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*Abstract of the contribution: The contribution proposes interim agreements for KI#1.*

**1. Introduction**

For KI#1 “Transfer of data over UP for UE data collection”, 21 solutions have been included in the TR, which are summarized and analysed in the following table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sol.** | **High level principles** | **Which CN NF controls UE data collection/transfer** | **How to support full controllability** | **How to support full visibility** | **How to differentiate the traffic of collected UE data** | **How the UE knows about what data to transfer** |
| 1 | - DCCF is utilized to support data collection from UE to data consumer e.g. UE model training entity server.- When DCCF receives the request from data consumer, it performs UE selection, generates data collection request and provides UP information and sends to UE via AMF with NAS message.- Based on the UP information, UE may establish UP connection for data collection via a PDU session, which is selected or established based on URSP.- The UE transfer the data for AI training via UP connection to DCCF and DCCF transfer data to UE model training entity server.- During data collection and transfer process, UE is aware of what the standardized data to be transferred to participate AI training. | DCCF | DCCF initiates data collection request. | FFS | URSP | Via data collection request? No details. |
| 2 | (From [S2-2504653](https://www.3gpp.org/ftp/tsg_sa/WG2_Arch/TSGS2_169_Fukuoka_2025-05/Docs/S2-2504653.zip)/SA2#169)* It proposes a solution for Generalized UE data collection over user plane by applying the existing user plane-based LCS, in similar to a user plane connection between UE and LMF specified in clause 6.18 of TS 23.273 [6].
* This solution provides MNO’s controllability through the UP signalling between UE and DCF over the secured user plane connection (i.e. explicitly requesting the initiation/termination of data transfer and/or providing the validity condition of the data transfer to UE).
* This solution provides MNO’s visibility through DCF verification before providing the collected data to UE side data collection server/OTT server.
 | DCF (Data Collection Function) | UP signalling between UE and DCF over the secured user plane connection | DCF verifies the collected UE data | URSP (DCF address, DNN and S-NSSAI associated to UE data collection) | Unclear. Requested by the UE side data collection server/OTT server, or the DCF? |
| 3 | - A UE-side server sends a request to receive data from a UE or Group of UEs. The standardised data to report are identified by a specific identifier.- A Data Collection Function receives the UE-side server request and determines the standardised data to retrieve from one or more UEs according to the request from the UE-side server.- Data Collection Functions prepares configuration information for the UEs where the configuration information indicates to the UE:1) the standardised data to transfer; and2) validity conditions on when to transfer the data.- The Data Collection Function sends the configuration information to the UE via an already established session with the Data Collection Function.- The UE establishes a UP session with a Data Collection Function based on existing URSP rules. No changes to URSP rules are required. | DCF | DCF initiates data collection (i.e. configures UE data collection) towards the UE via UP, based on triggers from the UE-side server or UE. | DCF identifies invalid UE data(see [S2-2504844](https://www.3gpp.org/ftp/tsg_sa/WG2_Arch/TSGS2_169_Fukuoka_2025-05/Docs/S2-2504844.zip)/SA2#169) | URSP (FQDN/IP address of the DCF and the DNN/S-NSSAI) | DCF sends configuration information to the UE via UP. |
| 4 |  | unspecific | NF initiates data collection over CP to UE | NF checks UE data | URSP (DNN/S-NSSAI) | NF sends training data type to the UE. |
| 5 | - A new network function in the 5GC named Data Collection Function (DCF) is introduced to support the data collection.- The UE side server/UE model training entity server (UMTES) configure the DCF about the data collection application information including the Event ID and the corresponding data type the UE need to be measured and reported.- The DCF provision the UE Data Collection configuration to the UE via control plane signalling including the Event ID and the corresponding data type the UE need to be measured and reported.- The UE side server/UE model training entity server sends the UE data collection request to the DCF including the AoI and the Event ID.- The DCF selects the UEs to be used for the data collection and establish the UP based connection with the UEs.- The DCF sends the Event ID to the UE via UP to tigger the UE to perform the data measurement with the RAN.- The UE sends the measured data to the DCF via UP with the Event ID.- The DCF verify and match the UE transmitted data based on the data collection application information stored in the DCF and the Event ID.- The DCF expose the UE transmitted data to the UE side server/UE model training entity server. | DCF | The DCF sends UE Data Collection configuration (with Event ID) and then a data collection request to the UE. | The DCF verify and match the UE transmitted data based on the data collection application information stored in the DCF and the Event ID. | NA | The DCF provisions UE Data Collection configuration to the UE via control plane signalling, before triggering UE data collection. |
| 6 | - New UDCF is proposed as a UP path termination entity in 5GC for UE data transfer as below:- AF requests the data for specific UE from DCCF.- DCCF checks if the requested UE collected data are already stored in ADRF or not. If the requested UE collected data are available in ADRF, DCCF exposes the data from ADRF to AF. If the requested UE collected data are not available in ADRF, DCCF sends data for the specific UE from UDCF.- UDCF informs the UDCF address to UE via NAS signalling. UE establishes the UP connection via UPF to UDCF.- UDCF sends data collection request to UE via application layer signalling. The security about the application layer signalling between UE and UDCF will be discussed in SA WG3.- UE collects data according to RAN1/RAN2's decisions and sends the report to UDCF.- UDCF sends the received data from UE to DCCF, DCCF further sends to AF. DCCF may also store the collected UE collected data in ADRF. | UDCF (UE Data Collection Function) + DCCF | UDCF sends data collection request (with event ID and reporting information) to UE via application layer signalling. | FFS | PDU Session level: URSP (UDCF IP address / FQDN, new connection capability; DNN/S-NSSAI);QoS flow level: UDCF IP address / IPv6 prefix or port number used as packet filter | Define standard data reporting parameters. How the parameters are known to UE is not described. |
| 7 | - Data Collection Function (DCF) is introduced in the core network with the following functionalities: exchange UE Data Transfer Control Messages (UEDT-CM) with the UE over user plane for managing the UE data transfer for an AI/ML enabled feature, receive standardized data from the UE and store them, manage event exposure subscription to data consumer of an Application Server (AS), e.g. UE side server or OTT server, for UE-side model training and report UE data to the AS over user plane based on event exposure subscription for UE data collection.- Enhance UE policy of URSP rules for UP data transfer of AI/ML enabled feature(s) for NR-air interface to support dedicated PDU Session for UP data transfer.- Introduce AI/ML enabled feature ID to achieve end to end coordination for UE data collection, transfer and report for a specific AI/ML enabled feature among UE, RAN node, Core network, AF/AS.- Enable a UE to collect standardized data and transfer standardized data for a specific AI/ML enabled feature to the DCF and then the AS.- Enhance the Nnef\_AFsessionWithQoS service, which allows the AF to requests the network for an AF session to provide a specific QoS for UE data collection and transfer and handle the event exposure subscription for UE data reporting to the AF/AS supporting UE-side model training. | DCF | DCF exchanges UE Data Transfer Control Messages (containing AI/ML enabled feature ID) with the UE over user plane for managing the UE data transfer. | FFS | URSP (IP descriptors for traffic destined to DCF, new connection capability, AI/ML enabled feature ID(s); DNN/S-NSSAI) | Define AI/ML enabled feature ID to identify a dataset associated with an AI/ML enabled feature (e.g. CSI feedback, Beam management, Positioning accuracy enhancements). The UE collects and transfers data according to the AI/ML enabled feature ID. |
| 8 | 1. The UE side model training server acts as an untrusted AF and interacts with the 5GC via NEF for providing data collection requirements and measurements configuration.2. The NF within the MNO domain supporting the data collection and transfer, receives the measurement and data collection configuration from the UE side training server acting as untrusted AF.3. Either the NF supporting the data collection and transfer or the UE side training server may use NEF services to request assistance to perform UE selection for data collection.4. The NF supporting the data collection and transfer may check the user consent data from the UDM before finalizing selection of UEs for data collection. User consent data in UDM holds consent status for a subscriber per purpose of data collection and per AF authorized to request data collection.5. The user plane connection for UE data collection is terminated at the NF supporting the data collection and transfer. The NF supporting the data collection and transfer or NEF perform required privacy operations on the collected data from the UE (anonymisation, aggregation) before exposure of the data towards UE side training server acting as AF. | unspecific | UEs are configured with URSP rules that help how and when to establish a PDU Session with connectivity towards the NF. | FFS | URSP? | Unclear. Via application client towards the 5GC NF? |
| 9 | - UE model training entity OTT server acting as an AF contacts (via NEF) a "UE data collection NF in 5G Core" to request data collection from specific UEs (identified by Type Allocation Codes), for specific measurement Id(s) and possibly in specific area(s).- Configuration of the data collection in the UEs is done via Control Plane.- gNBs are responsible for selecting the UEs for data collection based on Type Allocation Codes provided by Training entity OTT server, taking user consent and local gNB information into account.- UEs are configured by gNBs for data collection, together with UP information, which then allows UEs to transfer collected data to "UE data collection NF in 5G Core" via User Plane. | UE data collection NF in 5G Core (existing NF, e.g. DCCF, or a new NF) | FFS | UE data collection NF in 5G Core checks collected data according to measurement Ids. | URSP? | UEs are configured by gNBs for data collection -- via radio measurement configuration? |
| 10 | - RAN triggers UE data measurement and collection by core network request.- RAN triggers data measurement and collection with UE.- A dedicated NWDAF (DE-NWDAF) is responsible for UE data collection in the core network.- UE setup UP connection with DE-NWDAF to transfer data for UE-side model training. | DE-NWDAF (Data-Exposure NWDAF) | Core Network informs RAN to initiate UE data collection. RAN sends data collection request to the UE. | FFS | NA | Unclear. Indicated by Data context ID? |
| 11 | - New AIRF (AI data Repository Function) is introduced to store UE-side model training data.- The 5GC-centric variant is used:- AF requests UE-side model training data from DCCF.- DCCF checks whether the requested UE collected data is already stored in AIRF or not. If the requested UE collected data is available in AIRF, DCCF exposes the data from AIRF to AF. If the requested UE collected data is not available in AIRF, DCCF sends requests to UEs to collect data.- DCCF informs UE(s) the AIRF address. UEs establish the UP connection via UPF to AIRF.- UE(s) collects UE-side model training data and sends them to AIRF.- AIRF sends the received data(together with historical collected data if available) to DCCF, DCCF further sends to AF. | DCCF, AIRF (AI data Repository Function) | DCCF initiates data collection from UEs, UEs collect and send collected data to AIRF. | FFS | NA | Unclear |
| 12 | - To take the "futureproof and extendable solutions" requirement by RAN WGs, a new network function is proposed as the "first termination entity" to fulfil the MON's controllability and visibility requirements.- The UE data collection entity is deployed as a dedicated DNNI in the 5GC and it is configured to receive traffic from the user plane. Using the existing mechanisms, the SMF configures the UPF(s) to forward the traffic from UE(s) to the DNNI via the User Plane to the UE data collection entity. The PCF is also configured to provide the appropriate PCC rules for usage monitoring of the traffic to the DNNI.- The UE data collection entity manages (including initiating and terminating) the data transfer process based on operator's policy and considering the consumer (e.g. the UE model training entity server) request (which is already authorized by the NEF). It also provides visibility for the MNO via i) keep track of all the standardized data requests sent to the UE and UE response, ii) match data received from UE with respect to the standardized data format requested from the UE, iii) providing data content visibility based on operator's request.- A new NAS message is introduced to control the data transfer. It includes i) The information of the data collection entity as termination point (including DNNI, IP, port), ii) A list of standardized data to be transferred, iii) Data transfer control (e.g. start, stop).- Based on the information received by the NAS message, the UE may stablish/release QoS Flow (and PDU session) to the data collection entity and start/stop the data transfer process. | UE data collection entity, which is a new network function | UE data collection entity controls data transfer using new NAS message. | The UE data collection entity provides visibility for the MNO via i) keep track of all the standardized data requests sent to the UE and UE response, ii) match data received from UE with respect to the standardized data format requested from the UE, iii) providing data content visibility based on operator's request. | FQDN and/or DNN, and appropriate PCC rules | UE data collection entity indicates “A list of standardized data to be transferred” to the UE via the new NAS message. |
| 13 | - Reuses the generic architecture for collecting and exposing the collected UE data, via an intermediate Application Function defined in clause 6.2.8 of TS 23.288 [5] and in TS 26.531 [12].- Reuses the generic architecture for provides events to the event consumer using the event exposure service, defined in clause 6.2.8 of TS 23.288 [5] and in TS 26.531 [12]. This allows for the MNO controllability and MNO visibility of the data with minor changes in the 3GPP specifications.- The intermediate Application Function, i.e. DCAF is always located in the operator's domain. The UE is configured by DCAF via user plane and the UE reports to DCAF the collected data via user plane. The DCAF configures the UE with the DCAF address or FQDN via NAS.- Differentiation of the traffic for model training for charging purposes, traffic differentiation is achieved either by associating this traffic to a PDU Session to a dedicated DNN and S-NSSAI or if this traffic runs in a PDU Session that is not dedicated to the traffic for model training using PCC Rules that assigns a separate Charging Key to the traffic from/to the UE from/to the DCAF.Editor's note: It is FFS Whether this solution fulfils the architectural requirements to study UP Data Collection (for Option 2) are as documented in RAN LSs RP-243316 and RP-242389.Editor's note: Whether this solution addresses option 1b or option 2 needs to be checked with RAN before reaching conclusions.NOTE 1: User consent aspects are out of the scope of this solutionNOTE 2: The interface between the client in the UE and the chipset is not covered in this solution as it is out of the scope of 3GPP. | DCAF | Reuses the generic architecture for provides events to the event consumer using the event exposure service, defined in clause 6.2.8 of TS 23.288 [5] and in TS 26.531 [12]. | The DCAF verifies that the data collected is according to the data requested by the UE training centre. | 1) associating this traffic to a PDU Session to a dedicated DNN and S-NSSAI, or 2) if this traffic runs in a PDU Session that is not dedicated to the traffic for model training using PCC Rules that assigns a separate Charging Key to the traffic from/to the UE from/to the DCAF | The DCAF provides configuration information per EventID to the UE via user plane. |
| 14 | - The NWDAF-C directs AMF to initiate the UE data collection procedure and provides the IP address of NWDAF-U or ADRF to UE.- The NWDAF-U or ADRF receives the collected UE related data from UPF via N6 or N9 interface.- To report the uplink data to NWDAF-U or ADRF received from the NWDAF-C, the UE may request to initiate a new PDU session.In this solution, the NWDAF splits into NWDAF-C and NWDAF-U. NWDAF-C is responsible for control plane, e.g. handling signalling of the data collection request by AF, triggering the UE to establish the PDU session and provide some information e.g. about data transfer session to NWDAF-U while NWDAF-U is responsible for UE data collection, data storage, data processing (e.g. data verification) and data exposure, etc. | NWDAF-C, NWDAF-U or ADRF | The NWDAF-C sends the UE data collection request to UE, triggering the UE to establish the PDU session to NWDAF-U. | NA | NA | NA |
| 15 | - The solution leverages existing guidance for URSP procedure from TS 23.502 [3] to configure Data Transfer Configuration Information (DTCI) on the UE (e.g. from a trusted UMTES in MNO domain). Alternatively, URSP can be generated based on input from Data Transfer Network Function or MNO local configurations (e.g. for an UMTES).- The UE establishes UP PDU Session based on above to Data Transfer Network Function.- The data transfer initiation/ termination occurs in-band over UP PDU session based on data transfer request/ response between UMTES (via NEF, e.g. in case of an UMTES) and Data Transfer Network Function. | DTNF (Data Transfer Network Function), which can be hosted by an existing network function like DCCF.UMTES, PCF | DTNF sends the data transfer request to UE via UP | NA | DTNF address (e.g. FQDN), associated DNN and S-NSSAI | DTNF conveys the data transfer request (including any requested standardized data types) to UE over the Secure TLS connection. |
| 16 | - A new 5GC NF, DCF (data collection function), is introduced to support UE-side data transfer to AIML model training.- The data collection at UE side might be triggered by AIML training server or DCF's internal logic.- UP connection between UE and DCF might be established due to the trigger from either DCF or the UE that is to transfer the AIML data.- The UPF routes the AIML data to DCF and differentiate from other UE regular traffic in the 5GC based on the (destination) IP address of the AIML data packets via UP connection.- The DCF may exposure part of AIML data to the AIML server that requires the UE-side AIML for model training, e.g. based on user consent and privacy. | DCF (data collection function) as a new 5GC NF | DCF triggers data collection request towards the target UEs, e.g. via AMF or NG-RAN. | NA | (destination) IP address of the AIML data packets | Unclear |
| 17 | - The proposed solution focuses on UE data transfer rather than UE data collection.- A dedicated Data Collection Function standardizes the data to be transferred to UE model training entity server and fully controls the whole transferring process.- It can be UE side or NF side to trigger the request of UE data transfer.- User consent information should be stored in the UDM for the NF to check whether the UE data transfer is permitted.- Dedicated UP session is needed for UE data transfer for the sake of differentiation from normal UP data. | Data Collection Function | DCF sends configuration information (including UE data standardized template that can instruct the UE to standardize the collected data to be transferred and report config) and requests to the UE to initiate and terminate the UE data transfer | FFS | Dedicated UP session established or activated based on the existing PDU session | Unclear.  |
| 18 | - Data Collection Function (DCF) controls and manages standardized UE data collection for UE-side model training. It performs the following functions:- Provides the UE with 'UE Data Transfer' request via NAS signalling. The 'UE Data Transfer' request contains UP information and data collection parameters.- Collects standardized UE data over the user plane (UP).- Verifies and transfers the collected data to the AF, i.e. UE model training entity server.- The URSP is used to configure how to select the route for standardized UE data collection, such as determining the associated DNN, S-NSSAI and/or PDU Session type to be used for 'UE Data Collection' traffic.- The UE registers with the 'UE Data Collection' capability, allowing the AMF to identify UEs with this capability in a specified Area of Interest (AoI).- The UE establishes a PDU Session to the specified DNN and S-NSSAI that can be used for standardized UE data collection- The destination address of the 'UE Data Collection' traffic is the DCF address.- The NRF is used for the discovery of the DCF that provides 'UE Data Transfer' service. | DCF (Data Collection Function) | DCF sends UE Data Transfer request (with UP information and data collection parameters) via NAS signalling. | The DCF checks the integrity of data received from the UE and verifies that it conforms to the parameters, e.g. Data context ID. | Dedicated DNN or S-NSSAI, destination address corresponding to the DCF | Indicated by Data context ID in the UE Data Transfer request.The Data context ID identifies the use case for which the required data is used for, e.g. Beam management, CSI prediction, Positioning. Data context ID is used to determine what data should be collected. |
| 19 | - Full MNO control of the standardized data collection transfer process and management of data transfer by introducing a central Data Collection Function that handles both data collection requests and enforcement of the transfer of the collected data, through the Data Collection Function, including initiating, terminating and fully managing data transfer. The MNO has full visibility for standardized data, as collected data is processed at the Data Collection Function, prior to forwarding it to the AF (e.g. the UE-model training entity). Managing both data collection requests and data transfer, through a Data Collection Function enables the MNO to verify/match the data specified/configured to be collected and the data that is being reported. | new Data Collection Server Function (DCF) | The DCF sends a Data Collection Configuration Request to the target RAN nodes via the AMF including DCP (Data Collection Profile).Based on the DCP, the gNB sends measurement configuration to the UE adapted for the data collection.In addition, the DCF may determine to send DCP information to UE via AMF in a NAS message. | The DCF verify whether the collected data satisfy the requirement for data collection. | DNN / S-NSSAI combination | Using DCP which describes the data content that is collected and meta data related to specific handling of the data content. The DCP is configured and used in the UE and network nodes (RAN, CN) as part of the data collection process. |
| 20 | - The mechanism of PDU session with user plane connectivity between UE and the UE model training entity server with UPF performing visibility handling is used, which is totally standardised mechanism which is pretty mature in 5G.- The UPF or an dedicated NF (e.g. a new NF as DCF(Data Collection Function) in 5GC performs the full visibility of standardized UE data contents based on configured data packets handling rules.- The PDU session management mechanisms of QoS flow management or service data flow management support the controllability of standardized UE data transfer including initiating, terminating data transfer and also support to differentiate the traffic for UE data collection from the UE regular traffic in the 5GC.- The UE knows about what the standardized data to be transferred are based on what data is standardised. | SMF, UPF or an dedicated NF (e.g. a new NF as DCF(Data Collection Function) | Use the PDU session management mechanisms of QoS flow management or service data flow management, to support the controllability of standardized UE data transfer including initiating, terminating data transfer. | The SMF configures visibility control information on the specific service flow(s) or QoS flow(s), and UPF or DCF performs visibility handling. | Use the PDU session management mechanisms of QoS flow management or service data flow management | based on what data is standardised |
| 21 | - A data collection function (i.e. DCF) in 5GC instructs the UE what and how UE data are to be collected and transferred, based on UE request or AF request and subscription data.- A data session between the DCF and the UE is used for UE data transfer over the secure user plane with TLS connection, which is established over PDU connectivity service provided by a PDU session.- The DCF verifies the received UE data in encapsulated data packets over the data session, according to the UP protocol for UE data collection and transfer.- The DCF may perform the UE data collection and transfer update procedure to update the configuration for UE data collection and transfer towards the UE, based on various triggers (e.g. the request from UE, AF or RAN, or DCF internal decisions). | DCF (Data Collection Function) | DCF initiates UE data collection and transfer to the UE. | DCF verifies whether the reported data types and formats comply with the configured data types and formats for UE data collection and transfer. | NA | DCF provides/updates configuration information to the UE on what and how UE data are to be collected and transferred. |

Based on the summary and analysis as above, interim agreements for KI#1 are proposed.

**2. Proposal**

It is proposed to agree the following changes to 3GPP TR 23.700-04.

\* \* \* Start of Change \* \* \* \*

### 7.1.1 Agreed Principles for KI#1

Editor's note: This clause will include the principles that are agreed as work progresses for the specific KI#1. This may be populated directly or e.g. also when a topic in clause 7.2.1 gets resolved and a principle is agreed.

The interim agreements on principles for KI#1 are as follows:

- A data session is established between the UE and a 5GC NF, for transferring standardized collected data by the UE using PDU connectivity service provided by a PDU session.

- The 5GC NF controls UE data transfer, including initiating, modifying and terminating the data session. It also may modify or terminate the data session based on internal triggers (i.e. local configuration).

- The 5GC NF instructs on what UE data are to be transferred.

NOTE 1: The details of UE data for the use cases are defined by RAN WGs.

NOTE 2: The UE collects data via radio measurement according to measurement configuration from the NG-RAN.

- The 5GC NF checks whether the reported UE data comply with the request for UE data transfer.

- Dedicated S-NSSAI/DNNis used to differentiate the traffic of collected UE data from the UE regular traffic per PDU Session level.

- The UE establishes a new PDU Session or modifies an existing PDU Session to transfer the standardized UE data, based on URSP rules and/or local configuration.

\* \* \* Next Change \* \* \* \*

### 7.2.1 Topics for further consideration for KI#1

Editor's note: This clause will include the topics for further consideration as work progresses for the specific KI#Z. Eventually this clause should only contain topics for further consideration that did not result in agreements (i.e. in agreed principle(s) in a clause 7.1.Z) and can either be then marked as not pursued or postponed to a future release.

The following topics/principles are for further consideration:

- Whether an existing 5GC NF or a new 5GC CF is used for controlling UE data transfer.

- How the configuration information for UE data transfer is sent to the UE.

- How the 5GC NF sends its UP information (i.e. IP address or FQDN of the 5GC NF) , for standardized UE data transfer from the UE to the 5GC NF.

- Whether and how to select UEs for UE data collection.

- Whether and how the UE is aware what UE data are to be transfered.

- Whether the 5GC NF may modify or terminate the data session based on triggers from the NG-RAN.

- Whether or not to support differentiating the traffic of collected UE data from the UE regular traffic at QoS flow level (e.g. using the FQDN or address of the 5GC NF as traffic filter).

- Whether the UE needs to be authorized for UE data collection

Editor's note: Whether and how to differentiated UE data collection and UE data transfer is FFS.

\* \* \* End of Change \* \* \* \*