**SA WG2 Meeting #153E** **S2-2208991**

**October 10th – 17th, 2022 ; Elbonia (revision of S2-220xxxx)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.288** | **CR** | **0553** | **rev** | **-** | **Current version:** | **17.6.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Corrections on exposing 5GS information to untrusted AF | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph2 | | | | |  | ***Date:*** | | | 2022-09-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In [C3-224688](https://www.3gpp.org/ftp/tsg_ct/WG3_interworking_ex-CN3/TSGC3_123e/Inbox/C3-224688.zip) CT3 asks further questions on exposing 5GS information to an untrusted AF.  **For Service experience analytics**: UPF info is not relevant for trusted AF.  **NF load analytics**: Assumption is that this is not an analytics that an untrusted AF would be able to request. If untrusted AF requests such analytics, NEF filtering is necessary.  **Network performance analytics**: Same as NF load analytics.  **For UE communication analytics**: N4 session ID analytics subset is only relevant for SMF as a consumer of analytics, so this needs to be clarified in tables 6.7.3.3-1 and 6.7.3.3-2. Otherwise, N4 session ID subset can be provided to an AF, which is not correct.  **For DN performance analytics**: The item "Serving anchor UPF info" shall not be included if the consumer is an AF. SA2#152E agreed that the information shall not be provided to untrusted AF, however, in case of untrusted AF the request to NWDAF will come from NEF, not from untrusted AF directly, so previously agreed change is incorrect.  When untrusted AF request analytics, it will go via NEF. Exposure of internal 5Gs information to untrusted AF depends on operator configuration in NEF and as such is subject to SLA with the untrusted AF. NEF may apply restrictions when information is exposed to untrusted AF, as specified already in TS 23.288:  TS 23.288 clause 6.1.1.2:  4. If the NEF receives the notification from the NWDAF, the NEF notifies the AF with the analytics information or Termination Request by invoking Nnef\_AnalyticsExposure\_Notify service operation defined in TS 23.502 [3]. **NEF may apply outbound restrictions to the notifications to AFs (e.g. restrictions to parameters or parameter values of the Nnef\_AnalyticsExposure\_Notify service operation) based on analytics exposure mapping and may apply parameter mapping for external usage (e.g. TA(s), Cell-id(s) to geo coordinate).** The AF checks if a Termination Request is present in the Nnef\_AnalyticsExposure\_Notify as defined in step 2 in clause 6.1.1.1.  TS 23.288 clause 6.1.2.2:  4. The NEF responds with the analytics information to the AF. **NEF may apply restrictions to the response to AFs (e.g. restrictions to parameters or parameter values of the Nnef\_AnalyticsExposure\_Fetch response service operation) based on operator configuration.** The AF checks if a Termination Request is present and then follows as defined in step 2 in clause 6.1.1.1.  So the case of untrusted AF requesting analytics and which information can or cannot be provided to untrusted AF is subject of operator configuration and is already specified in TS 23.288. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Clarifies that:  - UPF info or serving anchor UPF info shall not be provided to trusted AF  - N4 session ID analytics subset is only relevant for SMF | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Information that should be hidden to AF is provided to AF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.4.3, 6.7.3.3, 6.14.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*1st CHANGE*

### 6.4.3 Output Analytics

The NWDAF services as defined in the clause 7.2 and 7.3 are used to expose the analytics.

- Service Experience statistics information is defined in Table 6.4.3-1.

- Service Experience predictions information is defined in Table 6.4.3-2.

