**3GPP TSG-CT3 Meeting #119e C3-216248**

**E-Meeting, 11th – 19th November 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **29.513** | **CR** | **0316** | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | AF Request for Simultaneous Connectivity over Source and Target PSA at Edge Relocation |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eEDGE\_5GC |  | ***Date:*** | 2021-11-11 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-17 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | AF may influence that certain traffic is redirected through a certain UL CL/BP and PSA, however it is unspecified how the relocation procedure happens, i.e., whether simultaneous connectivity should be temporarily maintained for source and target PSAs.SA2 agreed that the AF could indicate to the PCF that the re-anchoring procedure at edge relocation should provide simultaneous connectivity over the source and the target PSA temporarily, and could also provide a guidance about when the connectivity over the source PSA can be removed. |
|  |  |
| ***Summary of change:*** | Specify that when the EnEDGE feature is supported:* when the SMF receives from the PCF the indication that the AF requests that simultaneous connectivity should be maintained for the source and target PSA, the SMF should enforce this request.
* the SMF could maintain connectivity over the source PSA based on indication from the AF, which may override the locally configured value.
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| ***U*** |  |
| ***Consequences if not approved:*** | The edge relocation feature specified in TS 23.548 is not fully implemented. |
|  |  |
| ***Clauses affected:*** | 3.2, 5.5.3.2, 5.5.3.3 |
|  |  |
|  | **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's revision history:*** |  |

**Additional discussion(if needed):**

**…**

**Proposed changes:**

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

## 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].

5GC 5G Core Network

5G DDNMF 5G Direct Discovery Name Management Function

5QI 5G QoS Identifier

5G VN 5G Virtual Network

AF Application Function

AMBR Aggregate Maximum Bit Rate

AMF Access and Mobility Management Function

ARP Allocation and Retention Priority

AW Average Window

BDT Background Data Transfer

BSF Binding Support Function

CHEM Coverage and Handoff Enhancements using Multimedia error robustness feature

CHF Charging Function

DN-AAA Data Network Authentication, Authorization and Accounting

DTS Data Transport Service

LBO Local Breakout

MBR Maximum Bitrate

MCS Mission Critical Service

MPD Media Presentation Description

MPS Multimedia Priority Service

NEF Network Exposure Function

NID Network Identifier

NPLI Network Provided Location Information

NRF Network Repository Function

NSSAI Network Slice Selection Assistance Information

NWDAF Network Data Analytics Function

PCC Policy and Charging Control

PCF Policy Control Function

PDB Packet Delay Budget

PER Packet Error Rate

PDUID ProSe Discovery UE ID

PFD Packet Flow Description

PFDF Packet Flow Description Function

PMIC Port Management Information Container

PL Priority Level

ProSe Proximity Services

ProSeP 5G ProSe Policy

PSA PDU Session Anchor

PSAP Public Safety Access Point

P-CSCF Proxy Call Session Control Function

QNC QoS Notification Control

QoS Quality of Service

SCP Service Communication Proxy

SDP Session Description Protocol

SEPP Security Edge Protection Proxy

SMF Session Management Function

S-NSSAI Single Network Slice Selection Assistance Information

SNPN Stand-alone Non-Public Network

TSC Time Sensitive Communication

TSCAI Time Sensitive Communication Assistance Information

TSN Time Sensitive Networking

UDR Unified Data Repository

UL CL UpLink CLassifier

UMIC User plane node Management Information Container

UPF User Plane Function

UPSI UE policy section identifier

URSP UE Route Selection Policy

V2X Vehicle-to-Everything

V2XP Vehicle-to-Everything Policy

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

#### 5.5.3.2 AF requests targeting an individual UE address



Figure 5.5.3.2-1: Processing AF requests to influence traffic routing for Sessions identified by an UE address

1A. The AF sends the AF request to PCF via the NEF.

1a-1b. These steps are the same as steps 1-2 in Figure 5.5.3.3-1.

1c-1d. If the PCF address is not available on the NEF based on local configuration, the NEF invokes the Nbsf\_Management\_Discovery service operation, specified in subclause 8.5.4, to obtain the selected PCF ID for the ongoing PDU session identified by the individual UE address in the AF request.

1e-1f. The NEF forwards the AF request to the PCF.

 When receiving the Nnef\_TrafficInfluence\_Create request in step 1a, the NEF invokes the Npcf\_PolicyAuthorization\_Create service operation by sending the HTTP POST request to the "Application Sessions" resource as described in subclause 5.2.2.2.2.1. If the "URLLC" feature defined in 3GPP TS 29.514 [10] is supported, and the indication of AF acknowledgement was received from the AF request, the NEF forwards the indication to the PCF as described in 3GPP TS 29.514 [10]. If the "EnEDGE" feature defined in 3GPP TS 29.514 [10] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed were received from the AF request, the NEF forwards the received indication(s) to the PCF as described in 3GPP TS 29.514 [10].

