**3GPP TSG-CT WG3 Meeting #116e C3-213202**

**E-Meeting, 19th – 28th May 2021 (Revision of C3-21xxxx)**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **29.561** | **CR** | **0115** | **rev** |  | **Current version:** | **17.1.0** |  |
|  |
| *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:***  | Reporting UPF ID to Diameter DN-AAA server |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | TEI17, 5GS\_Ph1-CT |  | ***Date:*** | 2021-05-04 |
|  |  |  |  |  |
| ***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:*** | 1. UPF ID can be used by DN-AAA server to decide the DNS server address close to the UPF, to be sent in the Access-Accept message.
2. UPF ID is already included in N40 i/f and CHF CDR, which can be used for UPF based charging, hence can also be sent in Accounting Request messages to indicate the reported usage volume serving by the UPF e.g. with multiple UPF scenario, the local offloaded traffic flow volume served by the local UPF for charging and/or accounting statistics.
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| ***)*** |  |
| ***Summary of change:*** | Adding 3GPP AVP for the UPF ID may be reported to the trusted external DN in Diameter messages. |
|  |  |
| ***Consequences if not approved:*** | Can not support DN-AAA server for UPF based DNS server address provisioning. Can not support UPF based charging and/or accounting statistics. |
|  |  |
| ***Clauses affected:*** | 12.2.1, 12.2.2, 12.4.0, 12.6.1, 12.6.2 |
|  |  |
|  | **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's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

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

### 12.2.1 Authentication, Authorization and Accounting procedures

The SMF also represents the H-SMF in the home routed scenario in this subclause unless specified otherwise.

When an SMF receives an initial access request (i.e. the SMF receives the Nsmf\_PDUSession\_CreateSMContext request with type "Initial request" for non-roaming case or local breakout case, or the H-SMF receives the Nsmf\_PDUSession\_Create Request with type "Initial request" for home routed case) message for a given DNN, the SMF may (depending on the configuration for this DNN) send a Diameter DER message to a DN-AAA server. The SMF may also (depending on the configuration for this DNN) send the S-NSSAI and the PDU Session ID that are associated with the PDU Session, respectively in the 3GPP-Session-S-NSSAI AVP and the 3GPP-Session-Id AVP, and/or the UPF ID that is selected by SMF for the PDU Session interworking with the trusted external DN in the 3GPP-UPF-Id AVP, to a DN-AAA server. Upon receipt of the DER message, the DN-AAA server shall respond with an DEA message. Multi-round authentication using the DEA and DER messages may be used. The DN-AAA server finally authenticates and authorizes the user by replying with the DEA message. If the DN-AAA server is also responsible for IPv4 address and/or IPv6 prefix allocation, the DN-AAA server shall return the allocated IPv4 address and/or IPv6 prefix in the DEA message.

For re-authentication and re-authorization, the SMF shall send a DER message to the DN-AAA server and the DN-AAA server shall respond with a DEA message. Multi-round authentication using the DEA and DER messages may be used. The DN-AAA server finally authenticates and authorizes the user by replying with the DEA message.

The SMF may initiate Diameter re-authorization procedures for the purpose of IPv4 address and/or IPv6 prefix allocation (or renew the lease). In this case, the SMF shall set the Session-Id to the value used in the initial request, the Auth-Request-Type AVP to "AUTHORIZE\_ONLY" and the 3GPP-Allocate-IP-Type AVP to the type of IP address to be allocated in the AA-Request message sent to the AAA server. If the SMF is using DHCP signalling towards the UE and the DN-AAA server includes the Session-Timeout attribute in the Access-Accept, the SMF may use the Session-Timeout value as the DHCP lease time. The SMF shall not set the DHCPv4 lease time value higher than the Session-Timeout value. The SMF may renew the DHCP lease to the UE without re-authorization towards the DN-AAA server providing that the new lease expiry is no later than the Session-Timeout timer expiry. If the SMF wishes to extend the lease time beyond the current Session-Timeout expiry, it shall initiate a new AAA re-authorization.

