**3GPP TSG-CT WG3 Meeting #134 *C3-242547***

**Changsha, China, 15th – 19th April, 2024 (Revision of C3-242420)**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.522** | **CR** | **1272** | **rev** | **1** | **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:***  | Completion of HR-SBO procedures in the AF requests for influence of traffic routing. |
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| ***Source to WG:*** | Ericsson, Nokia |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | EDGE\_Ph2 |  | ***Date:*** | 2024-03-20 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)Rel-20 (Release 20)* |
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| ***Reason for change:*** | In the last SA2 meeting, SA2 agreed to update TS 23.502 to complete the procedures related to processing AF requesgs to influence traffic routing for HR-SBO sessions. The proposal was completed/corrected in SA#103 (SP-240438). The updates include the possible information that the AF can provide, how the NEF uses this information to interpret the PDU session is related to HR-SBO and what information is used when accessing the V-UDR.The corresponding procedures in TS 29.522 need to be aligned with these updates. |
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| ***Summary of change:*** | Clause 4.4.7.5 is updated to define the information that the NEF can receive from the AF, how to derive that the PDU session corresponds to an HR-SBO scenario, what info is needed towards the UDR and remove the corresponding Editor’s Notes.Clause 5.4.3.3.2 is updated to introduce the conditions for the AF to provide information that helps the NEF to identify the PDU session corresponds to an HR-SBO scenario.  |
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| ***Consequences if not approved:*** | Incomplete specification of HR-SBO scenarios. |
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| ***Clauses affected:*** | 4.4.7.5; 5.4.3.3.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR does not impact the TrafficInfluence OpenAPI specification.  |
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| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

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

#### 4.4.7.5 Processing AF requests to influence traffic routing for HR-SBO session

If HR-SBO scenarios are supported by the NEF, upon receiving the AF request, it shall determine whether the PDU session is working in HR-SBO mode based on the availability of the information provided by the AF as follows:

If the AF supports the "HR-SBO" feature and includes within the TrafficInfluSub data type the "plmnId", "dnn", and/or "snssai" attributes indicating the HPLMN ID, HPLMN DNN and HPLMN S-NSSAI of the UE, , the NEF shall determine that the PDU session is working in HR-SBO mode when the PLMN of the UE (derived from the "plmnId", "dnn" and/or "snssai" received attributes) is not the PLMN that the NEF belongs to.

NOTE 1: The DNN can be unique for a PLMN (see TS 23.003 [55]) and can be mapped to a HPLMN.

If the NEF did not receive any of the "plmnId", "dnn", and "snssai" attributes, the NEF shall deduce if the PDU session is working in HR-SBO mode and obtain the related information to be stored in the V-UDR based on the target UE information as follows:

1. If the "gpsi" attribute is received and the HPLMN of the UE is part of it, the NEF derives the HPLMN of the UE (and thus whether HR-SBO applies) from the received GPSI. The NEF shall contact the NEF of the HPLMN as described in 3GPP TS 23.502 [2], clause 4.3.6.5.5 in order to obtain the SUPI, and the DNN and S-NSSAI of the HPLMN.

NOTE 2: If the GPSI is in the form of External Identifier (see 3GPP TS 23.003 [55]) the NEF can determine the HPLMN of UE based on Domain Identifier in the GPSI.

2. If the "anyUeInd" attribute is received, the NEF determines based on configuration if the PDU Session is working in HR-SBO mode.

3. If the UE address is received as part of "ipv6Addr" or "ipv4Addr" attribute and it corresponds to a private IP address, the NEF determines whether HR-SBO applies based on configuration or based on interaction with the UPF by invoking the Nupf\_GetUEPrivateIPaddrAndIdentifiers service as described in 3GPP TS 23.502 [2], clause 4.3.6.1, according to local policies.

4. If the UE address is received as part of "ipv6Addr" or "ipv4Addr"attribute and it corresponds to a public IP address that belongs to a range not owned by the PLMN of the NEF, the NEF shall determine that HR-SBO applies.

5. If the UE address is received as part of "ipv4Addr"attribute and it corresponds to a public IP address NATed by the PLMN that the NEF belongs to, the NEF shall deduce the PDU session is working in HR-SBO by interacting with the UPF using the Nupf\_GetUEPrivateIPaddrAndIdentifiers\_Get request service operation as described in 3GPP TS 23.502 [2], clause 4.3.6.1.