 When receiving the Nnef\_TrafficInfluence\_Update request in step 1a, the NEF invokes the Npcf\_PolicyAuthorization\_Update service operation by sending the HTTP PATCH request to the "Individual Application Session Context" resource as described in subclause 5.2.2.2.2.2. If the "URLLC" feature defined in 3GPP TS 29.514 [10] is supported, and the indication of AF acknowledgement was received from the AF request, the NEF forwards the indication to the PCF as described in 3GPP TS 29.514 [10]. If the "EnEDGE" feature defined in 3GPP TS 29.514 [10] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed were received from the AF request, the NEF forwards the received indication(s) to the PCF as described in 3GPP TS 29.514 [10].

 When receiving the Nnef\_TrafficInfluence\_Delete request in step 1a The NEF invokes the Npcf\_PolicyAuthorization\_Delete service operation by sending the HTTP POST request to the "Individual Application Session Context" resource as described in subclause 5.2.2.2.2.3.

1g The NEF sends the HTTP response message to the AF correspondingly.

1B. The AF sends the AF request to PCF directly.

1a-1b. If the PCF address is not available on the AF based on local configuration, the AF invokes the Nbsf\_Management\_Discovery service operation, as specified in subclause 8.5.4, to obtain the selected PCF ID for the ongoing PDU session identified by the individual UE address in its request.

1c-1d. To create a new AF request, the AF invokes the Npcf\_PolicyAuthorization\_Create service operation by sending the HTTP POST request to the "Application Sessions" resource as described in subclause 5.2.2.2.2.1. If the "URLLC" feature defined in 3GPP TS 29.514 [10] is supported, the AF may provide an indication of AF acknowledgement to be expected as described in 3GPP TS 29.514 [10]. If the "EnEDGE" feature defined in 3GPP TS 29.514 [10] is supported, the AF may provide an indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed were received from the AF request to the PCF as described in 3GPP TS 29.514 [10]

 To update an existing AF request, the AF invokes the Npcf\_PolicyAuthorization\_Update service operation by sending the HTTP PATCH request to the "Individual Application Session Context" resource as described in subclause 5.2.2.2.2.2. If the "URLLC" feature defined in 3GPP TS 29.514 [10] is supported, the AF may provide an indication of AF acknowledgement to be expected as described in 3GPP TS 29.514 [10]. If the "EnEDGE" feature defined in 3GPP TS 29.514 [10] is supported, the AF may provide an indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed were received from the AF request to the PCF as described in 3GPP TS 29.514 [10].

 To remove an existing AF request, the AF invokes the Npcf\_PolicyAuthorization\_Delete service operation by sending the HTTP POST request to the "Individual Application Session Context" resource as described in subclause 5.2.2.2.2.3.

2-3. Upon receipt of the AF request, the PCF invokes the Npcf\_SMPolicyControl\_UpdateNotify service operation to update the SMF with corresponding PCC rule(s) by sending the HTTP POST request to the callback URI "{notificationUri}/update" as described in subclause 5.2.2.2.1. If the AF subscribes to UP Path change event, the PCF includes the related subscription information within the corresponding PCC rule(s) , in addition, if the "URLLC" feature defined in 3GPP TS 29.512 [9] is supported, and the indication of AF acknowledgement was received from the AF request, the PCF includes within the PCC rule(s) the indication of AF acknowledgement to be expected as specified in 3GPP TS 29.512 [9]. If the "EnEDGE" feature defined in 3GPP TS 29.512 [9] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed, were received from the AF request, the PCF includes within the PCC rule(s) the received indication(s) as specified in 3GPP TS 29.512 [9].

- For the case of 4A, the PCF includes in the PCC rule(s) the Notification URI pointing to the NEF and the Notification Correlation ID assigned by NEF.

- For the case of 4B, the PCF includes in the PCC rule(s) the Notification URI pointing to the AF and the Notification Correlation ID assigned by AF.

 If the AF unsubscribes from UP Path change event, the PCF removes the related subscription information from the corresponding PCC rule(s) as specified in 3GPP TS 29.512 [9].

3a. When the SMF installs PCC rule successfully, the SMF determines whether UP path change needs to be enforced. In this case, the SMF:

- when early notification is required, shall notify as described in step 4 before reconfiguring the User Plane of the PDU session;

- takes appropriate actions to reconfigure the User plane of the PDU Session such as:

i. adding, replacing or removing a UPF in the data path to e.g. act as an UL CL or a Branching Point;

ii. allocate a new Prefix to the UE (when IPv6 multi-Homing applies);

iii. updating the UPF in the target DNAI with new traffic steering rules;

iv. establishing a temporary N9 forwarding tunnel between the source UL CL and target UL CL and, if the AF requested so, and "EnEDGE" is supported in the concerned interfaces, maintaining simultaneous connectivity temporarily for the source and target PSA until the traffic ceases to exist for an AF indicated period of time or locally configured value; and

- when late notification is required, shall notify as described in step 4 after reconfiguring the User Plane of the PDU session.

