**3GPP TSG-SA5 Meeting #162 *S5-253392rev2***

Goteborg, Sweden, 25 - 29 August 2025

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **32.277** | **CR** | **0063** | **rev** | **-** | **Current version:** | **19.1.0** |  |
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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:*** | Add descriptions of multi-hop UE-to-UE relay communication via MANET | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | China Telecom | | | | | | | | | |
| ***Source to TSG:*** | SA5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_ProSe\_Ph3\_CH | | | | |  | ***Date:*** | | | 2025-08-27 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In accordance with the TS 23.304, IP PDU-based multi-hop UE-to-UE relay communication utilizes Mobile Ad-hoc Network (MANET) routing protocols, which consume a significant amount resources such as UE power and air interface resources. The network topology of MANET changes frequently because it is a self-organizing and dynamic network, and the UEs involved are mobile. This dynamic behavior makes it impractical for a charging system to track individual protocol updates or routing changes. Therefore, the charging logic should not depend on tracking these granular network events. Instead, the system should be designed to simply recognize the use of MANET-based routing.  In addition, some information elements are missing or incorrect in the relevant format table, which also needs to be corrected. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add a description clarifying that the charging logic should recognize the use of MANET-based routing for IP PDU-based multi-hop UE-to-UE relay communication. Furthermore, correct the missing and incorrect information elements in the relevant tables. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The charging system may be unable to correctly apply the appropriate charging logic for multi-hop UE-to-UE relay communication. Additionally, the incorrect or missing information in the tables would leads confusion. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.5.2.1,6.5.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

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| **First Change** |

#### 6.5.2.1 Definition of ProSe Information

The fields of the ProSe specific charging information used for 5G ProSe is provided within the Service Specification Information.

The detailed structure of the ProSe Information can be found in table 6.5.2.1.1.