NOTE 3: In this release, the HPLMN allows HR-SBO for a PDU session only if the UE IP address of the PDU Session has not been allocated in a range that may overlap with other PDU sessions to the same DNN and S-NSSAI of that HPLMN.

NOTE 4: It is assumed that the NEF is configured with the NATed IP range of its own PLMN. It is assumed that the NEF is configured based on HR-SBO roaming agreements of Public IP address ranges with an HPLMN ID.

NOTE 5 This procedure is not supported if the AF request targets includes "externalGroupId", "externalGroupIds" or "extSubscCats" attributes within the TrafficInfluSub data type.

The NEF shall derive the information to be stored in the UDR considering the information received from the AF, the H-PLMN derivation (e.g. from GPSI, DNN) and the information obtained from the V-UPF (e.g. SUPI, IP address, DNN, S-NSSAI) or H-NEF (e.g.DNN, S-NSSAI, SUPI) when applicable according to the scenarios described above.

After having derived the informationas described above, the NEF shall interact with the UDR to store the traffic influence parameters as described in 3GPP TS 29.504 [20] and 3GPP TS 29.519 [23].If the NEF receives an error response from the UDR, the NEF shall not create, update or delete the resource and shall respond to the AF with a proper error status code. If the NEF received within an error response a "ProblemDetails" data structure with a "cause" attribute indicating an application error, the NEF shall relay this error response to the AF with a corresponding application error, when applicable.

After receiving a successful response from the UDR, the NEF shall:

- for the HTTP POST request, create a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, addressed by a URI that contains the AF Identifier and an NEF-created subscription identifier, and shall respond to the AF with a 201 Created status code, including a Location header field containing the URI for the created resource. The AF shall use the URI received in the Location header in subsequent requests to the NEF to refer to this traffic influence subscription;

- for the HTTP PUT or PATCH request, update a resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall respond to the AF with a 200 OK status code with the "TrafficInfluSub" data structure as response body containing the representation of the modified "Individual Traffic Influence Subscription", or an HTTP "204 No Content" response; and

- for the HTTP DELETE request, delete the corresponding active resource "Individual Traffic Influence Subscription" which represents the traffic influence subscription, and shall responds to the AF with a 204 No Content status code.

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

##### 5.4.3.3.2 Type: TrafficInfluSub

This type represents a traffic influence subscription. The same structure is used in the subscription request and subscription response.