Table 6.4.3-1: Service Experience statistics

|  |  |
| --- | --- |
| Information | Description |
| Slice instance service experiences (0..max) | List of observed service experience information for each Network Slice instance. |
| > S-NSSAI | Identifies the Network Slice |
| > NSI ID (NOTE 2) | Identifies the Network Slice instance within the Network Slice. |
| > Network Slice instance service experience | Service experience across Applications on a Network Slice instance over the Analytics target period (average, variance). |
| > SUPI list (0..SUPImax) (NOTE 3) | List of SUPI(s) for which the slice instance service experience applies. |
| > Ratio (NOTE 3) | Estimated percentage of UEs with similar service experience (in the group, or among all UEs). |
| > Spatial validity (NOTE 6) | Area where the Network Slice service experience analytics applies. |
| > Validity period | Validity period for the Network Slice service experience analytics as defined in clause 6.1.3. |
| Application service experiences (0..max) | List of observed service experience information for each Application. |
| > S-NSSAI | Identifies the Network Slice used to access the Application. |
| > Application ID | Identification of the Application. |
| > Service Experience Type | Type of Service Experience analytics, e.g. on voice, video, other. |
| > UE location (NOTE 1, NOTE 5) | Indicating the UE location information (e.g. TAI list, gNB ID, etc) when the UE service is delivered. |
| > UPF Info (NOTE 4) | Indicating UPF serving the UE. |
| > DNAI | Indicating which DNAI the UE service uses/camps on. |
| > DNN | DNN for the PDU Session which contains the QoS flow. |
| > Application Server Instance Address | Identifies the Application Server Instance (IP address of the Application Server) or FQDN of Application Server. |
| > Service Experience | Service Experience over the Analytics target period (average, variance). |
| > SUPI list (0..SUPImax) (NOTE 3) | List of SUPI(s) with the same application service experience. |
| > Ratio (NOTE 3) | Estimated percentage of UEs with similar service experience (in the group, or among all UEs). |
| > Spatial validity (NOTE 6) | Area where the Application service experience analytics applies. |
| > Validity period | Validity period for the Application service experience analytics as defined in clause 6.1.3. |
| > RAT Type  (NOTE 7) | Indicating the list of RAT type(s) for which the application service experience analytics applies. |
| > Frequency  (NOTE 7) | Indicating the list of carrier frequency value(s) of UE's serving cell(s) where the application service experience analytics applies. |
| NOTE 1: This information element is an Analytics subset that can be used in "list of analytics subsets that are requested.  NOTE 2: The NSI ID is an optional parameter. If not provided the Slice instance service experience indicates the service experience for the S-NSSAI.  NOTE 3: The SUPI list and Ratio in the service experience information for an application can be omitted, if the corresponding parameter(s) is/are provided and are assigned with the same value(s) in the service experience information for the slice instance which the application belongs to. Otherwise, the SUPI list and Ratio are mandatory to be provided for an application service experience.  NOTE 4: If the consumer NF is an AF, the "UPF info" shall not be included.  NOTE 5: When possible and applicable to the access type, UE location is provided according to the preferred granularity of location information. UE location shall only be included if the Consumer analytics request is for single UE or a list of UEs. Inclusion of UE location requires user consent.  NOTE 6: The Spatial validity is present in the output parameters if the consumer provided the Area of Interest as defined in Table 6.4.1-1.  NOTE 7: When "any" value has been provided in the request (e.g. "any" RAT type, "any" frequency, or "any" for all the RAT type and frequency indication), the NWDAF provides an instance of the Application service experience per combination of RAT Type(s) and/or Frequency value(s) having the same Service Experience. | |

Table 6.4.3-2: Service Experience predictions

|  |  |
| --- | --- |
| Information | Description |
| Slice instance service experiences (0..max) | List of observed service experience information for each Network Slice instance. |
| > S-NSSAI | Identifies the Network Slice |
| > NSI ID (NOTE 2) | Identifies the Network Slice instance within the Network Slice. |
| > Network Slice instance service experience | Service experience across Applications on a Network Slice instance over the Analytics target period (average, variance). |
| > SUPI list (0..SUPImax) (NOTE 3) | List of SUPI(s) for which the slice instance service experience applies. |
| > Ratio (NOTE 3) | Estimated percentage of UEs with similar service experience (in the group, or among all UEs). |
| > Spatial validity (NOTE 6) | Area where the Network Slice service experience analytics applies. |
| > Validity period | Validity period for the Network Slice service experience analytics as defined in clause 6.1.3. |
| > Confidence | Confidence of this prediction. |
| Application service experiences (0..max) | List of predicted service experience information for each Application. |
| > S-NSSAI | Identifies the Network Slice used to access the Application. |
| > Application ID | Identification of the Application. |
| > Service Experience Type | Type of Service Experience analytics, e.g. on voice, video, other. |
| > UE location (NOTE 1, NOTE 5) | Indicating the UE location information (e.g. TAI list, gNB ID, etc) when the UE service is delivered. |
| > UPF Info (NOTE 4) | Indicating UPF serving the UE. |
| > DNAI | Indicating which DNAI the UE service uses/camps on. |
| > DNN | DNN for the PDU Session which contains the QoS flow. |
| > Application Server Instance Address | Identifies the Application Server Instance (IP address of the Application Server) or FQDN of Application Server. |
| > Service Experience | Service Experience over the Analytics target period (average, variance). |
| > SUPI list (0..SUPImax) (NOTE 3) | List of SUPI(s) with the same application service experience. |
| > Ratio (NOTE 3) | Estimated percentage of UEs with similar service experience (in the group, or among all UEs). |
| > Spatial validity (NOTE 6) | Area where the Application service experience analytics applies. |
| > Validity period | Validity period for the Application service experience analytics as defined in clause 6.1.3. |
| > Confidence | Confidence of this prediction. |
| > RAT Type  (NOTE 7) | Indicating the list of RAT type(s) for which the application service experience analytics applies. |
| > Frequency  (NOTE 7) | Indicating the list of carrier frequency value(s) of UE's serving cell(s) where the application service experience analytics applies. |
| NOTE 1: This information element is an Analytics subset that can be used in "list of analytics subsets that are requested".  NOTE 2: The NSI ID is an optional parameter. If not provided the Slice instance service experience indicates the service experience for the S-NSSAI.  NOTE 3: The SUPI list and Ratio in the service experience information for an application can be omitted, if the corresponding parameter(s) is/are provided and are assigned with the same value(s) in the service experience information for the slice instance which the application belongs to. Otherwise, the SUPI list and Ratio are mandatory to be provided for an application service experience.  NOTE 4: If the consumer NF is an AF, the "UPF info" shall not be included.  NOTE 5: When possible and applicable to the access type, UE location is provided according to the preferred granularity of location information. UE location shall only be included if the Consumer analytics request is for single UE or a list of UEs. Inclusion of UE location requires user consent.  NOTE 6: The Spatial validity is present in the output parameters if the consumer provided the Area of Interest as defined in Table 6.4.1-1.  NOTE 7: When "any" value has been provided in the request (e.g. "any" RAT type, "any" frequency, or "any" for all the RAT type and frequency indication), the NWDAF provides an instance of the Application service experience per combination of RAT Type(s) and/or Frequency value(s) having the same Service Experience. | |