Table 6.5.2.1.1: Structure of ProSe information

|  |  |  |
| --- | --- | --- |
| Information Element | Category | Description |
| Announcing PLMN ID | OC | Described in table 6.3.1.2.1. |
| Announcing UE HPLMN Identifier | OM | Described in table 6.3.1.2.1. |
| Announcing UE VPLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Monitoring UE HPLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Monitoring UE VPLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Discoverer UE HPLMN Identifier | OM | Described in table 6.3.1.2.1. |
| Discoverer UE VPLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Discoveree UE HPLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Discoveree UE VPLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Monitored PLMN Identifier | OC | Described in table 6.3.1.2.1. |
| ProSe Application ID | Oc | Described in table 6.3.1.2.1. |
| Application ID | Oc | Described in table 6.3.1.2.1. |
| Application Specific Data | Oc | Described in table 6.3.1.2.1. |
| ProSe functionality | Oc | This IE holds the ProSe functionality UE is requesting, e.g. direct discovery (Announcing, Monitoring, or Match Report), direct communication. |
| ProSe Event Type | Oc | Described in table 6.3.1.2.1. |
| Direct Discovery Model | Oc | Described in table 6.3.1.2.1. |
| Validity Period | Oc | Described in table 6.3.1.2.1. |
| Role of UE | Oc | Described in table 6.3.1.2.1. |
| ProSe Request Timestamp | Oc | Described in table 6.3.1.2.1. |
| PC3 Protocol Cause | Oc | Described in table 6.3.1.2.1. |
| Monitoring UE Identifier | Oc | Described in table 6.3.1.2.1. |
| Requestor PLMN Identifier | OC | Described in table 6.3.1.2.1. |
| Requested Application Layer User ID | Oc | Described in table 6.3.1.2.1. |
| Requested PLMN Identifier | Oc | Described in table 6.3.1.2.1. |
| Time Window | Oc | Described in table 6.3.1.2.1. |
| Range Class | Oc | Described in table 6.3.1.2.1. |
| Proximity Alert Indication | Oc | Described in table 6.3.1.2.1. |
| Proximity Alert Timestamp | Oc | Described in table 6.3.1.2.1. |
| Proximity Cancellation Timestamp | Oc | Described in table 6.3.1.2.1. |
| Hop Count | Oc | This value reflects the number of relays for the 5G ProSe Remote UE to reach the network in scenarios of ProSe multi-hop UE-to-Network relay communication as defined in TS 23.304 [241] clause 5.8.3.1. In scenarios of ProSe multi-hop UE-to-UE relay communication, this value reflects the number of relays for the 5G ProSe source UE to reach the 5G ProSe target UE as defined in TS 23.304 [241] clause 5.8.6. (see Note) |
| Relay IP address | Oc | Described in table 6.3.1.2.1. In case of layer-3 multi-hop UE-to-Network relay communication, it represents the IP address used by 5G ProSe UE-to-Network Root Relay as defined in TS 23.304 [241], clause 5.8.3.1. In case of Layer-3 UE-to-UE relay communication for IP type PDU, it represents the IP address of the 5G ProSe UE-to-UE relay node that is the next hop from the source ProSe UE, as defined in TS 23.304 [241], clause 6.7.5.2.1. |
| ProSe UE-to-Network Relay UE ID | Oc | Described in table 6.3.1.2.1. |
| ProSe UE-to-UE Relay UE ID | Oc | The identifier of a link-layer that uniquely represents 5G ProSe Layer-3 UE-to-UE Relay as defined in TS 23.304 [241] clause 6.7.1.1. |
| ProSe Destination Layer-2 ID | Oc | The identifier of a link-layer that identifies a device or a group of devices that are recipients of ProSe communication frames. |
| ProSe UE-to-UE Target End UE IP Address | Oc | In case of Layer-3 UE-to-UE relay communication for IP type PDU ,it represents the IP address used by the target 5G ProSe Layer-3 End UE as defined in TS 23.304 [241] clause 6.7.1.1. |
| Intermediate Relay Information Container | Oc | This field holds a list of Intermediate Relay Information,  (the Root Relay is not included), used for 5G ProSe Multi-hop UE-to-Network Relay Communication charging. |
| Intermediate Relay IP address | Oc | The IP address used by the 5G ProSe intermediate UE-to-Network Relay as defined in TS 23.304 [241] clause 6.4.3.8.2 and clause 6.4.3.9.2. |
| ProSe UE-to-Network Intermediate Relay UE ID | Oc | Link layer identifier of ProSe UE-to-Network intermediate Relay UE that is used for direct communication as defined in TS 23.304 [238] clause 4.6.4.3. |
| PFI Container information | OC | This field holds a list of PFI data container information |
| PC5 QoS Flow Id | M | This field holds the PC5 QoS flow Identifier (PFI) |
| Tme of First Usage | OC | This field holds the Timestamp when the first transmitted IP packet of the service data flow matching the current PFI data container |
| Time of Last Usage | OC | This field holds the Timestamp when the last transmitted IP packet of the service data flow matching the current PFI data container |
| QoS Information | OC | This field holds the PC5 QoS applied during the PFI data container interval |
| QoS Characteristics | OC | This field holds the PC5 QoS characteristics applied for PC5 QoS information. It is only be used when the non-standardized PQI is present in PC5 QoS information. |
| User Location Information | OC | This field holds the user location during the PFI data container interval |
| UE Time Zone | OC | This field holds the Time Zone of where the UE is located, during the PFI data container interval |
| Presence Reporting Area Information | OC | This field holds the Presence Reporting Area Information of UE during the PFI data container interval. |
| Report Time | M | This field holds the Timestamp when the PFI data container was closed |
| Transmission Data Container | OC | Described in table 6.3.1.2.1. |
| Local Sequence Number | Oc | Described in table 6.3.1.2.1. |
| Change Time | Oc | Described in table 6.3.1.2.1. |
| Coverage status | Oc | Whether UE is served by NG-RAN or not, i.e. in coverage, out of coverage. |
| User Location Information | Oc | The location of the UE, e.g. NCGI. |
| Data Volume Transmitted | Oc | Described in table 6.3.1.2.1. |
| Change Condition | Oc | Described in table 6.3.1.2.1. |
| VPLMN Identifier | Oc | Described in table 6.3.1.2.1. |
| Usage information report sequence number | Oc | Described in table 6.3.1.2.1. |
| Radio Resources indicator | Oc | Described in table 6.3.1.2.1. |
| Radio Frequency | Oc | Described in table 6.3.1.2.1. |
| PC5 Radio Technology | OM | Described in table 6.3.1.2.1. |
| Reception Data Container | Oc | Described in table 6.3.1.2.1. |
| Local Sequence Number | Oc | Described in table 6.3.1.2.1. |
| Change Time | Oc | Described in table 6.3.1.2.1. |
| Coverage status | Oc | Described in table 6.3.1.2.1. |
| User Location Information | Oc | The location of the UE, e.g. NCGI. |
| Data Volume Received | Oc | Described in table 6.3.1.2.1. |
| Change Condition | Oc | Described in table 6.3.1.2.1. |
| VPLMN Identifier | Oc | Described in table 6.3.1.2.1. |
| Usage information report sequence number | Oc | Described in table 6.3.1.2.1. |
| Radio Resources indicator | Oc | Described in table 6.3.1.2.1. |
| Radio Frequency | Oc | Described in table 6.3.1.2.1. |
| PC5 Radio Technology | OM | Described in table 6.3.1.2.1. |
| Note: The presence of a Hop Count for IP PDU-based UE-to-UE relay communication indicates that MANET protocols are being utilized. | | |