Even if the SMF was not involved in user authentication, it may send a Diameter Accounting-Request (START) message to a DN-AAA server. If no Diameter session is already open for the same PDU session a Diameter session needs to be activated, otherwise the existing Diameter session is used to send the Accounting-Request (START). If accounting is used per QoS flow, the QFI will identify the particular bearer this accounting message refers to. This message contains parameters, e.g. the tuple which includes the user ID and IPv4 address and/or IPv6 prefix, to be used by application servers (e.g. WAP gateway) in order to identify the user. This message may also (depending on the configuration for the DNN) contains the S-NSSAI and the PDU Session ID that are associated with the PDU Session, respectively in the 3GPP-Session-S-NSSAI AVP and the 3GPP-Session-Id AVP, and/or the used UPF ID interworking with the trusted external DN in the 3GPP-UPF-Id AVP, to a DN-AAA server. This message also indicates to the DN-AAA server that the user session has started.

If some external applications require Diameter Accounting-Request (START) information before they can process user packets, then the selected DNN (SMF) may be configured in such a way that the SMF drops user data until an Accounting-Answer (START) indicating success is received from the DN-AAA server. The SMF may wait for the Accounting-Answer (START) before sending the final authentication response message in Namf\_Communication\_N1N2MessageTransfer service operation. The SMF may reject the initial access request if the Accounting-Answer (START) is not received. The authentication and accounting servers may be separately configured for each DNN.

For IPv4 PDU type, if IPv4 address is allocated via DHCPv4 signalling between the UE and the DN-AAA after PDU session establishment, the SMF may wait to send the Accounting-Request START message until the UE receives its IPv4 address in a DHCPACK.

When the SMF receives a message indicating a QoS flow or PDU session release request and providing a Diameter Accounting-Request START message was sent previously, the SMF shall send a Diameter Accounting-Request (STOP) message to the DN-AAA server, which indicates the termination of this particular QoS flow or PDU session. The SMF shall immediately send the corresponding response (e.g. Nsmf\_PDUSession\_UpdateSMContext response) to the AMF, without waiting for an Accounting-Answer (STOP) message from the DN-AAA server.

If the last QoS flow of a PDU session is deactivated, the SMF shall additionally send an STR message to the DN-AAA server. The DN-AAA server shall reply with an STA message and shall deallocate the IPv4 address and/or IPv6 prefix initially allocated to the subscriber.

The following figure 12.2.1-1 is an example message flow to show the procedure of Diameter Authentication and Accounting between an SMF and a DN-AAA server:

1. UE initiates the PDU Session Establishment procedure, including authentication/authorization information.

2. The AMF sends Nsmf\_PDUSession\_CreateSMContext Request including the authentication/authorization information to the SMF and the SMF responds to the service operation.

 According to the configuration in the SMF, step 6 to step 9 are executed before step 3 if the SMF needs to send an EAP-Request message to the UE.

 In the case of home routed, the AMF sends Nsmf\_PDUSession\_CreateSMContext Request including the authentication/authorization information to the V-SMF and the V-SMF sends Nsmf\_PDUSession\_Create Request including the authentication/authorization information to the H-SMF.

3. If the N4 session has not been established before, the SMF triggers the N4 Session Establishment procedure to the UPF.

In the case of home routed, the V-SMF triggers the N4 Session Establishment procedure to the V-UPF and the H-SMF triggers the N4 Session Establishment procedure to the H-UPF.

4. The SMF sends the DER message to the DN-AAA via the UPF, the message is forwarded from the SMF to the DN-AAA by the UPF in N4 user plane message.

In the case of home routed, the H-SMF sends the Access-Request message to the DN-AAA via the H-UPF, the message is forwarded from the H-SMF to the DN-AAA by the H-UPF in N4 user plane message.

5-10. The DN-AAA responds with the DEA message to the SMF via the UPF, the message is forwarded from the DN-AAA to the SMF by the UPF in N4 user plane message. The authentication/authorization information is further transferred to UE via Namf\_Communication\_N1N2MessageTransfer service and NAS SM Transport message. UE responds to the received authentication/authorization data and such information is transferred in NAS SM Transport message and Nsmf\_PDUSession\_UpdateSMContext service, then finally sent to the DN-AAA by the SMF, via the UPF, in the DER message.

