolicyId to BdtPolicyData data structure.
  type: object
  required:
  - selTransPolicyId
  properties:
    selTransPolicyId:
      description: >
        Contains an identity (i.e. transPolicyId value) of the selected transfer
        policy. If the BdtNotification_5G feature is supported value 0 indicates that
        no transfer policy is selected.
      type: integer

BdtReqDataPatch:
  description: >
    A JSON Merge Patch body schema containing modification instruction to be performed
    on the bdtReqData attribute of the BdtPolicy data structure to indicate whether
    the BDT warning notification is enabled or disabled. Modifies warnNotifReq from
    BdtReqData data structure.
  type: object
  properties:

```

```

warnNotifReq:
  description: Indicates whether the BDT warning notification is enabled or disabled.
  type: boolean

TransferPolicy:
  description: Describes a transfer policy.
  type: object
  required:
  - ratingGroup
  - recTimeInt
  - transPolicyId
  properties:
    maxBitRateDl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
    maxBitRateUl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
    ratingGroup:
      description: Indicates a rating group for the recommended time window.
      type: integer
    recTimeInt:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    transPolicyId:
      description: Contains an identity of a transfer policy.
      type: integer

NetworkAreaInfo:
  description: >
    Describes a network area information in which the NF service consumer requests
    the number of UEs.
  type: object
  properties:
    ecgis:
      description: Contains a list of E-UTRA cell identities.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ecgi'
      minItems: 1
    ncgis:
      description: Contains a list of NR cell identities.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ncgi'
      minItems: 1
    gRanNodeIds:
      description: Contains a list of NG RAN nodes.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GlobalRanNodeId'
      minItems: 1
    tais:
      description: Contains a list of tracking area identities.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
      minItems: 1

