**3GPP TSG-CT WG4 Meeting #111-eC4-224404**

**E-Meeting, 18th – 26th August 2022** *Revision of C4-224068*

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.244** | **CR** | **0650** | **rev** | **1** | **Current version:** | **17.5.0** |  |
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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 to Add MBS Unicast Parameters | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5MBS | | | | |  | ***Date:*** | | | 2022-07-24 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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 can be 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | When an MB-SMF sends PFCP Session Establishment Request to an MB-UPF, the MB-SMF cannot know what the RAN/UPF tunnel info is, i.e. the IP address and TEID. Therefore, the condition for sending 'Add MBS Unicast Parameters' IE in the Create FAR IE within PFCP Session Establishment Request cannot be met during ordinary operation. MB-SMF instruct the MB-UPF later on to change the FAR with a PFCP Session Modification Request message, so that the MB-UPF could forward and replicate MBS Session data. However, during the restoration procedures upon PFCP session should be re-established in the MB-UPF with the GTP-U endpoints of gNBs or UPF, as specified in TS 23.527, e.g. in clause 8.2.2 and 8.2.3. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The usage of the 'Add MBS Unicast Parameters' IE in the Create FAR IE within PFCP Session Establishment Request is clarified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Ambiguos condition for sending 'Add MBS Unicast Parameters' IE in the PFCP Session Establishment Request remains in the spec. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.34.2.2, 7.5.2.3. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Rev1: Removed 'Add MBS Unicast Parameters' IE in the PFCP Session Establishment Request is reverted, but a clarification is added. Clarifications are added also to clause 5.34.2.2. Cover sheet is updated. | | | | | | | | |

\* \* \* First Change \* \* \* \*

#### 5.34.2.2 Instructing the MB-UPF to forward MBS data using multicast and/or unicast transport

When the MB-SMF receives an MBS Session Create Request from a NEF/MBSF to configure an MBS session, the MB-SMF shall select an MB-UPF and request that MB-UPF to allocate relevant user plane resource for the MBS session, or for the MBS session and MBS Service Area for a location dependent MBS service; to do so, the MB-SMF shall send a PFCP Session Establishment Request message to the MB-UPF to setup a PFCP session for the MBS Session, or for the MBS session and MBS Service Area for a location dependent MBS service, including the following information in the PFCP Session Establishment Request message:

- the MBS Session Identifier identifying the MBS session (i.e. TMGI or SSM address);

- the Area Session ID, for a location dependent MBS service;

- a JMBSSM (Join MBS Session SSM) indication in the MBSN4mbReq-Flags IE to request the MB-UPF to join the multicast tree towards the Source Specific Multicast (SSM) address information provided by AF/AS or MBSTF for the MBS Session where the SSM is provided in the IP Multicast Addressing Info IE in the corresponding downlink PDR, if multicast transport applies over N6mb or Nmb9 (i.e. if no N6mb or Nmb9 ingress tunnel is requested to be allocated);

- a PLLSSM (Provide Low Layer Source Specific Multicast address) indication in the MBSN4mbReq-Flags IE to request the MB-UPF to provide a lower layer SSM address (i.e. multicast destination address and related source IP address) and a GTP-U Common Tunnel EndPoint Identifier (C-TEID), if multicast transport applies over N3mb or N19mb;

- for each MBS QoS flow:

- a Create PDR IE to provision a downlink PDR with PDI or a Create Tunnel Endpoint IE containing either:

- a "Local Ingress Tunnel" IE with the CHOOSE bit set to "1" to request the MB-UPF to allocate an ingress tunnel for unicast transport over N6mb or Nmb9; or

- an IP Multicast Addressing Info IE to request the MB-UPF to retrieve the MBS session data from the IP Multicast Address, when using multicast transport over N6mb or Nmb9.

NOTE: A single ingress tunnel address is assigned, when using unicast transport over N6mb or Nmb9, regardless of the number of MBS QoS flows.