In the case of home routed, the DN-AAA responds with the Access-Challenge message to the H-SMF via the H-UPF, the message is forwarded from the DN-AAA to the H-SMF by the H-UPF in N4 user plane message. The authentication/authorization information is transferred to V-SMF via Nsmf\_PDUSession\_Update service and is further transferred to UE via Namf\_Communication\_N1N2MessageTransfer service and NAS SM Transport message. UE responds to the received authentication/authorization data and such information is transferred in NAS SM Transport message, Nsmf\_PDUSession\_UpdateSMContext service and Nsmf\_PDUSession\_Update servic, then finally sent to the DN-AAA by the H-SMF, via the H-UPF, in the Access-Request message.

NOTE: Step 5 to step 10 can be repeated depending on the authentication/authorization mechanism used (e.g. EAP-TLS).

11. The SMF receives final result of authentication/authorization from the DN-AAA in the DEA message, via the UPF.

12. The SMF requests to start accounting by sending the Accounting-Request (START) message to the DN-AAA via the UPF.

13. The SMF proceeds with the PDU session establishment procedure and includes the authentication/authorization information in Namf\_Communication\_N1N2MessageTransfer service.

In the case of home routed, the H-SMF proceeds with the PDU session establishment procedure and includes the authentication/authorization information is transferred to V-SMF via Nsmf\_PDUSession\_Update service and is further transferred to the AMF via Namf\_Communication\_N1N2MessageTransfer service.

14. The DN-AAA responds with the Accounting-Response (START) message. The SMF may wait for the Accounting-Response (START) before sending the Namf\_Communication\_N1N2MessageTransfer request in step 13.

 In the case of home routed, the H-SMF may wait for the Accounting-Response (START) before sending the Nsmf\_PDUSession\_Update service in step 13.

15. The AMF sends the NAS PDU Session Establishment Request with the authentication/authorization information to the UE.

16. The UE sends a NAS message Deregistration Request to the AMF.

17. The AMF sends Nsmf\_PDUSession\_ReleaseSMContext Request to the SMF and the SMF responds to the service operation.

 In the case of home routed, the AMF sends Nsmf\_PDUSession\_ReleaseSMContext Request to the V-SMF and the V-SMF sends the Nsmf\_PDUSession\_Release Request to the H-SMF.

18-19. The SMF requests to stop accounting by sending the Accounting-Request (STOP) message to the DN-AAA via the UPF and the DN-AAA responds with the Accounting-Response (STOP) message.



Figure 12.2.1-1: Diameter Authentication and Accounting example (successful case)

When PAP/CHAP is used as the authentication protocol with the external DN-AAA server which does not support EAP for the 5GS or for the 5GC and EPC interworking scenarios, the Diameter Authentication procedures refer to the non transparent access procedures in subclause 11.2.1 and related Diameter Authentication descriptions in subclause 16a.3a.1 in 3GPP TS 29.061 [5] are reused with the following differences:

- the SMF SMF+PGW-C performs the actions specified for the P-GW;

- the external DN-AAA server performs the actions specified for AAA;

- PDU Session Establishment request is sent from the UE to the SMF or SMF+PGW-C instead of or the Activate PDN connection request being sent from the UE to the S-GW and the Create Session request being sent from S-GW to P-GW;

- PDU Session Establishment accept is sent from the SMF or SMF+PGW-C to the UE instead of the Create Session Response message being sent from the P-GW to S-GW and the Activate PDN Connection Accept being sent from S-GW to the UE; and

- PDU Session Establishment reject is sent from the SMF or SMF+PGW-C to the UE instead of the Create Session Response message being sent from the P-GW to the S-GW and the Activate PDN Connection Reject being sent from S-GW to the UE.

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

### 12.2.2 Accounting Update

During the life of a QoS flow some information related to this QoS flow may change. The SMF may send an Accounting Request (Interim) to the DN-AAA server upon occurrence of a chargeable event, e.g. RAT change, UPF change or QoS change. Interim updates are also used when the IPv4 address and/or IPv6 prefix is allocated/released/re-allocated.

When the SMF receives a signalling request (i.e. Nsmf\_PDUSession\_UpdateSMContext) that indicates the occurrence of one of these chargeable events, the SMF may send an Accounting Request Interim-Update to the DN-AAA server to update the necessary information related to this QoS flow. It is not necessary for the SMF to wait for the Diameter Accounting Answer message from the DN-AAA server before sending the response for the triggering signalling message (i.e. Namf\_Communication\_N1N2MessageTransfer). The SMF may delete the QoS flow if the Accounting Answer is not received from the DN-AAA server.