4A. In case of 1A, if the SMF observes PDU Session related event(s) that AF has subscribed to, the SMF sends notification to the AF via the NEF.

4a-4d. The SMF invokes Nsmf\_EventExposure\_Notify service operation to the AF via the NEF by sending an HTTP POST request. When receiving the Nsmf\_EventExposure\_Notify service operation, the NEF performs information mapping (e.g. Notification Correlation ID to AF Transaction ID, etc.), and invokes the Nnef\_TrafficInfluence\_Notify service operation to forward the notification to the AF. If the indication of AF acknowledgement to be expected was included in the PCC rule(s), the SMF may notify with a notification URI for AF acknowledgement as described in 3GPP TS 29.508 [8], and then the NEF also notifies with a URI for the AF acknowledgement as described in 3GPP TS 29.522 [24].

4e-4h. When receiving the notification with the URI for AF acknowledgement, the AF acknowledges the notification to the SMF identified by the notification URI via the NEF.

 The step is the same as steps 7-14 in Figure 5.5.3.3-1.

4B. In case of 1B, if the SMF observes PDU Session related event(s) that AF has subscribed to, the SMF sends notification to the AF directly.

4a-4b. The SMF invokes Nsmf\_EventExposure\_Notify service operation to the AF directly by sending an HTTP POST request to the callback URI "{notifUri}", and the AF sends a "204 No Content" response to the SMF. If the indication of AF acknowledgement to be expected was included in the PCC rule(s), the SMF may provide an URI for the AF acknowledgement as described in 3GPP TS 29.508 [8].

4c-4d. When receiving the notification with the URI for AF acknowledgement from the SMF, the AF invokes Nsmf\_EventExposure\_AppRelocationInfo service operation by sending an HTTP POST request to the callback URI "{ackUri}" to acknowledge the notification, and the SMF sends a "204 No Content" response to the AF.

\*\*\* 3rd Change \*\*\*

#### 5.5.3.3 AF requests targeting PDU Sessions not identified by an UE address

If the AF traffic influence request affects future PDU session, the traffic influence procedure is performed as depicted in Figure 5.5.3.3-1.



Figure 5.5.3.3-1: Processing AF requests to influence traffic routing for Sessions not identified by an UE address, affecting future PDU session

1. To create a new AF request, the AF invokes the Nnef\_TrafficInfluence\_Create service operation to the NEF by sending the HTTP POST request to the "Traffic Influence Subscription" resource. If the "URLLC" feature defined in 3GPP TS 29.522 [24] is supported, the AF may provide an indication of AF acknowledgement to be expected. If the "EnEDGE" feature defined in 3GPP TS 29.522 [24] is supported, the AF may provide the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed.

 To update an existing AF request, the AF invokes the Nnef\_TrafficInfluence\_Update service operation by sending the HTTP PUT or PATCH request to the "Individual Traffic Influence Subscription" resource. If the "URLLC" feature defined in 3GPP TS 29.522 [24] is supported, the AF may provide an indication of AF acknowledgement to be expected. If the "EnEDGE" feature defined in 3GPP TS 29.522 [24] is supported, the AF may provide the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed.

 To remove an existing AF request, the AF invokes the Nnef\_TrafficInfluence\_Delete service operation by sending the HTTP DELETE request to the "Individual Traffic Influence Subscription" resource.

2. Upon receipt of the AF request, the NEF authorizes it and then performs the mapping from the information provided by the AF into information needed by the 5GC as described in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].

3-4. When receiving the Nnef\_TrafficInfluence\_Create request, the NEF invokes the Nudr\_DataRepository\_Create service operation to store the AF request information in the UDR by sending the HTTP PUT request to the "Individual Influence Data" resource, and the UDR sends a "201 Created" response. If the "EnEDGE" feature defined in 3GPP TS 29.519 [12] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed, were received from the AF request, the NEF includes within the creation request the received indication(s) as specified in 3GPP TS 29.519 [12].

 When receiving the Nnef\_TrafficInfluence\_Update request, the NEF invokes the Nudr\_DataRepository\_Update service operation to modify the AF request information in the UDR by sending the HTTP PATCH/PUT request to the resource "Individual Influence Data", and the UDR sends a "200 OK" or "204 No Content" response accordingly. If the "EnEDGE" feature defined in 3GPP TS 29.519 [12] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed, were received from the AF request, the NEF includes within the update request the received indication(s) as specified in 3GPP TS 29.519 [12].