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| **Second Change** |

### 6.5.3 Detailed message format for converged charging

The following clause specifies per Operation Type the charging data for 5G ProSe converged charging.

The Operation types are listed in the following order: I [Initial] / U (Update)/T [Termination]/E [event]. Therefore, when all Operation types are possible it is marked as IUTE. If only some Operation types are allowed for a node, only the appropriate letters are used (e.g. IUT or E) as indicated in the table heading. The omission of an Operation type for a particular field is marked with "-" (e.g. I-E). Also, when an entire field is not allowed in a node the entire cell is marked as "-".

Table 6.5.3.1 illustrates the basic structure of the supported fields in the Charging Data Request for 5G ProSe converged charging.

Table 6.5.3.1: Supported fields in Charging Data Request message

| Information Element | | Node Type | Direct  Discovery | | Direct  Communication | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Supported Operation Types | I/U/T/E | | I/U/T/E | |
| Session Identifier | | | --E | | IUTE | | |
| Subscriber Identifier | | | --E | | IUTE | | |
| Tenant Identifier | | | --E | | IUTE | | |
| NF Consumer Identification | | | --E | | IUTE | | |
| NF Functionality | | | --E | | IUTE | | |
| NF Name | | | --E | | IUTE | | |
| NF Address | | | --E | | IUTE | | |
| NF PLMN ID | | | --E | | IUTE | | |
| Invocation Timestamp | | | --E | | IUTE | | |
| Invocation Sequence Number | | | --E | | IUTE | | |
| One-time Event | | | --E | | --E | | |
| One-time Event Type | | | --E | | --E | | |
| Notify URI | | | I-- | | I-- | | |
| Triggers | | | --E | | IUTE | | |
| Multiple Unit Usage | | | --E | | IUTE | | |
| **ProSe Information** | | | | | | | |
| Announcing PLMN ID | | | ---E | | - | | |
| Announcing UE HPLMN Identifier | | | ---E | | - | | |
| Announcing UE VPLMN Identifier | | | ---E | | - | | |
| Monitoring UE HPLMN Identifier | | | ---E | | - | | |
| Monitoring UE VPLMN Identifier | | | ---E | | - | | |
| Discoverer UE HPLMN Identifier | | | ---E | | - | | |
| Discoverer UE VPLMN Identifier | | | ---E | | - | | |
| Discoveree UE HPLMN Identifier | | | ---E | | - | | |
| Discoveree UE VPLMN Identifier | | | ---E | | - | | |
| Monitored PLMN Identifier | | | ---E | | - | | |
| ProSe Application ID | | | ---E | | - | | |
| Application ID | | | ---E | | IUTE | | |
| Application Specific Data | | | - | | IUTE | | |
| ProSe functionality | | | ---E | | IUTE | | |
| ProSe Event Type | | | ---E | | - | | |
| Direct Discovery Model | | | ---E | |  | | |
| Validity Period | | | ---E | |  | | |
| Role of UE | | | ---E | |  | | |
| ProSe Request Timestamp | | | ---E | |  | | |
| PC3 Protocol Cause | | | ---E | |  | | |
| Monitoring UE Identifier | | | ---E | |  | | |
| Requested Application Layer User ID | | | ---E | |  | | |
| Requested PLMN Identifier | | | ---E | |  | | |
| Time Window | | | ---E | |  | | |
| Range Class | | | ---E | |  | | |
| Proximity Alert Indication | | | ---E | |  | | |
| Proximity Alert Timestamp | | | ---E | |  | | |
| Proximity Cancellation Timestamp | | | ---E | |  | | |
| Relay IP address | | | - | | IUTE | | |
| ProSe UE-to-UE Target End UE IP Address | | | - | | IUTE | | |
| ProSe UE-to-UE Relay UE ID | | | - | | IUTE | | |
| ProSe UE-to-Network Relay UE ID | | | - | | IUTE | | |
| ProSe Destination Layer-2 ID | | | - | | IUTE | | |
| Hop Count | | |  | | IUTE | | |
| Intermediate Relay Information Container | | | - | | IUTE | | |
| PFI Container information | | | - | | IUTE | | |
| Transmission Data Container | | | - | | IUTE | | |
| Reception Data Container | | | - | | IUTE | | |
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Table 6.5.3.2 illustrates the basic structure of the supported fields in the Charging Data Response for 5G ProSe converged charging.

