**3GPP TSG-CT WG3 Meeting #134 *C3-242296***

**Changsha, China, 15 - 19 April, 2024 *(Revision of C3-242xxx)***

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** | **-** | **Current version:** | **18.5.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  | Clarifications on BDT service |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | TEI18, xBDT |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | In the currecnt specification, the procedures about BDT service are used Nnef\_BDTPNegotiation service in the description, while in Stage 3, the name of the BDT service is ResourceManagementOfBdt API in TS 29.122 and ApplyingBdtPolicy API in TS 29.522. Also, the details about resource management of BDT and the "BdtNotification\_5G" feature is in clause 4.4.4, TS 29.522.Hence, it is proposed to correct the reference to 29.522 and add some clarifications to indicates the Stage 2 Nnef\_BDTPNegotiation service is used by ResourceManagementOfBdt API and ApplyingBdtPolicy API in Stage 3 to avoid causing confusion. |
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| ***Summary of change:*** | 1. Correct the reference
2. Rewording the NOTE to clarify the different between Stage 2 and Stage 3.
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| ***Consequences if not approved:*** | Unclear specification, and misalignment with other specifications. |
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| ***Clauses affected:*** | 5.5.4, 5.5.4A, 5.5.5 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR does not impact on the OpenAPI files. |
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| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

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

5.5.4 Negotiation for future background data transfer procedure

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**Figure 5.5.4-1: Negotiation for future background data transfer procedure**

1. The AF invokes the Nnef\_BDTPNegotiation\_Create service operation by sending an HTTP POST request to the resource "BDT Subscription" to get background data transfer policies. The AF request shall contain an ASP identifier, the volume of data to be transferred per UE, the expected amount of UEs, the desired time window and optionally, network area information either as a geographical area (e.g. a civic address or shapes), or an area of interest that includes a list of TAs and/or list of NG-RAN nodes and/or a list of cell identifiers. When the AF provides a geographical area, then the NEF maps it based on local configuration into a short list of TAs and/or NG-RAN nodes and/or cells identifiers that is provided to the (H-)PCF.

 If the "BdtNotification\_5G" feature defined in 3GPP TS 29.122 [34] is supported, the AF request may contain a notification URI to request the BDT warning notification as described in clause 4.4.4, 3GPP TS 29.522 [24].

NOTE 1: A 3rd party application server is typically not able to provide any specific network area information and if so, the AF request is for a whole operator network.

2. Upon receipt of a Background Data Transfer request from the AF indicating a transfer policy request, the NEF invokes the Npcf\_BDTPolicyControl\_Create service operation with the (H-)PCF by sending an HTTP POST request to the resource "BDT policies". The request operation includes the ASP identifier, the volume of data to be transferred per UE, the expected number of UEs, the desired time window, and optionally the network area information (list of TAIs and/or NG-RAN nodes and/or cells identifiers).

 If the AF requests the BDT warning notification in step 1, and if the "BdtNotification\_5G" feature defined in 3GPP TS 29.554 [26] is supported, the NEF provides a notification URI to request the BDT warning notification correspondingly.

NOTE 2: The NEF may contact any PCF in the operator network.

3-4. The (H-) PCF may invoke the Nudr\_DataRepository\_Query service operation by sending an HTTP GET request to the resource "BdtData", to request from the UDR all stored transfer policies. The UDR sends an HTTP "200 OK" response to the (H-) PCF.

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.

5. The (H-) PCF determines one or more transfer policies based on the information received from the NEF and other available information (e.g. network policy, existing transfer policies, network area information, network performance information from the NWDAF and load status estimation for the desired time window).

6. The (H-) PCF sends a "201 Created" response to the Npcf\_BDTPolicyControl\_Create service operation with the acceptable one or more transfer policies and a Background Data Transfer Reference ID.

7. The NEF sends a "201 Created" response to forward the received transfer policies to the AF. If the NEF received only one background transfer policy from the (H) PCF, steps 8-11 are not executed and the flow proceeds to step 12. Otherwise, the flow proceeds to step 8.

8. The AF invokes the Nnef\_BDTPNegotiation\_Update service operation by sending an HTTP PATCH request to the resource "Individual BDT Subscription" to provide the NEF with the selected background data transfer policy. The AF may also request to disable/enable the BDT warning notification if the "BdtNotification\_5G" feature is supported as described in 3GPP TS 29.522 [24].

