**3GPP TSG-SA5 Meeting #155 *S5-243324d2***

Jeju, South Korea, 27 - 31 May 2024 revision of S5-242695

**Source: NWDAF DC Transmission Rate**

**Title: Updates on measuring transmission rate to evaluate the NWDAF data collection efficiency**

**Document for: Approval, Information, Discussion**

**Agenda Item: 6.19.18**

# 1 Decision/action requested

***In this box give a very clear / short /concise statement of what is wanted.***

# 2 References

*(Reference - in list form - should be made to previous related SA5/3GPP/etc. documents.)*

*(For changes against a draft TS/TR, a pseudo CR - a.k.a. pCR - will be provided using this Tdoc template. In this case, the number, name and version of the draft TS/TR used as base must be provided and the version must be the latest available version of the draft TS/TR.)*

[1] 3GPP TR 28.877 Study on Enhancement of Management Aspects related to NWDAF Phase 2

# 3 Rationale

*(With bullet points, describe the reasons for the proposed action.
The objectives of the proposal should be clearly stated.
Rejected alternative solutions should be mentioned if this aids understanding).*

*(For pseudo CR, the reason for change(s) and summary of change(s) must be clearly explained.)*

Network resource is allocated and occupied for transmission when NWDAF performs the data collection from its data sources. The transmission rate can be monitored to evaluate the NWDAF data collection efficiency, which may reflect how well the network resources assigned to the NWDAF is sufficient for NWDAF data collection..

In this contribution, the use case and requirement of Management enhancement to related to NWDAF data collection efficiency is updated to take transmission rate into account, and a potential solution measures the trasnmission rate of the NWDAF data collection is proposed..

# 4 Detailed proposal

*(For pseudo CR, include the complete clause(s) or subclause(s) of the latest draft TS/TR to be modified, with clear clause and sub-clause headings included and* ***all modifications shown with revision marks****, unambiguously showing where the changes shall be made or inserted in the draft TS/TR. It is not sufficient to just state, for example, “add the following text to the draft TS/TR…”.)*

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| **1st Change**  |

## 4.2 Use case #2: Management enhancement to related to NWDAF data collection efficiency

### 4.2.1 Descriptions

The NWDAF Data Collection feature permits NWDAF to retrieve data from various sources (e.g. NF such as AMF, SMF, etc.), as a basis of the computation of network analysis. The procedures of NWDAF performing the NWDAF data collection is defined in TS 23.288[1] clause 6.2.

The NWDAF data collection will increase the data throughput of NWDAF. However, in the other hand, it will also increase the overhead of NWDAF related to the procedures of the NWDAF data collection.

In a period of time, if the data collected from one specific data source comprises hundreds of time of collection, but for each time of the aforesaid collection, only a small amount of data is collected, this will dramatically increase the accumulated overhead of the transmission for NWDAF data collection and these overhead may become an extra burden which needs to be considered for deploying NWDAF.

Therefore, it is meaningful for the operators to consider both the amount of the data collected from one specific data source and the corresponding accumulated transmission overhead related to the procedures of the NWDAF data collection. The later can be monitored or evaluated based on the frequency of the data collection of NWDAF from one specific data source.

If the NWDAF data collection works in an inefficient way where, for example, a small amount of data is collected while the accumulated transmission overhead for NWDAF data collection is very high, the operator may need to be informed. So that the operator can consider optimize the NWDAF data collection if necessary.

NOTE: Some enhanced NWDAF data collection procedures supported by the 3GPP which can help optimize the NWDAF data collection are described in TS 23.288[1] clause 6.2.

Network resource is occupied for NWDAF to perform the data collection from its data source. Since the NWDAF and its data sources may not be deployed close to each others from transmission point of view, the transmission rate can be measured to evaluate the NWDAF data collection efficiency..

The transmission rate is ratio between the a certain amount of data collected by NWDAF and the time used for data transmission from the data source to the NWDAF. Therefore, a relative low transmission rate may indicate that the transmission resource is not sufficient for NWDAF to collect data from the data source, it may also indicate the possible spaces for improving the performance of the time sensitive services provided by a NWDAF.

### 4.2.2 Potential requirements

**REQ-NWDAF-PM-DCE-1**: the 3GPP management system shall have a capability to provide a measurement to reflect the relationship between the amount of data collected by an NWDAF and the accumulated transmission overhead of the data collection by that NWDAF from one specific data source

**REQ-NWDAF-PM-DCE-2**: the 3GPP management system shall have a capability to provide a measurement to reflect the relationship between the amount of data collected by an NWDAF from its data sources and thetime used for the transmission of the collected data.

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### 4.2.3 Potential solutions

#### 4.2.3.X Potential solution #X :Transmission Rate related to the Data Collection from NFs performed by NWDAF

##### 4.2.3.X.1 Introduction

This potential solution is proposed to meet the requirement of **REQ-NWDAF-PM-DCE-2** considering the cases where Data Collection from NFs is performed by NWDAF.

##### 4.2.3.X.2 Description

When NWDAF performs Data Collection from NFs, the NWDAF will subscribe/unsubscribe at any 5GC NF to be notified for data on a set of events[1].