Table 5.4.3.3.2-1: Definition of type TrafficInfluSub

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability(NOTE 1) |
| afServiceId | string | O | 0..1 | Identifies a service on behalf of which the AF is issuing the request. |  |
| afAppId | string | O | 0..1 | Identifies an application.(NOTE 3) |  |
| afTransId | string | O | 0..1 | Identifies an NEF Northbound interface transaction, generated by the AF. |  |
| appReloInd | boolean | O | 0..1 | Identifies whether an application can be relocated once a location of the application has been selected.- Set to "true" if it shall be relocated.- Set to "false" if it shall not be relocated.- Default value is "false" if omitted. |  |
| dnn | Dnn | O | 0..1 | Identifies a DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. |  |
| snssai | Snssai | O | 0..1 | Identifies an S-NSSAI. |  |
| externalGroupId | ExternalGroupId | O | 0..1 | Identifies a group of users.(NOTE 2) (NOTE 6) |  |
| externalGroupIds | array(ExternalGroupId) | O | 2..N | List of external group identifiers associated with the subscriber.(NOTE 2) (NOTE 6) (NOTE 7) | FinerGranUEs |
| extSubscCats | array(string) | O | 1..N | List of external categories associated with the subscriber.(NOTE 8) | FinerGranUEs |
| anyUeInd | boolean | O | 0..1 | Identifies whether the AF request applies to any UE (i.e. all UEs).- Set to "true": the AF request is applicable to any UE.- Set to "false": the AF request is not applicable to any UE.- Default value is "false" if omitted.(NOTE 2) |  |
| subscribedEvents | array(SubscribedEvent) | O | 1..N | Identifies the requirement to be notified of the event(s).  |  |
| gpsi | Gpsi | O | 0..1 | Identifies a user. (NOTE 2) |  |
| ipv4Addr | Ipv4Addr | O | 0..1 | Identifies the IPv4 address. (NOTE 2) |  |
| ipDomain | string | O | 0..1 | The IPv4 address domain identifier.The attribute may only be provided if the ipv4Addr attribute is present. |  |
| ipv6Addr | Ipv6Addr | O | 0..1 | Identifies the IPv6 address. (NOTE 2) |  |
| macAddr | MacAddr48 | O | 0..1 | Identifies the MAC address. (NOTE 2) |  |
| dnaiChgType | DnaiChangeType | O | 0..1 | Identifies a type of notification regarding UP path management event. |  |
| notificationDestination | Link | C | 0..1 | Contains the Callback URL to receive the notification from the NEF.It shall be present if the "subscribedEvents" is present. |  |
| requestTestNotification | boolean | O | 0..1 | Indicates whether the AF requests the NEF to send a test notification.- Set to "true" by the AF to request the NEF to send a test notification as defined in clause 5.2.5.3 of 3GPP TS 29.122 [4].- Set to "false" by the AF to not to request the NEF to send a test notification.- Default value is "false" if omitted. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol. | Notification\_websocket |
| self | Link | C | 0..1 | Link to the created resource. This parameter shall be supplied by the NEF in HTTP responses that include an object of TrafficInfluSub type |  |
| trafficFilters | array(FlowInfo) | O | 1..N | Identifies IP packet filters.(NOTE 3) |  |
| ethTrafficFilters | array(EthFlowDescription) | O | 1..N | Identifies Ethernet packet filters.(NOTE 3) |  |
| trafficRoutes | array(RouteToLocation) | O | 1..N | Identifies the N6 traffic routing requirement. (NOTE 9) |  |
| sfcIdDl | string | O | 0..1 | Reference to a pre-configured steering of user traffic to service function chain in downlink.(NOTE 5) | SFC |
| sfcIdUl | string | O | 0..1 | Reference to a pre-configured steering of user traffic to service function chain in uplink.(NOTE 5) | SFC |
| metadata | Metadata | O | 0..1 | Contains opaque information for the service functions in the N6-LAN that is provided by AF and transparently sent to UPF. May only be provided when "sfcIdDl" and/or "sfcIdUl" are provided. | SFC |
| tfcCorrInd | boolean | O | 0..1 | Indication of traffic correlation.May only be included when "externalGroupId" attribute was included within the TrafficInfluSub data type previously.It is used to indicate that for the group of UEs, the targeted PDU sessions should be correlated by a common DNAI.Set to "true" if it should be correlated; otherwise set to "false". Default value is "false" if omitted. (NOTE 4) (NOTE 10) |  |
| tfcCorreInfo | TrafficCorrelationInfo | O | 0..1 | Contains the information for traffic correlation. The "notifUri" and "notifCorrId" attributes are not applicable for "tfcCorreInfo" attribute. (NOTE 10) | CommonEASDNAI |
| tempValidities | array(TemporalValidity) | O | 1..N | Indicates the time interval(s) during which the AF request is to be applied. |  |
| validGeoZoneIds | array(string) | O | 1..N | Identifies a geographic zone that the AF request applies only to the traffic of UE(s) located in this specific zone.This attribute is deprecated; the attribute "geoAreas" should be used instead. |  |
| geoAreas | array(GeographicalArea) | O | 1..N | Identifies geographical areas within which the AF request applies.This attribute deprecates validGeoZoneIds attribute. |  |
| afAckInd | boolean | O | 0..1 | Identifies whether the AF acknowledgement of UP path event notification is expected.- "true" indicates that the AF acknowledgement of UP path event is expected.- "false" indicates that the AF acknowledgement of UP path event notification is not expected.- Default value is "false" if omitted. | URLLC |