- a Create QER IE to provision a QER (associated with the PDR including the above PDI or Traffic EndPoint ID) instructing the MB-UPF to insert the QFI of the MBS QoS flow in user plane packets and possibly requesting the MB-UPF to apply specific QoS treatments; the IQFISN (Insert DL MBS QFI Sequence Number) flag in the Create QER IE shall be set to "1" to request the MB-UPF to insert the DL MBS QFI Sequence Number in the PDU session container in user plane packets;

- a Create FAR IE to provision a FAR (associated with the PDR including the above PDI or Traffic EndPoint ID) with the Apply Action set to "FSSM" with an MBS Multicast Parameters IE, when multicast transport is used over N3mb or N19mb, to forward the packets to the low layer SSM address when it is allocated; otherwise, the apply action shall be set to "DROP".

The MBS Session Identifier, Area Session ID (for a location dependent MBS service) and the MBSN4mbReq-Flags are included in the group IE "MBS Session N4mb Control Information" at the PFCP message level.

The MB-UPF shall return the allocated ingress tunnel information in the Created PDR IE or Created Traffic Endpoint IE and provide the Low Layer SSM address if requested.

For an MBS session using unicast transport over N3mb or N19mb, when one or more NG-RAN node(s) and/or PSA UPF(s) provides a downlink GTP-U F-TEID (i.e. IP address and tunnel endpoint identifier) to receive the MBS session data, the MB-SMF shall send a PFCP Session Modification Request or a PFCP Session Establishment Request message to change the FAR with the Apply-Action set to "MBSU" together with one or more Add MBS Unicast Parameters to instruct the MB-UPF to forward and replicate MBS Session data towards the one or more GTP-U DL tunnels terminating at the NG-RAN(s) and/or PSA UPF(s).

NOTE x: FAR with the Apply-Action set to "MBSU" together with one or more Add MBS Unicast Parameters is sent with a PFCP Session Establishment Request message only during the restoration procedures, as specified in 3GPP TS 23.527 [40], see e.g. clauses 8.2.2 and 8.2.3.

For an MBS session using multicast transport over N3mb or N19mb, if the "FSSM" flag is set in the Apply Action, the MB-UPF shall forward the MBS session data using the Low Layer Source Specific Multicast address (i.e. destination IP multicast address and related source IP address) and C-TEID it allocated to the MBS session.

Both the "FSSM" and "MBSU" flags shall be set in the Apply-Action IE if the MB-UPF is requested to forward MBS data using both multicast and unicast transport over N3mb or N19mb.

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

#### 7.5.2.3 Create FAR IE within PFCP Session Establishment Request

The Create FAR grouped IE shall be encoded as shown in Figure 7.5.2.3-1.

Table 7.5.2.3-1: Create FAR IE within PFCP Session Establishment Request

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  | Create FAR IE Type = 3 (decimal) | | | | | | |
| Octets 3 and 4 |  | Length = n | | | | | | |
| Information elements | P | Condition / Comment | Appl. | | | | | IE Type |
| Sxa | Sxb | Sxc | N4 | N4mb |
| FAR ID | M | This IE shall uniquely identify the FAR among all the FARs configured for that PFCP session. | X | X | X | X | X | FAR ID |
| Apply Action | M | This IE shall indicate the action to apply to the packets, See clauses 5.2.1 and 5.2.3. | X | X | X | X | X | Apply Action |
| Forwarding Parameters | C | This IE shall be present when the Apply Action requests the packets to be forwarded. It may be present otherwise.  When present, this IE shall contain the forwarding instructions to be applied by the UP function when the Apply Action requests the packets to be forwarded.  See table 7.5.2.3-2. | X | X | X | X | - | Forwarding Parameters |
| Duplicating Parameters | C | This IE shall be present when the Apply Action requests the packets to be duplicated. It may be present otherwise.  When present, this IE shall contain the forwarding instructions to be applied by the UP function for the traffic to be duplicated, when the Apply Action requests the packets to be duplicated.  Several IEs with the same IE type may be present to represent to duplicate the packets to different destinations. See NOTE 1.  See table 7.5.2.3-3. | X | X | - | - | - | Duplicating Parameters |
| BAR ID | O | When present, this IE shall contain the BAR ID of the BAR defining the buffering instructions to be applied by the UP function when the Apply Action requests the packets to be buffered. | X | - | - | X | - | BAR ID |
| Redundant Transmission Forwarding Parameters | C | This IE shall be present when the Apply Action requests the packets to be duplicated for redundant transmission and the Forwarding Parameters IE is included. It may be present otherwise.  When present, this IE shall contain the forwarding instructions to be applied by the UP function for the traffic to be duplicated, when the Apply Action requests the packets to be duplicated for redundant transmission. Except for the parameters included in the Redundant Transmission Parameters IE, the duplicated packets shall apply the same parameters as those indicated in the Forwarding Parameters IE.  See table 7.5.2.3-4. | - | - | - | - | - | Redundant Transmission Forwarding Parameters |
| MBS Multicast Parameters | C | This IE shall be present when the Apply Action is set to "FFSM". This requests the MB-UPF to forward the MBS session data to a Low Layer SSM. | - | - | - | - | X | MBS Multicast Parameters |
| Add MBS Unicast Parameters | C | This IE shall be present during restoration procedure when the Apply Action is set to "MBSU" (see e.g. clauses 8.2.2 and 8.2.3 in 3GPP TS 23.527 [40]). This requests the MB-UPF to forward the MBS session data to a remote GTP-U peer for unicast transport.  Several IEs with the same IE type may be present to request the MB-UPF to forward the MBS session data to multiple remote GTP-U peers. | - | - | - | - | X | Add MBS Unicast Parameters |
| NOTE 1: The same user plane packets may be required, according to operator's policy and configuration, to be duplicated to different SX3LIFs. | | | | | | | | |