Table 6.5.3.2: Supported fields in *Charging Data Response* Message

| Information Element | | Node Type | Direct  Discovery | | Direct  Communication | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Supported Operation Types | I/U/T/E | | I/U/T/E | |
| Session Identifier | | | --E | | IUTE | | |
| Invocation Timestamp | | | --E | | IUTE | | |
| Invocation Result | | | --E | | IUTE | | |
| Invocation Result | | | --E | | IUTE | | |
| Failed parameter | | | --E | | IUTE | | |
| Failure Handling | | | --E | | IUTE | | |
| Invocation Sequence Number | | | --E | | IUTE | | |
| Session Failover | | | - | | IUTE | | |
| Supported Features | | | - | | IUTE | | |
| Triggers | | | I--E | | IUTE | | |
| Multiple Unit Usage | | | --E | | IUTE | | |
| Result Code | | | --E | | IUTE | | |
| Rating Group | | | --E | | IUTE | | |
| Granted Unit | | | --E | | IUTE | | |
| Tariff Time Change | | | --E | | IUTE | | |
| Time | | | --E | | IUTE | | |
| Total Volume | | | --E | | IUTE | | |
| Uplink Volume | | | --E | | IUTE | | |
| Downlink Volume | | | --E | | IUTE | | |
| Service Specific Units | | | --E | | IUTE | | |
| Validity Time | | | --E | | IUTE | | |
| Final Unit Indication | | | --E | | IUTE | | |
| Time Quota Threshold | | | --E | | IUTE | | |
| Volume Quota Threshold | | | --E | | IUTE | | |
| Unit Quota Threshold | | | --E | | IUTE | | |
| Quota Holding Time | | | --E | | IUTE | | |
| Triggers | | | --E | | IUTE | | |

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| **Third Change** |

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [100] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [100].

**2G‑ / 3G‑:** prefixes 2G‑ and 3G‑ refer to functionality that supports only GSM or UMTS, respectively, e.g. 2G‑SGSN refers only to the GSM functionality of an SGSN. When the term/prefix is omitted, reference is made independently from the GSM or UMTS functionality.

**accounting:** process of apportioning charges between the Home Environment, Serving Network and Subscriber.

**billing:** function whereby CDRs generated by the charging function(s) are transformed into bills requiring payment.

**Billing Domain:** part of the operator network, which is outside the telecommunication network that receives and processes CDR files from the core network charging functions. It includes functions that can provide billing mediation and billing or other (e.g. statistical) end applications. It is only applicable to offline charging (see "Online Charging System" for equivalent functionality in online charging).

**chargeable event:** activity utilizing telecommunication network resources and related services for:

- user to user communication (e.g. a single call, a data communication session or a short message); or

- user to network communication (e.g. service profile administration); or

- inter-network communication (e.g. transferring calls, signalling, or short messages); or

- mobility (e.g. roaming or inter-system handover); and

- that the network operator may want to charge for.

As a minimum, a chargeable event characterises the resource / service usage and indicates the identity of the involved end user(s).

**charged party:** user involved in a chargeable event who has to pay parts or the whole charges of the chargeable event, or a third party paying the charges caused by one or all users involved in the chargeable event, or a network operator.