Notification:
  description: Describes a BDT notification.
  type: object
  required:
  - bdtRefId
  properties:
    bdtRefId:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/BdtReferenceId'
    candPolicies:
      description: >
        Contains a list of the candidate transfer policies from which the AF may
        select a new transfer policy due to a network performance is below the criteria
        set by the operator.
      type: array
      items:
        $ref: '#/components/schemas/TransferPolicy'
      minItems: 1
    nwAreaInfo:
      $ref: '#/components/schemas/NetworkAreaInfo'
    timeWindow:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'

```

Simple data types

AspId:

description: Contains an identity of an application service provider.

type: string

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|--------|-----------|------|-----|-----|---|-------------|
| Date | TSG # | TSG Doc. | CR | Rev | Cat | Subject/Comment | New version |
| 2018-01 | | | | | | TS skeleton | 0.0.0 |
| 2018-01 | CT3#94 | C3-180369 | | | | Inclusion of C3-180188 agreed in CT3#94. | 0.1.0 |
| 2018-03 | CT3#95 | C3-181376 | | | | Inclusion of documents agreed in CT3#95: C3-181055, C3-181091, C3-181268, C3-181269, C3-181270. | 0.2.0 |
| 2018-04 | CT3#96 | C3-182524 | | | | Inclusion of documents agreed in CT3#96: C3-182048, C3-182428, C3-182427, C3-182051, C3-182052, C3-182053, C3-182429, C3-182454, C3-182430, C3-182232. | 0.3.0 |
| 2018-06 | CT3#97 | C3-183915 | | | | Inclusion of documents agreed in CT3#97: C3-183241, C3-183280, C3-183289, C3-183291, C3-183292, C3-183297, C3-183298, C3-183562, C3-183563, C3-183564, C3-183565, C3-183714, C3-183869. | 0.4.0 |
| 2018-06 | CT#80 | CP-181028 | | | | TS sent to plenary for approval | 1.0.0 |
| 2018-06 | CT#80 | CP-181028 | | | | TS approved by plenary | 15.0.0 |
| 2018-09 | CT#81 | CP-182015 | 0001 | 1 | B | Format of bdtPolicyId | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0002 | 4 | B | Network area information | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0003 | 1 | F | Description of Structured data types | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0004 | 1 | F | Resource structure presentation | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0005 | 1 | F | Removal of externalDoc field | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0006 | | F | Corrections related to Feature negotiation | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0007 | | F | "404 Not found" response in OpenAPI | 15.1.0 |
| 2018-12 | CT#82 | CP-183205 | 0008 | 1 | F | Correction of apiName | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0010 | | F | Supported content types | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0011 | | F | Definition of BdtPolicyData structure | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0012 | | F | Non-empty arrays in OpenAPI file | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0013 | 1 | F | Adding the externalDocs field in the OpenAPI | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0014 | | F | Adding HTTP status code "200 OK" | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0015 | 1 | F | Error indicating "Unspecified resource URI structure" | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0016 | 3 | F | Npcf_BDTPolicyControl API Authorization based on OAuth2 | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0017 | 1 | F | API version update | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0018 | | F | Default value for apiRoot | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0019 | 1 | F | OpenAPI: HTTP status codes alignment | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0020 | 1 | F | NgRanNodeId definition in OpenAPI | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0021 | | F | OpenAPI: usage of the "tags" keyword | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0022 | | F | Location header field in OpenAPI | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0023 | 1 | F | Data structure used in PATCH request | 15.2.0 |
| 2019-03 | CT#83 | CP-190112 | 0024 | | F | Alignment of the BDT procedures | 15.3.0 |
| 2019-05 | CT#84 | CP-191084 | 0025 | 1 | F | Storage and precedence of OpenAPI specification file | 15.4.0 |
| 2019-06 | CT#84 | CP-191084 | 0028 | 1 | F | Copyright Note in YAML file | 15.4.0 |
| 2019-06 | CT#84 | CP-191084 | 0030 | | F | OpenAPI version number update | 15.4.0 |
| 2019-06 | CT#84 | CP-191105 | 0026 | 2 | B | Support of Npcf_BDTPolicyControl_Notify service operation | 16.0.0 |
| 2019-06 | CT#84 | CP-191090 | 0027 | 1 | B | Add External group Id | 16.0.0 |
| 2019-06 | CT#84 | CP-191101 | 0031 | 2 | F | OpenAPI version number update | 16.0.0 |
| 2019-09 | CT#85 | CP-192157 | 0032 | 1 | B | Modification of BDT warning notification request indication | 16.1.0 |