Table 7.5.2.3-2: Forwarding Parameters IE in FAR

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  |  | Forwarding Parameters IE Type = 4 (decimal) | | | | | | |
| Octets 3 and 4 |  |  | Length = n | | | | | | |
| Information elements | P | Condition / Comment | | Appl. | | | | | IE Type |
| Sxa | Sxb | Sxc | N4 | N4mb |
| Destination Interface | M | This IE shall identify the destination interface of the outgoing packet. | | X | X | X | X | - | Destination Interface |
| Network Instance | O | When present, this IE shall identify the Network instance towards which to send the outgoing packet. See NOTE 1. | | X | X | X | X | - | Network Instance |
| Redirect Information | C | This IE shall be present if the UP function is required to enforce traffic redirection towards a redirect destination provided by the CP function. | | - | X | X | X | - | Redirect Information |
| Outer Header Creation | C | This IE shall be present if the UP function is required to add one or more outer header(s) to the outgoing packet. If present, it shall contain the F-TEID of the remote GTP-U peer when adding a GTP-U/UDP/IP header, or the Destination IP address and/or Port Number when adding a UDP/IP header or an IP header or the C-TAG/S-TAG (for 5GC). See NOTE 2. | | X | X | - | X | - | Outer Header Creation |
| Transport Level Marking | C | This IE shall be present if the UP function is required to mark the IP header with the DSCP marking as defined by IETF RFC 2474 [22]. When present for EPC, it shall contain the value of the DSCP in the TOS/Traffic Class field set based on the QCI, and optionally the ARP priority level, of the associated EPS bearer, as described in clause 5.10 of 3GPP TS 23.214 [2]. When present for 5GC, it shall contain the value of the DSCP in the TOS/Traffic Class field set based on the 5QI, the Priority Level (if explicitly signalled), and optionally the ARP priority level, of the associated QoS flow, as described in clause 5.8.2.7 of 3GPP TS 23.501 [28], | | X | X | - | X | - | Transport Level Marking |
| Forwarding Policy | C | This IE shall be present if a specific forwarding policy is required to be applied to the packets. It shall be present if the Destination Interface IE is set to SGi-LAN / N6-LAN. It may be present if the Destination Interface is set to Core, Access, or CP-Function. See NOTE 2.  When present, it shall contain an Identifier of the Forwarding Policy locally configured in the UP function. | | - | X | X | X | - | Forwarding Policy |
| Header Enrichment | O | This IE may be present if the UP function indicated support of Header Enrichment of UL traffic. When present, it shall contain information for header enrichment. | | - | X | X | X | - | Header Enrichment |
| Linked Traffic Endpoint ID | C | This IE may be present, if it is available and the UP function indicated support of the PDI optimisation feature, (see clause 8.2.25). When present, it shall identify the Traffic Endpoint ID allocated for this PFCP session to receive the traffic in the reverse direction (see clause 5.2.3.1). | | X | X | - | X | - | Traffic Endpoint ID |
| Proxying | C | This IE shall be present if proxying is to be performed by the UP function.  When present, this IE shall contain the information that the UPF shall respond to Address Resolution Protocol and / or IPv6 Neighbour Solicitation based on the local cache information for the Ethernet PDUs. | | - | - | - | X | - | Proxying |
| Destination Interface Type | O | This IE may be present to indicate the 3GPP interface type of the destination interface, if required by functionalities in the UP Function, e.g. for performance measurements. | | X | X | - | X | - | 3GPP Interface Type |