**charging:** function within the telecommunications network and the associated OCS/BD components whereby information related to a chargeable event is collected, formatted, transferred and evaluated in order to make it possible to determine usage for which the charged party may be billed (offline charging) or the subscriber's account balance may be debited (online charging).

**Charging Data Record (CDR):** formatted collection of information about one or more chargeable event(s) (e.g. time of call set-up, duration of the call, amount of data transferred, etc) for use in billing and accounting. For each party to be charged for parts of or all charges of the chargeable event(s) a separate CDR should be generated, i.e. more than one CDR may be generated for a single chargeable event, e.g. because of its long duration, or because more than one charged party is to be charged.

**charging event:** set of charging information forwarded by the CTF towards the CDF (offline charging) or towards the OCS (online charging). Each charging event matches exactly one chargeable event.

**charging function:** entity inside the core network domain, subsystem or service that is involved in charging for that domain, subsystem or service.

**Credit Control:** mechanism which directly interacts in real-time with an account and controls or monitors the charges, related to the service usage. Credit control is a process of: checking if credit is available, credit reservation, deduction of credit from the end user account when service is completed and refunding of reserved credit not used.

**domain:** part of a communication network that provides network resources using a certain bearer technology.

**EPC-level ProSe Discovery:** A ProSe Discovery procedure by which the EPC determines the proximity of two ProSe-enabled UEs and informs them of their proximity.

**Fully Qualified Partial CDR (FQPC):** partial CDR that contains a complete set of the fields specified in the present document. This includes all the mandatory and conditional fields as well as those fields that the PLMN operator has provisioned to be included in the CDR. The first Partial CDR should be a Fully qualified Partial CDR.

**GTP':** GPRS protocol used for CDR transport. It is derived from GTP with enhancements to improve transport reliability necessary for CDRs.

NOTE: This protocol is not used for tunnelling.

**GSM only:** qualifier indicating that this clause or paragraph applies only to a GSM system. For multi-system cases this is determined by the current serving radio access network.

**in GSM,...:** qualifier indicating that this paragraph applies only to GSM System.

**in UMTS,...:** qualifier indicating that this paragraph applies only to UMTS System.

**inter-system change:** change of radio access between different radio access technologies such as GSM and UMTS.

**Local PLMN**: A PLMN which is not the serving PLMN, and in whose radio resources the monitoring UE is authorized by the HPLMN to engage in ProSe Direct Discovery.

**middle tier TS:** term used for the 3GPP charging TSs that specify the domain / subsystem / service specific, online and offline, charging functionality. These are all the TSs in the numbering range from 3GPP TS 32.250 to 3GPP TS 32.279, e.g. 3GPP TS 32.250 [10] for the CS domain, or 3GPP TS 32.270 [30] for the MMS service. Currently, there is only one "tier 1" TS in 3GPP, which is 3GPP TS 32.240 [1] that specifies the charging architecture and principles. Finally, there are a number of top tier TSs in the 32.29x numbering range ([50] ff) that specify common charging aspects such as parameter definitions, encoding rules, the common billing domain interface or common charging applications.

**Model A:** involves one UE announcing "I am here"

**Model B:** involves one UE asking "who is there" and/or "are you there"

**offline charging:** charging mechanism where charging information **does not** affect, in real-time, the service rendered.

**online charging:** charging mechanism where charging information **can** affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with bearer/session/service control is required.

**Online Charging System (OCS):** the entity that performs real-time credit control. Its functionality includes transaction handling, rating, online correlation and management of subscriber account balances.

**partial CDR:** CDR that provides charging information on part of a subscriber session. A long session may be covered by several partial CDRs. Two formats are considered for Partial CDRs. One that contains all of the provisioned fields (FQPC); the second has a reduced format (RPC).

**ProSe Direct Discovery:** A procedure employed by a ProSe-enabled UE to discover other ProSe-enabled UEs in its vicinity by using only the capabilities of the two UEs with E-UTRA or NR technology.

**ProSe Discovery:** A process that identifies that a UE that is ProSe-enabled is in proximity of another, using E-UTRA (with or without E-UTRAN) or EPC.

**ProSe-enabled Public Safety UE:** A UE that the HPLMN has configured to be authorized for Public Safety use, and which is ProSe-enabled and supports ProSe procedures and capabilities specific to Public Safety.