The SMF may also send interim updates at the expiry of an operator configured time limit.

Figure 12.2.2-1 is an example message flow to show the procedure of Diameter accounting update, messages between the SMF and DN-AAA are forwarded by the UPF in N4 user plane message.



Figure 12.2.2-1: Diameter accounting update

For the 5GC and EPC interworking scenario without authentication, authorization, re-authentication and/or re-authorization impacts, if the UE establishes the PDU session through the 5GC and initiates the accounting session, when the SMF+PGW-C determines that the UE has moved to the EPS (i.e. the SMF+PGW-C receives the modify beare request or create session request from the S-GW), the SMF+PGW-C may perform the accounting session update with the following modifications:

- for the case that the accounting session is initiated per PDU session, the SMF+PGW-C may update the accounting session by including the identifier of the accounting session within the Session-Id AVP, the "EUTRA" within the 3GPP-RAT-Type AVP, the IPv4 address of S-GW within the 3GPP-SGSN-Address AVP or IPv6 address of S-GW within the 3GPP-SGSN-IPv6-Address AVP, the default EPS bearer id within the 3GPP-NSAPI AVP, the user location in the EPC within the 3GPP-User-Location-Info AVP if available and the new QoS profile within the 3GPP-GPRS-Negotiated-QoS-Profile AVP if changed.

- for the case that the accounting session is initiated per QoS flow:

- if the SMF+PGW-C mapped a QoS flow to an EPS bearer, the SMF may update the accounting session corresponding to the QoS flow with the information of the EPS bearer by including the identifier of the accounting session within the Session-Id AVP, the "EUTRA" within the 3GPP-RAT-Type AVP, the IPv4 address of S-GW within the 3GPP-SGSN-Address AVP or IPv6 address of S-GW within the 3GPP-SGSN-IPv6-Address AVP, the default EPS bearer id within the 3GPP-NSAPI AVP, the user location in the EPC within the 3GPP-User-Location-Info AVP if available and the new QoS profile within the 3GPP-GPRS-Negotiated-QoS-Profile AVP if changed, the new charging id within the 3GPP-Charging-Id AVP if allocated and the new packet filters within the 3GPP-Packet-Filter AVP if changed;

- if the SMF+PGW-C mapped multiple QoS flows to one EPS beare, the SMF shall select one of the accouting sessions corresponding to these QoS flows to update it as above and terminate the accounting session(s) corresponding to the other QoS flow(s).

- if the SMF+PGW-C did not map a QoS flow to any EPS bearer, the SMF may decide to associate the corresponding account session to the default bearer or terminate the corresponding account session.

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

### 12.4.0 General

Table 12.4-1 lists the Diameter AVPs re-used by the N6 reference point from existing Diameter Applications, reference to the respective specifications and a short description of the usage within the N6 reference point.