| addrPreserInd | boolean | O | 0..1 | Indicates whether UE IP address shall be preserved.- "true" indicates that the UE IP address shall be preserved.- "false" indicates that the UE IP address shall not preserved.- Defalult value is "false" if omitted. | URLLC |
| simConnInd | boolean | O | 0..1 | Indication of whether simultaneous connectivity shall be temporarily maintained for the source and target PSA.- "true" indicates that the temporary simultaneous connectivity shall be kept.- "false" indicates that the temporary simultaneous connectivity shall not be kept.- Default value is "false" if omitted. | SimultConnectivity |
| simConnTerm | DurationSec | O | 0..1 | Indication of the minimum time interval to be considered for inactivity of the traffic routed via the source PSA during the edge re-location procedure. It may be included when the "simConnInd" attribute is set to true.  | SimultConnectivity |
| maxAllowedUpLat | Uinteger | O | 0..1 | Indicates the target user plane latency in units of milliseconds. The SMF may use this value to decide whether edge relocation is needed to ensure that the user plane latency does not exceed the value. | AF\_lantency |
| easIpReplaceInfos | array(EasIpReplacementInfo) | O | 1..N | Contains EAS IP replacement information. | EASIPreplacement |
| easRedisInd | boolean | O | 0..1 | Indicates whether the EAS rediscovery is required for the application.- "true" indicates that the EAS rediscovery is required for the application.- "false" indicates that the EAS rediscovery is not required for the application.- Defalult value is "false" if omitted.The indication shall be invalid after it was applied unless it is provided again. | EASDiscovery |
| eventReq | ReportingInformation | O | 0..1 | Indicates the event reporting requirements.This attribute may be provided if the "EDGEAPP" feature is supported and the "subscribedEvents" attribute is present. | EDGEAPP |
| eventReports | array(EventNotification) | C | 1..N | Represents user plane path management event report(s).This attribute shall be present in an HTTP POST response if the immediate reporting indication in the "immRep" attribute within the "eventReq" attribute is set to true and the "subscribedEvents" was present in the corresponding HTTP POST request and the report(s) are available.This attribute may also be present in an HTTP PUT or PATCH response when the report(s) are available. | EDGEAPP |
| candDnaiInd | boolean | O | 0..1 | Indication of reporting candidate DNAI(s). If it is included and set to "true", the candidate DNAI(s) for the PDU session need to be reported. Otherwise, the default value is "false" if omitted. | CommonEASDNAI |
| plmnId | PlmnId | O | 0..1 | Identifies the H-PLMN of the UE. | HR-SBO |
| portNumber | Port | O | 0..1 | Indicates the UDP or TCP port number associated with the UE IP address as provided in the "ipv4Addr" or "ipv6Addr" property. | HR-SBO |
| suppFeat | SupportedFeatures | C | 0..1 | Indicates the list of Supported features used as described in clause 5.4.4.This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| NOTE 1: Properties marked with a feature as defined in clause 5.4.4 are applicable as described in clause 5.2.7 of 3GPP TS 29.122 [4]. If no feature is indicated, the related property applies for all the features.NOTE 2: If "HR-SBO" feature is not supported, only one of individual UE identifier (i.e. "gpsi", "macAddr", "ipv4Addr" or "ipv6Addr"), External Group Identifier (i.e. "externalGroupId" or "externalGroupIds" (is included when FinerGranUEs feature is supported)) or any UE indication "anyUeInd" shall be included. If "HR-SBO" feature is supported and the AF wants to influence traffic routing for HR-SBO sessions in the VPLMN, only one of individual UE identifier (i.e. "gpsi", "ipv4Addr" or "ipv6Addr") or any UE indication "anyUeInd" shall be included.NOTE 3: One of "afAppId", "trafficFilters" or "ethTrafficFilters" shall be included. NOTE 4: The indication of traffic correlation shall be provided only when the AF requires that all the PDU sessions related to the 5G VN group member UEs should be correlated by a common DNAI in the user plane for the traffic as described in 3GPP TS 23.501 [3], clause 5.6.7.1 and clause 5.29.NOTE 5: When the SFC feature is supported, for the purpose of influencing service function chaining, at least one attribute shall be present.NOTE 6: The attributes "externalGroupId" and "externalGroupIds" are mutually exclusive attributes.NOTE 7: The AF request applies to the UE(s) that belong to all the External Group Identifiers indicated by the attribute "externalGroupIds", when included.NOTE 8: The AF request applies to the UE(s) that belong to all the External Subscriber Categories indicated by the attribute "extSubscCats", which is included only if either "externalGroupIds" attribute is included or "externalGroupId" is included or "anyUeInd" attribute is included. If "HR-SBO" feature is supported and the AF works in HR-SBO mode, "extSubscCats" shall not be provided.NOTE 9: When only one DNAI is included, and the Indication of traffic correlation within the "tfcCorrInd" attribute is available or the "corrType" attribute of the "tfcCorreInfo" includes the value "COMMON\_DNAI", the DNAI is used as common DNAI for UEs identified by AF request.NOTE 10: The "tfcCorrInd" attribute and the "tfcCorreInfo" attribute are mutually exclusive. |

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