**3GPP TSG-SA5 Meeting #154 *S5-242126d4***

Changsha, China, 15 April - 19 April 2024 was S5-241503

**Source: China Telecom, Nokia**

**Title: Add new use case and corresponding requirement on configuring NWDAF analytic exposure capability**

**Document for: Approval**

**Agenda Item: 6.19.18**

# 1 Decision/action requested

***The group is asked to discuss and agree on the proposal.***

# 2 References

[1] 3GPP TS 28.541-i61: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[2] 3GPP TS 28.552-i60: "Management and orchestration; 5G performance measurements".

[3] 3GPP TS 23.288-i40: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[4] 3GPP TS 28.877-000: "Study on Enhancement of the management aspects related to Network Data Analytics Functions (NWDAF) Phase 2".

# 3 Rationale

In Rel-18, SA5 has finished the first phase of management enhancement related to Network Data Analytics Functions (NWDAF) [1][2]. In Rel-19, we will continue the study of management enhancement related to NWDAF, considering the evolution of NWDAF in Rel-18.

According to TS 23.288 [3], analytics exposure in roaming case is supported in Rel-18.

--- Start of quote from TS 23.288---

*Based on roaming agreements (e.g. SLA), analytics may be exchanged between PLMNs (i.e. HPLMN and VPLMN of a UE served by the NWDAF analytics consumer). In this case, an NWDAF with roaming exchange capability (RE-NWDAF) is used as entry point in a PLMN to exchange analytics in roaming scenario with other PLMNs. It authorizes the analytics request according to roaming agreements, and filters the information exposed to other PLMNs. The roaming architecture is defined in clause 4.3.*

*The H-RE-NWDAF may provide analytics to the V-RE-NWDAF. The V-RE-NWDAF may provide analytics to the H-NWDAF.*

---End quote---

**Observation 1: An NWDAF with roaming exchange capability (RE-NWDAF) can be used as an entry point in a PLMN to exchange analytics in roaming scenario with other PLMNs.**

--- Start of quote from TS 23.288---

*NOTE 2: It depends on the deployment whether analytics exchange between PLMNs is supported, and thus whether H-RE-NWDAF and V-RE-NWDAF are provided in a PLMN.*

*As described in TS 23.288 [3], The H-RE-NWDAF or V-RE-NWDAF provides the Nnwdaf\_RoamingAnalytics. An RE-NWDAF is the only consumer of these services, i.e. both H-NWDAF and V-NWDAF need to have roaming exchange capability when used as entry point to exchange analytics in roaming scenario.*

---End Quote---

**Observation 2: Analytics exposure in roaming case depends on the deployment whether analytics exchange between PLMAN is supported, and thus whether H-RE-NWDAF and V-RE-NWDAF are provided in a PLMN.**

Based on the above observations, we found that an NWDAF registered with roaming exchange capability (RE-NWDAF) may be discovered and used (by other NWDAFs) as an entry point between PLMNs to exchange analytics. From the operator's perspective, this capability is useful for the operator who has multiple PLMNs and the NWDAFs are deployed within more than one PLMN. To better configure and identify this capability, it is necessary to provide information on whether one or more NWDAFs with roaming exchange capability are deployed within the PLMN, and whether the NWDAF is capable of analytics exchange. Therefore, the NWDAF instance needs to provide information on whether it has roaming exchange capability and analytics exchange capability. However, the NWDAFFunction IOC defined in [1] cannot reflect this feature.

**Proposal1: NRM enhancements need to be investigated to support the indication of whether NWDAF has roaming exchange capability.**

**Proposal2: NRM enhancements need to be investigated to support the indication of whether the RE-NWDAF supports analytics exchange.**

With the observations and proposal above, this contribution is proposed to provide a new use case for management enhancement to support the analytics exposure in roaming case.

# 4 Detailed proposal

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| **Start of 1st 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".

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

[y] 3GPP TS 28.541: "5G Network Resource Model (NRM)".…

[x] <doctype> <#>[ ([up to and including]{yyyy[-mm]|V<a[.b[.c]]>}[onwards])]: "<Title>".

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| **Start of 2nd Change** |

X Use cases, potential requirements and possible solutions

X.Y Use case #Y: Management enhancement to support the analytics exposure in roaming case

X.Y.1 Description

As described in TS 23.288 [x], an NWDAF registered with roaming exchange capability (RE-NWDAF) may be discovered and used (by other NWDAFs) as an entry point between PLMNs to exchange analytics. The home roaming exchange NWDAF (H-RE-NWDAF) or visitor roaming exchange NWDAF (V-RE-NWDAF) needs to provide the *Nnwdaf\_RoamingAnalytics* to exchange analytics. NWDAFs, with and without “roaming exchange capability”, exhibit different behaviours. The NWDAF with “roaming exchange capability” necessitates extra interactions with NWDAFs from other operators. To better configure and identify this capability, it is necessary to provide information on whether one or more NWDAFs with roaming exchange capability are deployed within the PLMN.

Besides, based on TS 23.288 [x], RE-NWDAF is also able to act as an entry point for *Nnwdaf\_roamingData* to collect and exchange data between H-PLMN and V-PLMN. However, with consideration of data security and privacy, operators may only want to provide *Nnwdaf\_RoamingAnalytics* without exchanging data across different PLMNs. Therefore, operators need to configure that the RE-NWDAF supports *Nnwdaf\_RoamingAnalytics* exclusively. However, the NWDAFFunction IOC defined in [y] cannot reflect this feature in roaming case.

In TS 23.288 [x], four service operations are specified under “NWDAF Roaming Analytics” that enables the consumer to request or to subscribe or to unsubscribe for roaming analytics generated by the RE-NWDAF. These service operations include the following:

• *Nnwdaf\_RoamingAnalytics\_Subscribe* service operation

• *Nnwdaf\_RoamingAnalytics\_Unsubscribe* service operation

• *Nnwdaf\_RoamingAnalytics\_Notify* service operation

• *Nnwdaf\_RoamingAnalytics\_Request* service operation

The number of roaming analytics subscriptions, requests, notifications and responses are some of the basic statistic information to monitor the performance of RE-NWDAF. These basic measurements can be used to derive the other performance of RE-NWDAF such as roaming analytics service successful and/or failed rate, etc. With these measurements, operators can analyze and evaluate the performance of the RE-NWDAF. Operators can use these measurements to take management actions for configuration, resource allocation, load balance and placement purposes.

X.Y.2 Potential requirements

**REQ-NWDAF-RE-AE-01：**the 3GPP management system should be able to reflect whether the NWDAF supports roaming exchange capability and to indicate whether it exclusively supports *Nnwdaf\_RoamingAnalytics* when the NWDAF supports roaming exchange.

**REQ-NWDAF-RE-AE-02:**The 3GPP management system should have the capability to measure the number of roaming analytics service subscriptions, and requests received by an RE-NWDAF.

**REQ-NWDAF-RE-AE-03:**The 3GPP management system should have the capability to measure the number of roaming analytics service notifications, and responses generated by an RE-NWDAF.

**REQ-NWDAF-RE-AE-04:**The 3GPP management system should have the capability to measure the number of failed and successful roaming analytics service subscriptions.

**REQ-NWDAF-RE-AE-05:** The 3GPP management system should have the capability to measure the time consumed by the RE-NWDAF to provide roaming analytics service information.