9. The NEF invokes the Npcf\_BDTPolicyControl\_Update service operation by sending an HTTP PATCH request to the resource "Individual BDT policy" to provide the (H-)-PCF with the selected background data transfer policy. The NEF may also request to disable/enable the BDT warning notification if the "BdtNotification\_5G" feature defined in 3GPP TS 29.554 [26] is supported.

10. The (H-) PCF sends an HTTP PATCH response message to the NEF.

11. The NEF sends an HTTP PATCH response message to the AF.

12-13. If the (H-)PCF does not locally store the transfer policy and, if applicable, BDT warning notification information, it invokes the Nudr\_DataRepository\_Update service operation by sending an HTTP PUT request to the resource "IndividualBdtData", to store for the provided ASP identifier the new transfer policy together with the associated background data transfer reference ID, the volume of data per UE, the expected number of UEs and if available the corresponding network area information and if applicable, warning notification information in the UDR. The UDR sends an HTTP "201 Created" response to the (H-)PCF.

NOTE 4: For the details of Nnef\_BDTPNegotiation\_Create/Update service operations used for the procedure defined in this clause, refer to ResourceManagementOfBdt API with the "BdtNotification\_5G" feature as described in 3GPP TS 29.522 [24].

NOTE 5: For details of Npcf\_BDTPolicyControl\_Create/Update service operations refer to 3GPP TS 29.554 [26].

NOTE 6: For details of Nudr\_DataRepository\_Query/Update service operations refer to 3GPP TS 29.519 [12] and 3GPP TS 29.504 [27].

NOTE 7: When the AF sends an HTTP PUT request to the NEF to update BDT negotiation data different from selecting a transfer policy and/or toggling the BDT warning notification, the procedure defined in this clause applies, and in this case, Nnef\_BDTPNegotiation\_Create service operation is replaced by Nnef\_BDTPNegotiation\_Update service operation in step 1 and step 7.

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

5.5.4A Modification of BDT warning notification request indication procedure

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**Figure 5.5.4A-1: Modification of BDT warning notification request indication procedure**

1. The AF invokes the Nnef\_BDTPNegotiation\_Update service operation by sending an HTTP PATCH request to the resource "Individual BDT Subscription" to disable/enable the BDT warning notification if the "BdtNotification\_5G" feature defined in 3GPP TS 29.122 [34] is supported as described in 3GPP TS 29.522 [24].

2. The NEF invokes the Npcf\_BDTPolicyControl\_Update service operation by sending an HTTP PATCH request to the resource "Individual BDT policy" to disable/enable the BDT warning notification if the "BdtNotification\_5G" feature defined in 3GPP TS 29.554 [26] is supported.

3. The (H-) PCF sends an HTTP PATCH response message to the NEF.

4. The NEF sends an HTTP PATCH response message to the AF.

5-6. If the (H-)PCF does not locally store the BDT warning notification information, it invokes the Nudr\_DataRepository\_Update service operation by sending an HTTP PATCH request to the resource "IndividualBdtData", to store the warning notification information in the UDR. The UDR responds to the (H-)PCF.

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

5.5.5 BDT warning notification procedure

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**Figure 5.5.5-1: BDT warning notification procedure**

0. The AF subscribes to BDT warning notification from the (H-)PCF via NEF during Negotiation for future background data transfer procedure (see clause 5.5.4).

1. The (H-)PCF subscribes to network performance from the NWDAF, and is notified when the network performance in the area of interest goes below the criteria from the NWDAF as described in clause 5.7.5 of 3GPP TS 29.552 [48].

2-3. The (H-)PCF may invoke the Nudr\_DataRepository\_Query service operation by sending an HTTP GET request to the "BdtData" collection resource, to request from the UDR all stored transfer policies. The UDR sends an HTTP "200 OK" response to the (H-)PCF.

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

4. The (H-)PCF identifies the transfer policies that are affected by degradation of the network performance and for each affected transfer policy the (H-)PCF determines the ASP of which the background traffic will be influenced by the degradation of network performance and which requested the H-PCF to send the notification.

5. The (H-)PCF decides, based on operator policies, for each of the affected transfer policies whether a list of candidate transfer policies has to be calculated.

NOTE 2: If the (H-)PCF does not find any new candidate BDT policies, the previously negotiated BDT policy is kept and no interaction with the AF occurs i.e. steps 6 to 19 are not performed.