**ProSe Function:** The ProSe Function is the logical function that is used for network related actions required for ProSe. The ProSe Function plays different roles for each of the features of ProSe. In this version of the specification it is assumed that there is only one logical ProSe Function in each PLMN that supports Proximity Services.   
The ProSe Function contains three main sub-functions: Direct Provisioning Function (DPF), Direct Discovery Name Management Function, and EPC-level Discovery Function. The ProSe Function provides the necessary charging functionality for usage of ProSe.

**ProSe identifier:** An identifier used to indicate the ProSe Application associated with the ProSe operation in ProSe Direct Discovery and ProSe Direct Communication. A ProSe identifier can be associated with one or more ProSe applications, and a ProSe application can be associated with one or more ProSe identifier(s). For ProSe Direct Discovery, ProSe identifier is equivalent to "Application ID" defined in 23.303 [240].

**real-time:** real-time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 second.

**Reduced Partial CDR (RPC):** partial CDRs that only provide mandatory fields and information regarding changes in the session parameters relative to the previous CDR.

EXAMPLE: Location information is not repeated in these CDRs if the subscriber did not change its location.

**settlement:** payment of amounts resulting from the accounting process.

**subscriber:** entity (associated with one or more users) that is engaged in a subscription with a service provider. The subscriber is allowed to subscribe and unsubscribe services, to register a user or a list of users authorized to enjoy these services, and also to set the limits relative to the use that associated users make of these services.

**user:** entity, not part of the 3GPP System, that uses network resources by means of a subscription. The user may or may not be identical to the subscriber holding that subscription.

**User Equipment (UE):** device allowing a user access to network services. For the purpose of 3GPP specifications the interface between the UE and the network is the radio interface. A User Equipment can be subdivided into a number of domains, the domains being separated by reference points. Currently defined domains are the USIM and ME Domains. The ME Domain can further be subdivided into several components showing the connectivity between multiple functional groups. These groups can be implemented in one or more hardware devices. An example of such a connectivity is the TE – MT interface. Further, an occurrence of a User Equipment is an MS for GSM as defined in TS 24.002 [237].

**5G ProSe-enabled UE:** A UE that supports 5G ProSe requirements and associated procedures.

**5G ProSe Direct Discovery:** A procedure employed by a 5G ProSe-enabled UE to discover other 5G ProSe-enabled UEs in its vicinity based on direct radio transmissions between the two UEs with NR technology.

**5G ProSe Direct Communication:** A communication between two or more UEs in proximity that are 5G ProSe-enabled, by means of user plane transmission using NR technology via a path not traversing any network node.

**5G ProSe UE-to-Network Relay:** A 5G ProSe-enabled UE that provides functionality to support connectivity to the network for 5G ProSe Remote UE(s).

**5G ProSe Remote UE:** A 5G ProSe-enabled UE that communicates with a DN via a 5G ProSe UE-to-Network Relay.

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## 4.4 5G ProSe converged charging architecture

The 5G ProSe converged charging architecture in service-based representation can be achieved under the alternatives:

- ProSe converged charging architecture (CTF), depicted in figure 4.4.1.

- ProSe converged charging architecture when using PC5 (Distributed CTF), depicted in figure 4.4.2.

- ProSe converged charging architecture in reference point representation for non-roaming, depicted in figure 4.4.3.

Details on the interfaces and functions can be found in TS 32.240 [1] for the general architecture components. Ga is described in clause 5.4.4 and Bx in clause 5.4.5 of this document, and Nchf is described in TS 32.290 [55].

For the 5G ProSe Direct Discovery and 5G ProSe Direct Communication Service over PC5, the CTF is divided into two functional blocks as described in Annex D of TS 32.240 [1]. The Accounting Metrics Collection (AMC) function block is in the UE. The AMC sends usage information collected to the Accounting Data Forwarding (ADF) function block of the CTF in the 5G DDNMF over the PC3a reference point defined in TS 23.304 [241]. The subset of PC3a specific to usage information collection for charging purposes is denoted as PC3ach in figure 4.2.2.



Figure 4.4.1: ProSe converged charging architecture (CTF)



Figure 4.4.2: ProSe converged charging architecture when using over PC5 (Distributed CTF)

Figure 4.4.3 depicts the 5G ProSe converged charging architecture in reference point representation for non-roaming:



Figure 4.4.3: 5G ProSe converged charging architecture non-roaming reference point representation

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