| Data Network Access Identifier | C | This IE shall be present over N16a to link the UL FAR in an UL CL or BP towards a specific local PSA, if more than one local PSA has been inserted by an I-SMF. It may be present over N16a otherwise. This IE shall not be sent over N4.  When present, it shall be set to the DNAI associated to the local PSA towards which the UL traffic shall be forwarded. | | - | - | - | - | - | Data Network Access Identifier |
| IP Address and Port Number Replacement | C | This IE shall be present if the UP function indicated support of replacing the source and destination IP address and Port Number of an (inner) IP packet, and if the source or destination IP address and/or port number of the (Inner) IP packet shall be modified, e.g. for Edge Relocation using EAS IP address and Port number Replacement (see clause 5.33.3).  This IE shall also be present if the destination IP address and/or port number of the (Inner) IP packet shall be modified, e.g. for EAS Discovery procedure with Local DNS Server/Resolver using Local DNS Server/Resolver IP address and Port number Replacement (see clause 5.33.4).  (NOTE 3) | | - | - | - | X | - | IP Address and Port Number Replacement |
| NOTE 1: The Network Instance parameter is needed e.g. in the following cases:  - PGW/TDF UP function supports multiple PDNs with overlapping IP addresses;  - SGW UP function is connected to PGWs in different IP domains (S5/S8);  - PGW UP function is connected to SGWs in different IP domains (S5/S8);  - SGW UP function is connected to eNodeBs in different IP domains;  - UPF is connected to 5G-ANs in different IP domains;  - Separation of multiple 5G VN groups communication in the UPF;  - Indirect data forwarding.  NOTE 2: If the Outer Header Creation and Forwarding Policy are present, the UP function shall put the user plane packets in the user plane tunnel by applying Outer Header Creation, after enforcing the required Forwarding Policy.  NOTE 3: As opposed to the Outer Header Creation IE, this IE does not result in adding any outer header to the outgoing packet. | | | | | | | | | |

Table 7.5.2.3-3: Duplicating Parameters IE in FAR

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  |  | Duplicating Parameters IE Type = 5 (decimal) | | | | | | |
| Octets 3 and 4 |  |  | Length = n | | | | | | |
| Information elements | P | Condition / Comment | | Appl. | | | | | IE Type |
| Sxa | Sxb | Sxc | N4 | N4mb |
| Destination Interface | M | This IE shall identify the destination interface of the outgoing packet. | | X | X | - | - | - | Destination Interface |
| Outer Header Creation | C | This IE shall be present if the UP function is required to add one or more outer header(s) to the outgoing packet. If present, it shall contain the F-TEID of the remote GTP-U peer. See NOTE 1. | | X | X | - | - | - | Outer Header Creation |
| Transport Level marking | C | This IE shall be present if the UP function is required to mark the IP header with the DSCP marking as defined by IETF RFC 2474 [22]. When present, it shall contain the value of the DSCP in the TOS/Traffic Class field. | | X | X | - | - | - | Transport Level Marking |
| Forwarding Policy | C | This IE shall be present if a specific forwarding policy is required to be applied to the packets. When present, it shall contain an Identifier of the Forwarding Policy locally configured in the UP function. | | X | X | - | - | - | Forwarding Policy |
| NOTE 1: If the Outer Header Creation and Forwarding Policy are present, the UP function shall put the user plane packets in the user plane tunnel by applying Outer Header Creation, after enforcing the required Forwarding Policy. | | | | | | | | | |