6-7. If the (H-)PCF stored the affected transfer policy in the UDR and one or more new candidate BDT policies are calculated, the (H-)PCF invokes the Nudr\_DataRepository\_Update service operation by sending an HTTP PATCH request to the resource "IndividualBdtData", to invalidate the affected background transfer policy in the UDR. The UDR sends an HTTP "200 OK" or "204 No Content" response to the (H-)PCF.

8. The (H-)PCF invokes the Npcf\_BDTPolicyControl\_Notify service operation by sending the HTTP POST request with the BDT warning notification to the Notification URI "{notifUri}".

 The BDT warning notification includes the BDT Reference ID of the impacted transfer policy and optionally the time window when the network performance will go below the criteria set by the operator, the network area where the network performance will go below the criteria set by the operator and the list of candidate transfer policies.

9. Upon the reception of the BDT warning notification from the (H-)PCF, the NEF invokes the Nnef\_BDTPNegotiation\_Notify service operation by sending the HTTP POST request with the BDT warning notification to the Notification URI "{notificationDestination}" as described in clause 4.4.16, 3GPP TS 29.522 [24].

10. The AF sends an HTTP POST response to the NEF.

11. The NEF sends an HTTP POST response to the (H-)PCF.

12. When the AF receives the BDT warning notification, the AF checks new candidate background transfer policies.

13. If the AF selected one of the background transfer policies from the received candidate list or decided to indicate that none of the candidate background transfer policies is acceptable, steps 8 - 11 from clause 5.5.4 are executed with the exception that an indication that no background transfer policy is selected is included in the HTTP PATCH request if the AF did not select any of the background transfer policy.

14A-15A. If the AF selected one of the background transfer policies from the candidate list and if the (H‑)PCF stored the affected transfer policy in the UDR, the (H‑)PCF shall invoke the Nudr\_DataRepository\_Update service operation by sending an HTTP PATCH request to the resource "IndividualBdtData", to update the UDR with the selected candidate transfer policy. The UDR sends an HTTP "200 OK" or "204 No Content" response to the (H-)PCF.

14B-15B. If the AF did not select one of the background transfer policies from the candidate list and if the (H‑)PCF stored the affected transfer policy in the UDR, the (H‑)PCF shall invoke the Nudr\_DataRepository\_Delete service operation to remove the affected transfer policy from the UDR by sending the HTTP DELETE request to the "IndividualBdtData" resource. The UDR sends an HTTP "204 No Content" response to the (H-)PCF.

NOTE 3: If the AF did not invoke within an operator configurable time the Nnef\_BDTPNegotiation\_Update service operation to indicate if the one of the background transfer policies from the candidate list is selected or not, the (H‑)PCF might remove the no longer valid BDT policy from UDR.

16-17. If the PCF subscribed to notification of "IndividualBDTdata" resource data changes in the UDR, i.e. the transfer policies are updated or deleted, the UDR invokes the Nudr\_DataRepository\_Notify service operation to the PCF by sending the HTTP POST request to the callback URI "{notificationUri}" as specified in 3GPP TS 29.519 [12].

NOTE 4: The PCF might be a different one than the PCF handling the BDT negotiation procedures, although in the figure it is represented as the same one for the simplification.

18. If the (H-)PCF identifies the URSP rules to UE need to be updated the (H-)PCF initiates the procedure "UE Policy Association Modification" defined in clause 5.6.2.2.2.

19. If the (H-)PCF identifies that:

- the PCC rules and/or session rules delivered to the SMF need to be updated the (H-)PCF initiates the procedure "SM Policy Association Modification initiated by the PCF" defined in clause 5.2.2.2; or

- the SM policy association needs to be terminated the (H-)PCF initiates the procedure "SM Policy Association Termination initiated by the PCF" defined in clause 5.2.3.2.

NOTE 5: For the details of Nnef\_BDTPNegotiation\_Notify service operation used for the procedure defined in this clause, refer to ApplyingBdtPolicy API as described in 3GPP TS 29.522 [24].

NOTE 6: For details of Npcf\_BDTPolicyControl\_Notify service operation refer to 3GPP TS 29.554 [26].

NOTE 7: For details of Nudr\_DataRepository\_Query/Update/Notify/Delete service operations refer to 3GPP TS 29.519 [12] and 3GPP TS 29.504 [27].

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