Table 12.4-1: N6 re-used Diameter AVPs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Attribute Name | AVP Code | Section defined | Value Type (NOTE 2) | AVP Flag rules(NOTE 1) | May Encr. | Applicability |
| Must | May | Should not | Must not |
| 3GPP-IMSI | 1 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-Charging-Id | 2 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-PDP-Type | 3 | 3GPP TS 29.061 [5] (NOTE 3) | Enumerated | V | P |  | M | Y |  |
| 3GPP-CG-Address | 4 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-GPRS-Negotiated-QoS-Profile | 5 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-SGSN-Address | 6 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-GGSN-Address | 7 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-IMSI-MCC-MNC | 8 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-GGSN-MCC-MNC | 9 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-NSAPI | 10 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-Selection-Mode | 12 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-Charging-Characteristics | 13 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-CG-IPv6-Address | 14 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-SGSN-IPv6-Address | 15 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-GGSN-IPv6-Address | 16 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-IPv6-DNS-Servers | 17 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-SGSN-MCC-MNC | 18 | 3GPP TS 29.061 [5] (NOTE 3) | UTF8String | V | P |  | M | Y |  |
| 3GPP-IMEISV | 20 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-RAT-Type | 21 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-User-Location-Info | 22 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-MS-TimeZone | 23 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-Packet-Filter | 25 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-Negotiated-DSCP | 26 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-Allocate-IP-Type | 27 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| External-Identifier | 28 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| TWAN-Identifier | 29 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-User-Location-Info-Time | 30 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-Secondary-RAT-Usage | 31 | 3GPP TS 29.061 [5] (NOTE 3) | OctetString | V | P |  | M | Y |  |
| 3GPP-Notification | 110 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-UE-MAC-Address | 111 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Authorization-Reference | 112 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Policy-Reference | 113 | 11.3.1 | OctetString | V | P |  | M | Y | NOTE 4 |
| 3GPP-Session-AMBR | 114 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-NAI | 115 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Session-AMBR-v2 | 116 | 11.3.1 | OctetString | V | P |  | M | Y | eSessionAMBR |
| 3GPP-IP-Address-Pool-Info | 118 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-VLAN-Id | 119 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-TNAP-Identifier | 120 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-HFC-NodeId | 121 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-GLI | 122 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Line-Type | 123 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-NID | 124 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Session-S-NSSAI | 125 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-CHF-FQDN | 126 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Serving-NF-FQDN | 127 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-Session-Id | 128 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-GCI | 129 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| 3GPP-UPF-Id | 130 | 11.3.1 | OctetString | V | P |  | M | Y |  |
| Supported-Features | 628 | 3GPP TS 29.229 [41] | Grouped | V | M |  |  | N |  |
| NOTE 1: The AVP header bit denoted as 'M', indicates whether support of the AVP is required. The AVP header bit denoted as 'V', indicates whether the optional Vendor-ID field is present in the AVP header. For further details, see IETF RFC 6733 [24].NOTE 2: The value types are defined in IETF RFC 6733 [24].NOTE 3: The use of Radius VSA as a Diameter vendor AVP is described in Diameter NASREQ (IETF RFC 7155 [23]) and the P flag may be set.NOTE 4: It is not used in this release. |

NOTE 1: Attribute 3GPP-CAMEL-Charging-Info (24) is not applicable for 5G in the present specification.

NOTE 2: Table 11.3-2 lists the differences between the RADIUS VSAs used in 5G and the VSAs defined in subclause 16.4.7 of 3GPP TS 29.061 [5].

\*\*\* 4th Change \*\*\*

### 12.6.1 General

This clause describes the N6 Diameter messages.

The relevant AVPs that are of use for the N6 interface are detailed in this subclause. Other Diameter AVPs as defined in IETF RFC 4072 [25] and IETF RFC 7155 [23], even if their AVP flag rules are marked with "M", are not required for being compliant with the current specification.

Diameter messages as defined in subclause 16.4 of 3GPP TS 29.061 [5] are re-used in 5G with the following differences:

- SMF replaces GGSN/P-GW.

- 5G QoS flow replaces IP-CAN/EPS bearer and PDU session replaces IP-CAN session.

- N6 replaces Gi/Sgi.

NOTE: N6 re-used and specific AVPs are specified in subclause 12.3 and subclause 12.4.

- 3GPP-NAI AVP may be included in the AAR and ACR command.

- 3GPP-NID AVP may be included together with 3GPP-SGSN-MCC-MNC AVP in the AAR and ACR command.

- 3GPP-Session-S-NSSAI AVP and/or 3GPP-Session-Id may be included in the AAR and ACR command.

- 3GPP-UPF-Id AVP may be included in the AAR and ACR command to the trusted DN-AAA server.

- Multiple 3GPP-IP-Address-Pool-Info AVPs may be included in the AAR command and one or two 3GPP-IP-Address-Pool-Info AVPs may be included in the AAA and ACR command.

- Multiple 3GPP-UE-MAC-Address AVPs may be included in the AAR and ACR command.

- For indicating user location, TWAN-Identifier AVP, 3GPP-TNAP-Identifier AVP, 3GPP-HFC-NodeId AVP, 3GPP-GLI AVP, 3GPP-Line-TypeAVP may be included in the AAR and ACR command.

- Acct-Application-Id AVP shall be included in the ACR and ACA command as specified in IETF RFC 7155 [23].