According to the clause 6.2.2.1 in [1], the Data Collection from NFs is based on the services of AMF, SMF, UDM, PCF, NRF, NSACF, UPF and AF (possibly via NEF):

- Event Exposure Service offered by each NF.

- other NF services (e.g. Nnrf\_NFDiscovery and Nnrf\_NFManagement in NRF)

The list of NF Services consumed by NWDAF for data collection is provided in table 6.2.2.1-1 in [1]. And the NF service producers are the data source.

For each of the NF services producers listed in table 6.2.2.1-1 in [1], the data can be provided to a NWDAF by the notification corresponding to the subscription of Event Exposure Service or by the response corresponding to the request to the other services offered by the data source NF. The amount of data collected by NWDAF from each notification and/or response varies. Since the NWDAF and the data sources NFs may not be deployed close to each others from transmission point of view, the time used for transmission from the differenc NFs in 5GC to the NWDAF varies, too.

For a given time length of observation, the transmission rate is measured as the ratio between the total amount of data collected by NWDAF and the corresponding accumulated time used for transmitting those amount of data from the data source NF to the NWDAF.

NOTE: The time used for transmitting, i.e. transmission time does not include the time used for the preparation of data for sending.

A relative low transmission rate may indicate that the transmission resource is not sufficient for NWDAF to collect data from the data source, it may also indicate the possible spaces for improving the performance of the time sensitive services provided by a NWDAF.

More specifically, the measurement of the transmission rate can be provided with different granularities:

**Transmission Rate of NWDAF Data Collection from NFs:** For a given time length of observation, the measurement is provided by averaging the total amount of data collected from one or more NF(s) with the accumulation of the transmission time of each notification and response corresponding to the subscription and request for NWDAF to perform Data Collection from NFs. Moreover, the notification and the response are received from the aforesaid one or more NF(s). This measurement reflects the transmission efficiency when NWDAF collecting data from one or more NF(s).

NOTE 1: In case only one NF is considered, the measurement reflects the transmission efficiency of one NWDAF performing data collection from one specific NF.

NOTE 2: In case all data source NFs are considered, the measurement reflects the averaged transmission efficiency of one NWDAF performing the Data Collection from NFs.

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#### 4.2.3.Y Potential solution #Y: Transmission Rate related to the data collection from DCCF/NWDAF hosting DCCF performed by NWDAF

##### 4.2.3.Y.1 Introduction

This potential solution is proposed to meet the requirement of **REQ-NWDAF-PM-DCE-2** considering the cases where data is collected from DCCF or NWDAF hosting DCCF directly by NWDAF.

##### 4.2.3.Y.2 Description

The NWDAF data collection may be performed via DCCF, when DCCF is deployed or via NWDAF hosting DCCF. NWDAF may obtain data using Ndccf\_DataManagement\_Subscribe/Nnwdaf\_DataManagement\_Subscribe services operations directly. Therefore, in such cases, the DCCF or the NWDAF hosting DCCF can be considered as the source of NWDAF data collection.

NOTE: The case where NWDAF collects data via MFAF is not considered in this potential solution.

According to clause 6.2.6.3 and 6.2.6.2 in [1], the data can be provided to a NWDAF via DCCF/NWDAF hosting DCCF by the Ndccf\_DataManagement\_Notify/Nnwdaf\_DataManagement\_Notify corresponding to Ndccf\_DataManagement\_Subscribe/Nnwdaf\_DataManagement\_Subscribe directly.

Or as instructed by the DCCF/NWDAF hosting DCCF via Ndccf\_DataManagement\_Notify/Nnwdaf\_DataManagement\_Notify, the NWDAF obtains data by invoking the request and receiving response of Ndccf\_DataManagement\_Fetch/Nnwdaf\_DataManagement\_Fetch.

For a given time length of observation, the transmission rate is measured as the ratio between the total amount of data collected by NWDAF from DCCF/NWDAF hosting DCCF and the corresponding accumulated time used for transmitting those amount of data from the DCCF/NWDAF hosting DCCF to the NWDAF.

NOTE: The time used for transmitting, i.e. transmission time does not include the time used for the preparation of data for sending.

Therefore, the measurement of the transmission rate can be provided as:

**Transmission Rate of NWDAF Data Collection from DCCF/NWDAF instance hosting DCCF:** For a given time length of observation, the measurement is provided by averaging the total amount of data collected from one or more DCCF(s)/NWDAF(s) hosting DCCF with the transmission time used for each notification and response corresponding to the subscription and request for NWDAF to perform data collection from the aforesaid one or more DCCF(s) /NWDAF(s) hosting DCCF. This measurement reflects the transmission efficiency when NWDAF collecting data from DCCF(s)/NWDAF(s) hosting DCCF.

NOTE 1: In case only one NF is considered, the measurement reflects the transmission efficiency of one NWDAF performing data collection from one specific DCCF/NWDAF hosting DCCF.

NOTE 2: In case all data source NFs are considered, the measurement reflects the averaged transmission efficiency of one NWDAF performing the data collection via DCCF/NWDAF hosting DCCF.