**3GPP SA WG2 Meeting #153eS2-xxxxxxx**

**e-meeting, Oct 10-14, 2022**

**Source: Nokia, Nokia Shanghai Bell**

**Title: KI#9 : Location Accuracy– Enhancements & Evaluation/Conclusion**

**Document for: Approval**

**Agenda Item: x.xx**

**Work Item / Release: FS\_eNA\_Ph3 / Rel-18**

*Abstract of the contribution: This paper proposes update to the solution #59 and evaluation/conclusion for KI#9.*

# Discussion

Key Issue #9: Enhancement of NWDAF with finer granularity of location information

In this key issue, the following aspects will be studied:

- Identify use cases and corresponding existing or new Analytics ID(s) where the analytics require location information with finer granularity than TA/cell level, and how to enhance related existing Analytics ID(s).

- Identify how an NWDAF determines that location information with finer granularity than cell/TA level is required in output analytics.

- Identify what input data needs to be collected to deliver analytics with fine granularity location information.

- Identify how NWDAF acquires the input data to deliver finer granularity location information. Whether and how the functionality and services of NWDAF or other NFs need to be enhanced.

# Proposal

It is proposed to update TR 23.700-81 as follows

\*\*\* Start of changes Clause 7, Evaluation, all new text \*\*\*

## 7.X Key Issue #9: Enhancement of NWDAF with finer granularity of location information

Table7.x-1: Solution evaluation for KI #9

|  |  |  |
| --- | --- | --- |
| **Candidate solution # & title** | **Summary of the solution** | **Remarks** |
|  |  | |
| Solution #25: Outdoors Advertisement use case with finer granularity location information | This solution proposes a new analytics service that provides outdoors advertisements statistics business  The new analytics service takes as input the UE location estimate (one or a group of UEs)  It provides analytics output like location of outdoors billboard, collection period, total number of users, average staying time etc., | Unclear how UEs can be selected for data collection. Statics about all UEs might be required, which is very heavy |
| Solution #26: Finer granularity of location information based on cell sequence | This solution proposes to add a new input/output to the already defined UE mobility analytics service  The input indicates if the NWDAF has to output the UE location in order of UE mobility and the output has the multiple UE locations in a given order (if requested). Output will use one of the alternatives  Alt#1, the NWDAF adds a list of timestamps or orders for each UE location;  Alt#2, NWDAF does not aggregate the UE locations in a long duration but provides the UE location one by one in their own time period | Unclear why Alt#2 requires analytics instead of simple location reports  Is solution in scope of the KI? |
| Solution #27: Relative Proximity Analytics | This solution proposes a new Analytics Service/ID : "Relative Proximity" provided by the NWDAF provides UE proximity analytics.  The AF could give various inputs for the analytics like : area of interest, directions of interest, a ranging distance, UE velocity, average speed, orientation or trajectory, slice, DNN, time period, level of accuracy etc.,  The Relative Proximity Analytics service uses the above inputs as filters, gets input data from various sources (AMF, LCS framework, AF, OAM etc.,) and provides the requested analytics information in the form of for example - relative proximity and TTC (Time To Collide) information |  |
| Solution #54: Finer granular location information based on LCS input data. | Proposes that the NWDAF may act as an LCS client to request the LMF for higher granularity UE location estimate  The NWDAF may then use this estimate for its other analytics services like providing statistics on outdoors advertisements, providing location-based recommendation to users etc., | Similar to solution 57 and 58.  More information about input and output data for the finer granular location statistical or prediction information is required. |
| Solution #55: location information with finer granularity in horizontal and vertical directions | This solution proposes new analytics with different levels of granularity of UE location information in both horizontal & vertical directions  The NWDAF gets this information either from the AMF (if the level is cell/TA) or LCS framework (if the level is of finer granularity) | It is FFS how areas can be defined with finer granularity than TA/cell level.  Unclear whether explicit granularity parameters per direction are required or this can be encoded in the finer granular area. |
| Solution #56: PSAP resolution with finer granularity of location information | A PSAP (Public Safety Answering Point) for emergency services is determined by NWDAF based on analytics about UE location (if current UE location cannot be determined)  Proposes new analytics with UE ID as input and PSAP destination as output. IMS uses that analytics to route SIP emergency session setup requests to PSAP. | It is FFS if this use case requires analytics about UE location or only the UE location when emergency communication was initiated from that UE. Is it realistic that a UE can start emergency communication, but the UE location cannot be determined?  Existing analytic IDs e.g., UE mobility, could be used to address the PSAP resolution use case. |
| Solution #57: NWDAF determines granularity when the consumer requests finer granularity location information | UE mobility analytics are enhanced with preferred granularity / accuracy of location finer than TA/cell, LCS QoS. NWDAF provides finer granular analytics/predictions as output. NWDAF collects related input data from LCS and AF. | Similar to solution 54 and 58.  How data collection works (e.g. via AMF or GMLC) depends on LCS work.  UE location needs to be in the form of some area to enable related analytics. It is FFS how areas can be defined with finer granularity than TA/cell level |
| Solution #58: Supporting UE mobility analytics with finer granularity than TA/cell | UE mobility analytics are enhanced with finer granular location information and related timestamps to describe routes. NWDAF collects input data from LCS architecture | Similar to solution 54 and 57.  How data collection works (e.g. via AMF or GMLC) depends on LCS work.  UE location needs to be in the form of some area to enable related analytics. It is FFS how areas can be defined with finer granularity than TA/cell level |
| Solution #59: Enhancement of NWDAF with location accuracy prediction | This solution proposes a new analytics service in NWDAF that can be used by the LMF to improve UE location accuracy. The new analytics ID shall take the UE location estimate as input and provide the predicted UE location accuracy as output.In the training phase location information determined by two methods is correlated to derive location accuracy for the less precise method. | The eLCS\_ph3 study already agreed an interim conclusion to use this analytics. |
| Solution #70: Improved control of location granularity | Proposes to add new optional input parameters "temporal granularity size" and "spatial granularity size" to several analytics like UE mobility, Observed Service Experience, QoS sustainability, Dispersion analytics  The NWDAF then provides the analytics based on the granularity size given by the AF. |  |
| Solution #71: Traffic flow statistics use case with finer granularity location information | This solution proposes a new analytics ID for traffic flow statistics analytics to be provided by the NWDAF.  The service interfaces with the LCS framework to get UE/UE group location data and uses that the provide the analytics |  |

Most solutions address different use cases and need to be evaluated indepentley.

However, solutions 54, 57 and 58 all propose extensions to UE mobility analytics to cover finer granularity.

\*\*\* Next changes Clause 8, Conclusions, all new text \*\*\*

## 8.X Key Issue #9: Enhancement of NWDAF with finer granularity of location information

Interim conmclusions

- UE mobility analytics are enhanced to cover finer granularity than cell level. The NWDAF obtains related input data from the LCS framework using methods determined by the eLCS-Ph3 study.

- The NWDAF provides a new analytic ID with location accuracy estimates as required by the by the interim conclusions of the eLCS-Ph3 study

Editor´s note: Interim conclusions related to other solutions and their use cases are ffs.

Editor´s note: Coordination with the eLCS-Ph3 study is required.

# \*\*\* End of changes \*\*\*