- Additional Diameter messages needed for 5G compared to the 3GPP TS 29.061 [5] are described in the following subclauses.

- Multiple Supported-Features AVPs may be included in the ACR and ACA command.

\*\*\* 5th Change \*\*\*

### 12.6.2 DER Command

The DER command, defined in IETF RFC 4072 [25], is indicated by the Command-Code field set to 268 and the 'R' bit set in the Command Flags field. It is sent by the SMF to the DN-AAA server upon reception of an initial access request (e.g. Nsmf\_PDUSession\_CreateSMContext) message for a given DNN to request user authentication and authorization.

The relevant AVPs that are of use for the N6 interface are detailed in the ABNF description below. Other valid AVPs for this command are not used for N6 purposes and should be ignored by the receiver or processed according to the relevant specifications.

The bold marked AVPs in the message format indicate new optional AVPs for N6, or modified existing AVPs.

Message Format:

<Diameter-EAP-Request> ::= < Diameter Header: 268, REQ, PXY >

 < Session-Id >

 { Auth-Application-Id }

 { Origin-Host }

 { Origin-Realm }

 { Destination-Realm }

 { Auth-Request-Type }

 [ Destination-Host ]

 [ NAS-Port ]

 [ NAS-Port-Id ]

 [ NAS-Port-Type ]

 [ Origin-State-Id ]

 [ Port-Limit ]

 [ User-Name ]

 { EAP-Payload }

 [ EAP-Key-Name ]

 [ Service-Type ]

 [ Authorization-Lifetime ]

 [ Auth-Grace-Period ]

 [ Auth-Session-State ]

 [ Callback-Number ]

 [ Called-Station-Id ]

 [ Calling-Station-Id ]

 [ Originating-Line-Info ]

 [ Connect-Info ]

 \* [ Framed-Compression ]

 [ Framed-Interface-Id ]

 [ Framed-IP-Address ]

 \* [ Framed-IPv6-Prefix ]

 \* [ Delegated-IPv6-Prefix ]

 [ Framed-IP-Netmask ]

 [ Framed-MTU ]

 [ Framed-Protocol ]

 \* [ Tunneling ]

 \* [ Proxy-Info ]

 \* [ Route-Record ]

 **[ External-Identifier ]**

 **[ 3GPP-IMSI ]**

 **[ 3GPP-NAI ]**

 \* **[ 3GPP-UE-MAC-Address ]**

 **[ 3GPP-Charging-ID ]**

 **[ 3GPP-PDP-Type ]**

 **[ 3GPP-CG-Address ]**

 **[ 3GPP-CHF-FQDN ]**

 **[ 3GPP-GPRS-Negotiated-QoS-Profile ]**

 **[ 3GPP-SGSN-Address ]**

 **[ 3GPP-GGSN-Address ]**

 **[ 3GPP-Session-S-NSSAI ]**

 **[ 3GPP-Session-Id ]**

 **[ 3GPP-UPF-Id ]**

 **[ 3GPP-IMSI-MCC-MNC ]**

 **[ 3GPP-GGSN-MCC-MNC ]**

 **[ 3GPP-NSAPI ]**

 **[ 3GPP-Selection-Mode ]**

 **[ 3GPP-Charging-Characteristics ]**

 **[ 3GPP-CG-IPv6-Address ]**

 **[ 3GPP-SGSN-IPv6-Address ]**

 **[ 3GPP-Serving-NF-FQDN ]**

 **[ 3GPP-GGSN-IPv6-Address ]**

 **[ 3GPP-SGSN-MCC-MNC ]**

 **[ 3GPP-NID ]**

 **[ 3GPP-User-Location-Info ]**

 **[ 3GPP-RAT-Type ]**

 **[ 3GPP-Negotiated-DSCP ]**

 **[ 3GPP-Allocate-IP-Type ]**

 **[ TWAN-Identifier ]**

  **[ 3GPP-TNAP-Identifier ]**

 **[ 3GPP-HFC-NodeId ]**

 **[ 3GPP-GCI ]**

 **[ 3GPP-GLI ]**

 **[ 3GPP-Line-Type ]**

 \* **[ 3GPP-IP-Address-Pool-Info]**

\* **[ Supported-Features ]**

 \* [ AVP ]

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