 When receiving the Nnef\_TrafficInfluence\_Delete request, the NEF invokes the Nudr\_DataRepository\_Delete service operation to delete the AF requirements from the UDR by sending the HTTP DELETE request to the "Individual Influence Data" resource, and the UDR sends a "204 No Content" response.

5. The NEF sends the HTTP response message to the AF correspondingly.

6. The PCF retrieves the stored AF request in the UDR by invoking the Nudr\_DataRepository\_Query service operation during SM Policy Association Establishment procedure (see subclause 5.2.1).

 The PCF generates the PCC rule(s) based on the AF request and provides it to the SMF. If the AF subscribes to UP Path change event, the PCF includes the Notification URI pointing to the NEF and the Notification Correlation ID assigned by NEF within the corresponding PCC rule(s) as specified in 3GPP TS 29.512 [9]. If the AF unsubscribes from UP Path change event, the PCF removes the related subscription information from the corresponding PCC rule(s) as specified in 3GPP TS 29.512 [9].

If the "EnEDGE" feature defined in 3GPP TS 29.512 [9] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed, were stored in UDR, the PCF includes within the PCC rule(s) the received indication(s) as specified in 3GPP TS 29.512 [9].

6a. This step is the same as the step 3a in Figure 5.5.3.2-1.

7. If the SMF observes PDU Session related event(s) that AF has subscribed to, the SMF invokes the Nsmf\_EventExposure\_Notify service operation to the NEF by sending an HTTP POST request to the callback URI "{notifUri}". If the indication of AF acknowledgement to be expected was included in the PCC rule(s), the SMF may notify with an URI for the AF acknowledgement as described in 3GPP TS 29.508 [8].

8. When receiving the Nsmf\_EventExposure\_Notify service operation, the NEF performs information mapping (e.g. Notification Correlation ID to AF Transaction ID), and invokes the Nnef\_TrafficInfluence\_Notify service operation to forward the notification to the AF by sending the HTTP request to the callback URI "notificationDestination" as specified in 3GPP TS 29.522 [24]. If the notification from the SMF includes an URI for the AF acknowledgement, the NEF also notifies with a URI for the AF acknowledgement as described in 3GPP TS 29.522 [24].

9. The AF sends an HTTP "204 No Content" response to the NEF.

10. The NEF sends an HTTP "204 No Content" response to the SMF.

11-12. When receiving the notification with the URI for AF acknowledgement from the NEF, the AF invokes Nnef\_TrafficInfluence\_AppRelocationInfo service operation by sending an HTTP POST request to the callback URI "{afAckUri}" to acknowledge the notification, and the NEF sends a "204 No Content" response to the AF.

13-14. When receiving the AF acknowledgement from the AF, to forward it to the SMF, the NEF invokes Nsmf\_EventExposure\_AppRelocationInfo service operation by sending an HTTP POST request to the callback URI "{ackUri}", and the SMF sends a "204 No Content" response to the NEF.

If the AF traffic influence request affects ongoing PDU session, the traffic influence procedure is performed as depicted in Figure 5.5.3.3-2.



Figure 5.5.3.3-2: Processing AF requests to influence traffic routing for Sessions not identified by an UE address, affecting ongoing PDU session

0. The PCF subscribes to the changes of traffic influence data in the UDR during SM Policy Association establishment procedure (see subclause 5.2.1).

1-5. These steps are the same as steps 1-5 in Figure 5.5.3.3-1.

6-7. The UDR invokes the Nudr\_DataRepository\_Notify service operation to PCF(s) that have subscribed to modifications of AF requests by sending the HTTP POST request to the callback URI "{notificationUri}", and the PCF sends a "204 No Content" response to the UDR.

8-9. Upon receipt of the AF request from the UDR, the PCF determines if existing PDU Sessions are potentially impacted by the AF request. For each of these PDU Sessions, the PCF invokes the Npcf\_SMPolicyControl\_UpdateNotify service operation to update the SMF with corresponding PCC rule(s) by sending the HTTP POST request to the callback URI "{notificationUri}/update" as described in subclause 5.2.2.2.1.

 If the AF subscribes to UP Path change event, the PCF includes the information on AF subscription to UP path change event within the corresponding PCC rule(s) as specified in 3GPP TS 29.512 [9]. If the AF unsubscribes from UP Path change event, the PCF removes the related subscription information from the corresponding PCC rule(s) as specified in 3GPP TS 29.512 [9].

If the "EnEDGE" feature defined in 3GPP TS 29.512 [9] is supported, and the indication of simultaneous temporary connectivity for source and target PSA, and, optionally, guidance about when the connectivity over the source PSA can be removed, were stored in UDR, the PCF includes within the PCC rule(s) the received indication(s) as specified in 3GPP TS 29.512 [9].

9a. This step is the same as step 6a in Figure 5.5.3.3-1.

10-17. These steps are the same as steps 7-14 in Figure 5.5.3.3-1.

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