

ETSI TS 129 554 V15.4.0 (2019-10)



**5G;
5G System;
Background Data Transfer Policy Control Service;
Stage 3
(3GPP TS 29.554 version 15.4.0 Release 15)**

STANDARD PREVIEW
<https://standards.iteh.ai/standards/28c55d88-2263-46d4-9863-7a0c66ec2582/standards/ETSI-129-554-V15.4.0-2019-10>



ReferenceRTS/TSGC-0329554vf40

Keywords5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2019.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	7
3.1 Definitions	7
3.2 Abbreviations	7
4 Background Data Transfer Policy Control Service	8
4.1 Service Description	8
4.1.1 Overview	8
4.1.2 Service Architecture	8
4.1.3 Network Functions.....	9
4.1.3.1 Policy Control Function (PCF)	9
4.1.3.2 NF Service Consumers.....	9
4.2 Service Operations	9
4.2.1 Introduction.....	9
4.2.2 Npcf_BDTPolicyControl_Create service operation	9
4.2.2.1 General	9
4.2.2.2 Retrieval of BDT policies	10
4.2.3 Npcf_BDTPolicyControl_Update service operation	11
4.2.3.1 General	11
4.2.3.2 Indication about selected transfer policy.....	11
5 Npcf_BDTPolicyControl API.....	12
5.1 Introduction	12
5.2 Usage of HTTP.....	13
5.2.1 General.....	13
5.2.2 HTTP standard headers.....	13
5.2.2.1 General	13
5.2.2.2 Content type	13
5.2.3 HTTP custom headers.....	13
5.3 Resources	14
5.3.1 Resource Structure	14
5.3.2 Resource: BDT policies (Collection).....	14
5.3.2.1 Description	14
5.3.2.2 Resource definition	14
5.3.2.3 Resource Standard Methods.....	15
5.3.2.3.1 POST	15
5.3.2.4 Resource Custom Operations	15
5.3.3 Resource: Individual BDT policy (Document)	15
5.3.3.1 Description	15
5.3.3.2 Resource definition	15
5.3.3.3 Resource Standard Methods.....	16
5.3.3.3.1 GET	16
5.3.3.3.2 PATCH.....	16
5.4 Custom Operations without associated resources.....	17
5.5 Notifications	17
5.6 Data Model.....	17
5.6.1 General.....	17
5.6.2 Structured data types.....	18
5.6.2.1 Introduction.....	18
5.6.2.2 Type BdtPolicy	18

5.6.2.3 Type BdtReqData..... 19

5.6.2.4 Type BdtPolicyData 19

5.6.2.5 Type TransferPolicy 20

5.6.2.6 Type BdtPolicyDataPatch 20

5.6.2.7 Void..... 20

5.6.2.8 Type NetworkAreaInfo 20

5.6.2.9 Void..... 20

5.6.3 Simple data types and enumerations 20

5.6.3.1 Introduction 20

5.6.3.2 Simple data types 21

5.7 Error handling 21

5.7.1 General..... 21

5.7.2 Protocol Errors..... 21

5.7.3 Application Errors 21

5.8 Feature negotiation..... 21

5.9 Security 22

Annex A (normative): OpenAPI specification.....23

A.1 General 23

A.2 Npcf_BDTPolicyControl API..... 23

Annex B (informative): Change history28

History 29

iTeh STANDARD PREVIEW
 (standards.iteh.ai)
 Full standard:
<https://standards.iteh.ai/catalog/standards/sist/28c55d88-2263-46d4-9863-7a0c66ee2589/etsi-ts-129-554-v15.4.0-2019-10>

Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

ETSI STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/28c55d88-2263-46d4-9863-7a0c66ec2589/etsi-ts-129-554-v15.4.0-2019-10>

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 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [9] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [10] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.
- [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 7807: "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".

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], subclause 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
JSON	JavaScript Object Notation
NEF	Network Exposure Function
NG-RAN	Next Generation - Radio Access Network
NRF	Network Repository Function
PCF	Policy Control Function
SBI	Service Based Interface
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 NEF; and
- update background data transfer policies based on the selection provided by the NEF.

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.