| 2019-09 | CT#85 | CP-192173 | 0034 | | F | OpenAPI version update for TS 29.554 Rel-16 | 16.1.0 |
| 2019-12 | CT#86 | CP-193198 | 0035 | 1 | F | Indication of "BdtNotification_5G" feature | 16.2.0 |
| 2019-12 | CT#86 | CP-193212 | 0037 | | F | Update of API version and TS version in OpenAPI file | 16.2.0 |
| 2020-03 | CT#87e | CP-200208 | 0036 | 2 | B | BDT renegotiation upon the network conditions change | 16.3.0 |
| 2020-03 | CT#87e | CP-200219 | 0038 | 2 | B | map ASPid to DNN and SNSSAI for xBDT | 16.3.0 |
| 2020-03 | CT#87e | CP-200216 | 0039 | | F | Update of OpenAPI version and TS version in externalDocs field | 16.3.0 |
| 2020-06 | CT#88e | CP-201234 | 0040 | 1 | F | Removal of not valid BDT policy from UDR | 16.4.0 |
| 2020-06 | CT#88e | CP-201244 | 0041 | 1 | F | Storage of YAML files in ETSI Forge | 16.4.0 |
| 2020-06 | CT#88e | CP-201256 | 0043 | 1 | F | URI of the Npcf_BDTPolicyControl service | 16.4.0 |
| 2020-06 | CT#88e | CP-201276 | 0045 | 1 | F | Traffic descriptor for xBDT | 16.4.0 |
| 2020-06 | CT#88e | CP-201225 | 0047 | | A | OpenAPI: adding Location header field in 303 response | 16.4.0 |
| 2020-06 | CT#88e | CP-201244 | 0048 | 1 | F | Optionality of ProblemDetails | 16.4.0 |
| 2020-06 | CT#88e | CP-201244 | 0049 | 1 | F | Supported headers, Resource Data type and yaml mapping | 16.4.0 |
| 2020-06 | CT#88e | CP-201255 | 0051 | | F | Update of OpenAPI version and TS version in externalDocs field | 16.4.0 |
| 2020-12 | CT#90e | CP-203139 | 0053 | 1 | F | TS 29.554 Essential Corrections and alignments | 16.5.0 |
| 2020-12 | CT#90e | CP-203129 | 0054 | 1 | F | Correction to the BDT policy re-negotiation | 16.5.0 |
| 2020-12 | CT#90e | CP-203139 | 0055 | 1 | F | Storage of YAML files in ETSI Forge | 16.5.0 |
| 2020-12 | CT#90e | CP-203110 | 0056 | 1 | F | Correction to support redirection codes and the update of the Callback URI | 16.5.0 |
| 2020-12 | CT#90e | CP-203152 | 0057 | | F | Update of OpenAPI version and TS version in externalDocs field | 16.5.0 |
| 2021-03 | CT#91e | CP-210191 | 0058 | | F | Supported feature number of ES3XX | 16.6.0 |
| 2021-03 | CT#91e | CP-210206 | 0062 | 1 | F | set bdtStatus to VALID | 16.6.0 |
| 2021-03 | CT#91e | CP-210201 | 0064 | 1 | A | Correction to PATCH method | 16.6.0 |

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|---------|--------|-----------|------|---|---|---|--------|
| 2021-03 | CT#91e | CP-210239 | 0066 | | F | Update of OpenAPI version and TS version in externalDocs field | 16.6.0 |
| 2021-03 | CT#91e | CP-210219 | 0059 | | F | Support of optional HTTP custom header fields | 17.0.0 |
| 2021-03 | CT#91e | CP-210220 | 0060 | | F | Terminology alignment: usage of "NF service consumer" | 17.0.0 |
| 2021-03 | CT#91e | CP-210220 | 0061 | | F | OpenAPI reference | 17.0.0 |
| 2021-06 | CT#92e | CP-211200 | 0068 | 1 | A | Redirect responses with "application/json" media type | 17.1.0 |
| 2021-06 | CT#92e | CP-211265 | 0070 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.1.0 |
| 2021-12 | CT#94e | CP-213239 | 0071 | | F | API URI of the Npcf_BDTPolicyControl API | 17.2.0 |
| 2022-03 | CT#95e | CP-220176 | 0072 | 2 | A | Alignment of "Application Errors" clause with SBI TS template | 17.3.0 |
| 2022-03 | CT#95e | CP-220201 | 0073 | 1 | F | Formatting of description fields | 17.3.0 |
| 2022-03 | CT#95e | CP-220194 | 0075 | | F | Update of info and externalDocs fields | 17.3.0 |
| 2022-06 | CT#96 | CP-221154 | 0076 | | F | Readability of the OpenAPI file and alignment with the SBI template | 17.4.0 |
| 2022-06 | CT#96 | CP-221152 | 0077 | | F | Update of info and externalDocs fields | 17.4.0 |
| 2022-12 | CT#98e | CP-223192 | 0078 | 1 | F | Adding the mandatory error code 502 Bad Gateway for Npcf_BDTPolicyControl | 18.0.0 |
| 2022-12 | CT#98e | CP-223200 | 0079 | 1 | F | Correction to DNN encoding | 18.0.0 |
| 2022-12 | CT#98e | CP-223190 | 0080 | | F | Update of info and externalDocs fields | 18.0.0 |
| 2023-06 | CT#100 | CP-231132 | 0081 | 1 | F | Use of a Location header field during redirection | 18.1.0 |
| 2023-12 | CT#102 | CP-233247 | 0082 | | F | Store BDT warning notification indication and AS address in UDR | 18.2.0 |
| 2023-12 | CT#102 | CP-233229 | 0087 | 1 | F | Reference update: IETF RFC 9113 | 18.2.0 |
| 2023-12 | CT#102 | CP-233228 | 0088 | | F | ProblemDetails RFC 7807 obsoleted by RFC 9457 | 18.2.0 |
| 2024-06 | CT#104 | CP-241095 | 0093 | 1 | F | Editorial correction in BDT Create Clause | 18.3.0 |
| 2024-06 | CT#104 | CP-241086 | 0094 | | F | Update of info and externalDocs fields | 18.3.0 |

History

| Document history | | |
|-------------------------|-----------|-------------|
| V18.2.0 | May 2024 | Publication |
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