The number of Service Experiences and SUPIs are limited respectively by the maximum number of objects and the Maximum number of SUPIs provided as part of Analytics Reporting Information by the NWDAF Service Consumer.

## 

*2nd CHANGE*

#### 6.7.3.3 Output Analytics

The NWDAF supporting UE Communication Analytics provides the analytics results to consumer NFs. The analytics results provided by the NWDAF include the UE communication statistics as defined in Table 6.7.3.3-1 or predictions as defined in Table 6.7.3.3-2.

Table 6.7.3.3-1: UE Communication Statistics

|  |  |
| --- | --- |
| Information | Description |
| UE group ID or UE ID | Identifies a UE or a group of UEs, e.g. internal group ID defined in TS 23.501 [2] clause 5.9.7 or SUPI (see NOTE). |
| UE communications (1..max) (NOTE 1) | List of communication time slots. |
| > Periodic communication indicator (NOTE 1) | Identifies whether the UE communicates periodically or not. |
| > Periodic time (NOTE 1) | Interval Time of periodic communication (average and variance) if periodic.  Example: every hour |
| > Start time (NOTE 1) | Start time observed (average and variance) |
| > Duration (NOTE 1) | Duration of communication (average and variance). |
| > Traffic characterization | S-NSSAI, DNN, ports, other useful information. |
| > Traffic volume (NOTE 1) | Volume UL/DL (average and variance). |
| > Ratio | Percentage of UEs in the group (in the case of a UE group). |
| Applications (0..max) (NOTE 1) | List of application in use. |
| > Application Id | Identification of the application. |
| > Start time | Start time of the application. |
| > Duration time | Duration interval time of the application. |
| > Occurrence ratio | Proportion for the application used by the UE during requested period. |
| > Spatial validity | Area where the service behaviour applies. If Area of Interest information was provided in the request or subscription, spatial validity may be a subset of the requested Area of Interest. |
| N4 Session ID (1..max) (NOTE 1) (NOTE 3) | Identification of N4 Session. |
| > Inactivity detection time | Value of session inactivity timer (average and variance). |
| NOTE 1: Analytics subset that can be used in "list of analytics subsets that are requested" and "Preferred level of accuracy per analytics subset".  NOTE 3: this analytics subset shall only be included if the consumer is SMF. | |