Table 7.5.2.3-4: Redundant Transmission Forwarding Parameters IE in FAR

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  |  | Redundant Transmission Forwarding Parameters IE Type = 270 (decimal) | | | | | | |
| Octets 3 and 4 |  |  | Length = n | | | | | | |
| Information elements | P | Condition / Comment | | Appl. | | | | | IE Type |
| Sxa | Sxb | Sxc | N4 | N4mb |
| Outer Header Creation | M | This IE shall be present if the UP function is required to perform the redundant transmission of the outgoing packet.  If present, it shall contain the F-TEID of the remote GTP-U peer for redundant transmission. | | - | - | - | X | - | Outer Header Creation |
| Network Instance for Redundant Transmission | C | This IE shall be included if the GTP-U tunnel used for redundant transmission uses a different network Instance than the Network Instance used for the primary GTP-U tunnel. | | - | - | - | X | - | Network Instance |

Table 7.5.2.3-5: MBS Multicast Parameters IE in the Create FAR IE

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  | MBS Multicast Parameters IE Type = 301 (decimal) | | | | | | |
| Octets 3 and 4 |  | Length = n | | | | | | |
| Information elements | P | Condition / Comment | Appl. | | | | | IE Type |
| Sxa | Sxb | Sxc | N4 | N4mb |
| Destination Interface | M | This IE shall identify the destination interface of the outgoing packet. | - | - | - | - | X | Destination Interface |
| Network Instance | O | When present, this IE shall identify the Network instance towards which to send the outgoing packet. | - | - | - | - | X | Network Instance |
| Outer Header Creation | M | This IE shall instruct the MB-UPF to create a GTP-U header using the Low Layer SSM and the C-TEID allocated to the MBS session. | - | - | - | - | X | Outer Header Creation |
| Transport Level marking | C | This IE shall be present if the UP function is required to mark the IP header with the DSCP marking as defined by IETF RFC 2474 [22]. When present, it shall contain the value of the DSCP in the TOS/Traffic Class field. | - | - | - | - | X | Transport Level Marking |
| Destination Interface Type | O | This IE may be present to indicate the 3GPP interface type of the destination interface, if required by functionalities in the UP Function, e.g. for performance measurements.  Several IEs with the same IE type may be present to represent multiple destination interface types (e.g. N3mb and N19mb). | - | - | - | - | X | 3GPP Interface Type |

Table 7.5.2.3-6: Add MBS Unicast Parameters IE in the Create FAR IE

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  | Add MBS Unicast Parameters IE Type = 302 (decimal) | | | | | | |
| Octets 3 and 4 |  | Length = n | | | | | | |
| Information elements | P | Condition / Comment | Appl. | | | | | IE Type |
| Sxa | Sxb | Sxc | N4 | N4mb |
| Destination Interface | M | This IE shall identify the destination interface of the outgoing packet. | - | - | - | - | X | Destination Interface |
| MBS Unicast Parameters ID | M | This IE shall identify the MBS Unicast Parameters IE. | - | - | - | - | X | MBS Unicast Parameters ID |
| Network Instance | O | When present, this IE shall identify the Network instance towards which to send the outgoing packet. | - | - | - | - | X | Network Instance |
| Outer Header Creation | M | This IE shall be present to request the MB-UPF to add one outer header to the outgoing packet. It shall contain the F-TEID of the remote GTP-U peer when adding a GTP-U/UDP/IP header. | - | - | - | - | X | Outer Header Creation |
| Transport Level marking | C | This IE shall be present if the UP function is required to mark the IP header with the DSCP marking as defined by IETF RFC 2474 [22]. When present, it shall contain the value of the DSCP in the TOS/Traffic Class field. | - | - | - | - | X | Transport Level Marking |
| Destination Interface Type | O | This IE may be present to indicate the 3GPP interface type of the destination interface, if required by functionalities in the UP Function, e.g. for performance measurements. | - | - | - | - | X | 3GPP Interface Type |

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