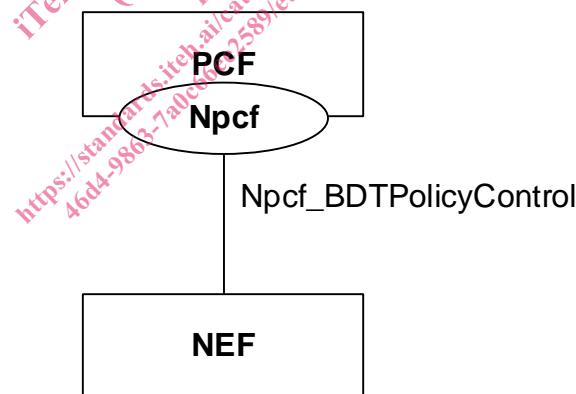


Figure 4.1.2-1: Reference Architecture for the Npcf_BDTPolicyControl Service; SBI representation

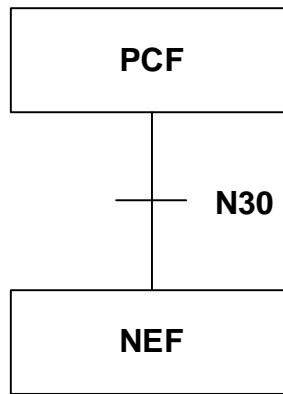


Figure 4.1.2-2: Reference Architecture for the Npcf_BDTPolicyControl Service; reference point representation

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 NEF. The PCF determines, based on information provided by the NEF 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 NEF.

4.1.3.2 NF Service Consumers

The Network Exposure Function (NEF):

- requests the PCF to provide background data transfer policies; and
- provides the selected background data transfer policy to the PCF.

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	Provides the requested background data transfer policies to the NF service consumer.	NF service consumer (NEF)
Npcf_BDTPolicyControl_Update	Updates the PCF with the background data transfer policy selected by the NF service consumer.	NF service consumer (NEF)

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 retrieve BDT policies from the PCF.

The following procedure using the Npcf_BDTPolicyControl_Create service operation is supported:

- retrieval of BDT policies.

4.2.2.2 Retrieval of BDT policies

This procedure is used by the NEF to request BDT policies from 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 a retrieval of BDT policies.

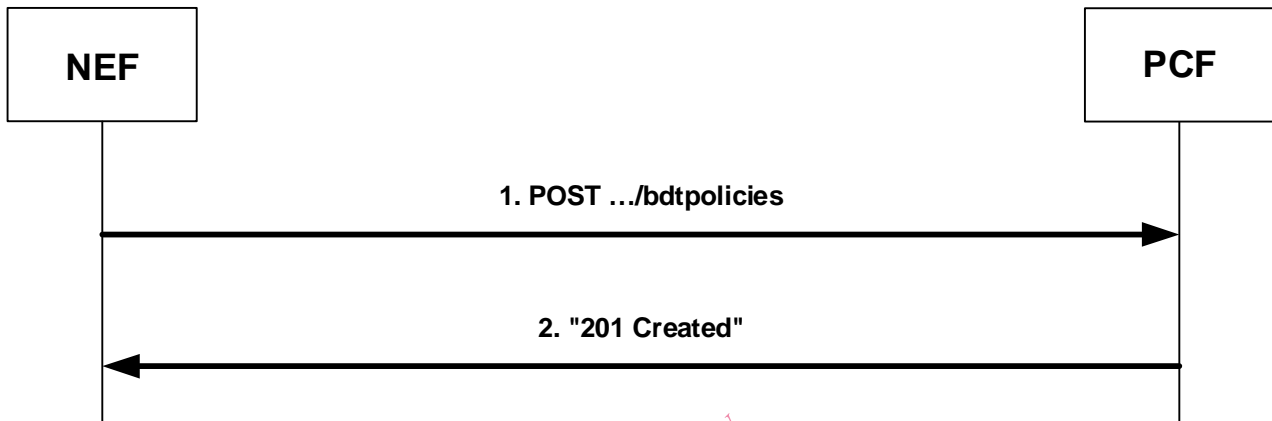


Figure 4.2.2.2-1: Retrieval of BDT policies

Upon reception of a Background Data Transfer request from the AF indicating a transfer policy request, the NEF 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 NEF shall include a "BdtReqData" data type in a payload body 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; and
- a desired time window in the "desTimeInt" 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.

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 subclause 5.7.

Otherwise, upon the reception of the HTTP POST request from the NEF indicating a BDT policies 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 NEF; 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 send to the NEF 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: