**3GPP TSG-CT WG4 Meeting #130C4-253366**

**Göteborg, Sweden; 25 - 29 August 2025 was3321**

**Source: China Mobile**

**Title: Pseudo-CR on Clarifications to Solution #4 and conclusion for KI#1**

**Spec: 3GPP TR 29.889 v1.0.0**

**Agenda item: 20.1**

**Document for: Agreement**

**1. Introduction**

<Introduction part (optional)>

**2. Reason for Change**

There are five Editor’s note remained in solution #4, the corresponding aspects should be clarified.

Editor's note: It should be clarified to which extent a new PDU session type parameter would really help in comparison with the existing DNN parameter as it can be assumed that the DNN implicitly denotes a PDU session type in most cases.

Editor's note: It should be further studied whether there is any benefit in identifying the 5G VN Group by the 5G VN Group ID (i.e. the Internal Group Id) rather than by the S-NSSAI/DNN, i.e. by extending PFCP signaling and Nupf\_EventExposure Subscribe with a new 5G VN Group ID.

Editor's note: It is FFS how the UPF should handle event reports for PDU sessions upon a change of RAT type, e.g. for periodic event reporting when the RAT type of the PDU session would stop (or would start again) matching the subscribed RAT type.

Editor's note: the above impact does not exist if no new 5G VN Group ID is introduced over N4, i.e. if the 5G VN Group is identified by the S-NSSAI/DNN.

Editor's note: the above impact to identify PDU sessions of a 5G VN Group ID does not exist if no new 5G VN Group ID is introduced over N4, i.e. if the 5G VN Group is identified by the S-NSSAI/DNN.

**3. Conclusions**

<Conclusion part (optional)>

**4. Proposal**

It is proposed to agree the following changes to 3GPP TR 29.889 v1.0.0.

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

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System (5GS); Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[5] 3GPP TS 29.564: "User Plane Function Services; Stage 3".

[6] 3GPP TS 32.295: "Telecommunication management; Charging management; Charging Data Record (CDR) transfer".

[7] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[8] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[9] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[10] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; Stage 3".

[11] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[a] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[b] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[c] 3GPP TS 29.505: "5G System; Usage of the Unified Data Repository services for Subscription Data; Stage 3".

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

### 6.4.1 Description

The solution addresses the Key Issue #1 on Identifying and lowering the network performance impacts of intensive data collection from UPF.

As illustrated in solution #2, in several use cases, the operator needs to collect frequent User Plane measurements for PDU sessions or users having specific characteristics. The only way to achieve this with the current Nupf\_EventExposure service design is to create an event exposure subscription for each such individual PDU session (e.g. of each 5G VN group members), which can result in a very large number of subscriptions at the UPF and to lots of signalling to create (and terminate) these subscriptions. Furthermore, the UPF reports measurements per subscription, causing massive signalling (i.e. very high number of HTTP requests and responses) for reporting the measurements from all such PDU sessions. So, the Nupf\_EventExposure can be enhanced to support the creation of a UPF event exposure subscription targeting all the users and/or PDU sessions associated with the specific characteristics (operator defined marker in solution#2).

Various mechanisms/concepts/identifiers defined in 5GS can be used to identify the Users or PDU sessions with the same characteristics, e.g.,

- Users or PDU sessions belongs to 5G VN group

- Users establishing a specific PDU session type, e.g., Ethernet PDU session, IP PDU session

- Users with same RAT type

This solution relies on reusing the existing mechanisms/concepts/identifiers above to identify the users or PDU sessions with the same characteristics and enhancing the Nupf\_EventExposure to support the creation of a UPF event exposure subscription targeting all the users and/or PDU sessions associated with same characteristics.

Principles of the solution:

1) During the UE’s PDU session establishment/modification, the SMF provides the following information to the UPF:

- Information identifying a specific 5G VN group. The existing 5G VN group provisioning and subscription mechanism applied to this solution. During the 5G VN group member's PDU session establishment, the SMF provides the information identifying the specific 5G VN group, which is retrieved from UDM to the UPF, during the PFCP session establishment or modification. The UPF stores the information identifying the 5G VN group in its PFCP session context.

- PDU session type, specified as PDN Type IE in clause 7.5.2 of 3GPP TS 29.244 [10].

- RAT type, specified as RAT type IE in clause 7.5.2 of 3GPP TS 29.244 [10].

2) The UPF Event Exposure is enhanced to enable an NF service consumer to create an event exposure subscription at the UPF with the following information.

- Information identifying the specific 5G VN group, this information enables the NF service consumer to create UPF event exposure subscription targeting to all the users or PDU sessions belongs to this specific 5G VN group.

- PDU session type. this information enables the NF service consumer to create UPF event exposure subscription targeting to all the users establishing the same PDU session type, e.g., Ethernet PDU session.

NOTE m: Several allowed PDU session types are supported for a given data network as specified in clause 6.1.6.2.11 of 3GPP TS 29.503 [b].

NOTE n: Several PDU session types are supported for a given VN group as specified in clause 6.1.6.2.39 of 3GPP TS 29.503 [b] for Nudm\_SubscriberDataManagement Service. Several PDU session types are allowed to be provisioned for a given VN group as specified in clause 6.5.6.2.7of 3GPP TS 29.503 [b] for Nudm\_ParameterProvision Service.

- RAT type, this information enables the NF service consumer to create UPF event exposure subscription targeting to all the users with the same RAT type, e.g., NG-REDCAP or a specific NTN RAT Type.

3) The UPF reports the measurements of such PDU sessions (up to the maximum size of the message) in a same notification message towards the NF service consumer (the message indicates to which PDU session each measurement applies).

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

### 6.4.2 Procedures

The solution includes the PDU session establishment/modification procedure as specified in clause 4.3.2 of 3GPP TS 23.502 [2]. During the PDU session establishment/modification procedure, SMF provides information identifying a specific 5G VN group, PDU session type or RAT type over N4 interface to UPF.

UPF event exposure subscription to PDU sessions of a specific 5G VN Group:

The solution includes the following steps as illustrated in Figure 6.4.2-1:

1. The NF service consumer (e.g. NWDAF) sends the Nsmf\_EventExposure Subscription request to the SMF to subscribe to UE data, including the groupId set to the internalGroup ID.

NOTE 1: The External Group ID and Internal Group ID are used to identify the 5G VN group as specified in clause 5.29.2 of 3GPP TS 23.501 [1].

NOTE 2: According to the Abnormal behaviour related network data analytics defined in clause 6.7.5 of 3GPP TS 23.288 [7], End-to-end data volume transfer time analytics defined in clause 6.18 of 3GPP TS 23.288 [7], QoS and Policy Assistance Analytics defined in clause 6.23 of 3GPP TS 23.288 [7], the target of Analytics Reporting may be an individual UE or a group of UEs which can be identified by the Internal-Group-Id. And in the corresponding procedures, the NWDAF may invoke the Nsmf\_EventExposure\_Subscribe service operation for collecting the related data.

NOTE 3: The groupId is already supported in Nsmf\_EventExposure\_Subscribe API as specified in clause 5.6.2.2 of 3GPP TS 29.508 [a].

NOTE 4: Since the NF service consumer (e.g. NWDAF) subscribes to the UPF via the SMF, the NF service consumer needs not determine by itself whether the internal Group ID corresponds to a 5G VN Group or not.

2. The SMF determines that the internalGroupID corresponds to a 5G VN group (based on the subscription information it retrieves from UDM).

The SMF sends the Nupf\_EventExposure Subscription request to the UPF to subscribe to UE data, with information identifying the 5G VN group to identify PDU sessions of the 5G VN group.

The above can be done by sending an Nupf\_EventExposure Subscription request targeting ANY UE and including the S-NSSAI/DNN and the internalGroupID associated with the 5G VN Group.

NOTE x: Only a 1:1 mapping between (DNN, S-NSSAI) combination and 5G VN group is supported as specified in clause 5.29.2 of 3GPP TS 23.501 [2]. In order to support dynamic management of 5G VN Group identification and membership, the NEF exposes a set of services to manage (e.g. add/delete/modify) 5G VN groups and 5G VN members as specified in clause 5.29.2 of 3GPP TS 23.501 [2].

NOTE y: If a new 5G VN group is created, the UDM shall assign a unique Internal Group ID for the 5G VN group and include the newly assigned Internal Group ID in the Nudr\_DM\_Create Request message as specified in clause 4.15.6.2 of 3GPP TS 23.502 [3]. After creation of the Individual5GVnGroup, the UDR will ensure the consistency with other resources like AccessAndMobilitySubscriptionData and SessionManagementSubscriptionData to contain the internal group id of the Individual5GVnGroup the UE belongs to as specified in clause 5.2.35.3.1 of 3GPP TS 29.505 [c]. There is no additional UE subscription to S-NSSAI and DNN required in the 5G VN group creation or deletion procedure from stage 2. It means some UE can have the S-NSSAI and DNN combination subscription before/after adding/deleting to a specific 5G VN group.

NOTE p: Not all UEs subscribed to a specific DNN and S-NSSAI belongs to the 5G VN group, So, if UPF event subscriptions targeting this specific 5G VN group are identified only by S-NSSAI/DNN, the UPF will incorrectly monitor the UEs which is not a member of the 5G VN group but subscribed to the S-NSSAI/DNN. Therefore, It’s necessary to include the 5G VN Group identification to the UPF event subscriptions targeting a specific 5G VN group.

NOTE 5: If a new 5G VN Group ID was defined, the solution assumes that the UPF supports UPF event subscriptions with the new subscription parameters. Otherwise, the NF service consumer subscribes to the UPF using the existing UPF event subscription solution (i.e. per PDU session).

3. The UPF creates event subscription resource if the request is accepted and sends 201 Created or returns relevant error as specified in clause 5.2.2.2.2 of 3GPP TS 29.564 [5].

4. The UPF sends the requested PDU session data by invoking the Nupf\_EventExposure\_Notify service operation to the NF consumer (i.e. UPF event consumer). All the event reports of these PDU sessions (up to the maximum size of the message) are contained in a same notification message towards the NF service consumer (the message indicates to which PDU session each measurement applies).

NOTE 6: The solution applies to Internal Group ID corresponding to a 5G VN Group. Members of a 5G VN Group are expected to be supported by the same UPF(s), and therefore creating a single subscription to the UPF targeting all 5G VN group members allows to save signaling.



Figure 6.4.2-1 – UPF event exposure subscription to PDU sessions of a specific 5G VN Group

UPF event exposure subscription to PDU sessions with the same RAT Type(s):

The solution includes the following steps as illustrated in Figure 6.4.2-2:

1. The NF service consumer (e.g. NWDAF) sends the Nupf\_EventExposure Subscription request to the UPF (direct subscription) to subscribe to UE data which camping on the same RAT type(s).

The above can be done by sending an Nupf\_EventExposure Subscription request targeting ANY UE and including the inclRatType IE and RatType IE per subscribed event.

The inclRatType IE indicate UPF to include the RatType information in the notification report and RatType IE identifies the subscribed PDU sessions with the same RAT type(s) for which the UPF will report the collected notification data to the NF consumer.

NOTE 7: The solution assumes that the UPF supports UPF event subscriptions with the new subscription parameters. Otherwise, the NF service consumer subscribes to the UPF using the existing UPF event subscription solution (i.e. per PDU session).

2. The UPF creates event subscription resource if the request is accepted and sends 201 Created or returns relevant error as specified in clause 5.2.2.2.2 of 3GPP TS 29.564 [5].

NOTE z: The RatType contained in RatType IE will not impact the PDU sessions filter for the event subscription resource creation.

3. The UPF sends the requested PDU session data by invoking the Nupf\_EventExposure\_Notify service operation to the NF consumer (i.e. UPF event consumer). All the event reports of these PDU sessions (up to the maximum size of the message) are contained in a same notification message towards the NF service consumer (the message indicates to which PDU session each measurement applies) with the RAT type.

NOTE k: By receiving the inclRatType IE, the UPF shall monitor all the subscribed PDU sessions and include the RAT type information per subscribed event in the collected Notification data (NotificationItems). If the RAT type changed during a reporting period, multiple NotificationItems corresponding to the measurement reports for the same event but measured over different RAT type may be included in the report. Before sending the collected Notification data, the UPF can discard the Notification data that doesn’t contains RAT type indicated in the RatType IE and send the remaining ones.

NOTE 8: The solution only considers direct subscriptions to UPF for subscriptions targeting the same RAT type.



Figure 6.4.2-2 – UPF event exposure subscription to PDU sessions with a specific PDU session type or RAT Type

UPF event exposure subscription to PDU sessions with a specific PDU session type:

The solution includes the following steps as illustrated in Figure 6.4.2-2:

1. The NF service consumer (e.g. NWDAF) sends the Nupf\_EventExposure Subscription request to the UPF (direct subscription) to subscribe to UE data, identifying PDU sessions with a specific PDU session type.

The above can be done by sending an Nupf\_EventExposure Subscription request targeting ANY UE and including the specific PDU session type (as well as any further parameters such as S-NSSAI/DNN).

NOTE 7: The solution assumes that the UPF supports UPF event subscriptions with the new subscription parameters. Otherwise, the NF service consumer subscribes to the UPF using the existing UPF event subscription solution (i.e. per PDU session).

2. Same as step 3 of Figure 6.4.2-1.

3. Same as step 4 of Figure 6.4.2-1



Figure 6.4.2-2 – UPF event exposure subscription to PDU sessions with a specific PDU session type

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

### 6.4.3 Impacts on services, entities and interfaces

UPF/SMF:

- the PFCP session establishment/modification requests are extended to enable the SMF to send the 5G VN group identification for a 5G VN group member's PFCP session (PDU session).

UPF/SMF/NWDAF:

- the Nupf\_EventExposure service is enhanced to enable an NF service consumer to create an event exposure subscription at the UPF targeting all PDU sessions within the specific 5G VN group, or all the PDU sessions with the same PDU session type, or all the PDU sessions with the same RAT type.

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

## 8.1 Conclusions for Key Issue #1

The main issue to be solved is related with UPF reports per subscription, causing massive signaling and processing for reporting the measurements from all PDU sessions related with different subscriptions. Solution #7 provides a generic solution addressing this issue and enabling significant performance gains with minimal impacts to the system.

Further performance enhancements can also be achieved by enabling subscriptions with temporal conditions and/or enabling to skip the reporting of zero measurements.

Accordingly, the following solutions are agreed for normative work:

- solution #7 (Bundling event reports of different subscriptions);

- solution #1 (Reduced Report Instructions); and

- solution #4 (Optimized UPF data collection based on existing 5G VN group mechanisms, PDU session type or RAT type) with the following solutions specified in clause 6.4.2.

- UPF event exposure subscription to PDU sessions of a specific 5G VN Group;

- UPF event exposure subscription to PDU sessions with the same RAT Type(s).

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