Table 6.7.3.3-2: UE Communication Predictions

|  |  |
| --- | --- |
| Information | Description |
| UE group ID or UE ID | Identifies a UE or a group of UEs, e.g. internal group ID defined in TS 23.501 [2] clause 5.9.7 or SUPI (see NOTE). |
| UE communications (1..max) (NOTE 1) | List of communication time slots. |
| > Periodic communication indicator (NOTE 1) | Identifies whether the UE communicates periodically or not. |
| > Periodic time (NOTE 1) | Interval Time of periodic communication (average and variance) if periodic.  Example: every hour. |
| > Start time (NOTE 1) | Start time predicted (average and variance). |
| > Duration time (NOTE 1) | Duration interval time of communication. |
| > Traffic characterization | S-NSSAI, DNN, ports, other useful information. |
| > Traffic volume (NOTE 1) | Volume UL/DL (average and variance). |
| > Confidence | Confidence of the prediction. |
| > Ratio | Percentage of UEs in the group (in the case of a UE group). |
| Applications (0..max) (NOTE 1) | List of application in use. |
| > Application Id | Identification of the application. |
| > Start time | Start time of the application. |
| > Duration time | Duration interval time of the application. |
| > Occurrence probability | Probability the application will be used by the UE. |
| > Spatial validity | Area where the service behaviour applies. If Area of Interest information was provided in the request or subscription, spatial validity may be a subset of the requested Area of Interest. |
| N4 Session ID (1..max) (NOTE 1) (NOTE 2) | Identification of N4 Session. |
| > Inactivity detection time | Value of session inactivity timer (average and variance). |
| > Confidence | Confidence of the prediction. |
| NOTE 1: Analytics subset that can be used in "list of analytics subsets that are requested" and "Preferred level of accuracy per analytics subset".  NOTE 2: this analytics subset shall only be included if the consumer is SMF. | |

NOTE: When Target of Analytics Reporting is an individual UE, one UE ID (i.e. SUPI) will be included, the NWDAF will provide the analytics communication result (i.e. list of (predicted) communication time slots) to NF service consumer(s) for the UE.

The results for UE groups address the group globally. The ratio is the proportion of UEs in the group for a given communication at a given time and duration.

The number of UE communication entries (1..max) is limited by the maximum number of objects provided as part of Analytics Reporting Information. The communications shall be provided by order of time, possibly overlapping.

Depending on the list size limitation, the least probable communications on a given Analytics target period may not be provided.

## 

*4th CHANGE*

### 6.14.3 Output Analytics

The DN performance analytics is shown in table 6.14.3-1 and table 6.14.3-2.

Table 6.14.3-1: DN service performance statistics

|  |  |
| --- | --- |
| Information | Description |
| Application ID | Identifies the application for which analytics information is provided. |
| S-NSSAI | Identifies the Network Slice for which analytics information is provided. See note 1. |
| DNN | Identifies the data network name (e.g. "internet") for which analytics information is provided. See NOTE 1. |
| DN performance (0-x) | List of DN performances for the application. |
| > Application Server Instance Address | Identifies the Application Server Instance (IP address/FQDN of the Application Server). |
| > Serving anchor UPF info | The UPF ID/address/FQDN information for the involved anchor UPF. See NOTE 1. |
| > DNAI | Identifier of a user plane access to one or more DN(s) where applications are deployed as defined in TS 23.501 [2]. |
| > Performance | Performance indicators. |
| >> Average Traffic rate (NOTE 2) | Average traffic rate observed for UEs communicating with the application. |
| >> Maximum Traffic rate (NOTE 2) | Maximum traffic rate observed for UEs communicating with the application. |
| >> Average Packet Delay (NOTE 2) | Average packet delay observed for UEs communicating with the application. |
| >> Maximum Packet Delay (NOTE 2) | Maximum packet delay for observed for UEs communicating with the application. |
| >> Average Packet Loss Rate (NOTE 2) | Average packet loss observed for UEs communicating with the application. |
| > Spatial Validity Condition | Area where the DN performance analytics applies. |
| > Temporal Validity Condition | Validity period for the DN performance analytics. |
| NOTE 1: The item "Serving anchor UPF info" shall not be included if the consumer NF is an AF.  NOTE 2: Analytics subset that can be used in "list of analytics subsets that are requested", "Preferred level of accuracy per analytics subset" and "Reporting Thresholds". | |

Table 6.14.3-2: DN service performance predictions

|  |  |
| --- | --- |
| Information | Description |
| Application ID | Identifies the application for which analytics information is provided. |
| S-NSSAI | Identifies the Network Slice for which analytics information is provided. See NOTE 1. |
| DNN | Identifies the data network name (e.g. internet) for which analytics information is provided. See NOTE 1. |
| DN performance (0-x) | List of DN performance for the application. |
| > Application Server Instance Address | Identifies the Application Server Instance (IP address/FQDN of the Application Server). |
| > Serving anchor UPF info | The UPF ID/address/FQDN information for the involved anchor UPF. See NOTE 1. |
| > DNAI | Identifier of a user plane access to one or more DN(s) where applications are deployed as defined in TS 23.501 [2]. |
| > Performance | Performance indicators |
| >> Average Traffic rate (NOTE 2) | Average traffic rate predicted for UEs communicating with the application. |
| >> Maximum Traffic rate (NOTE 2) | Maximum traffic rate predicted for UEs communicating with the application. |
| >> Average Packet Delay (NOTE 2) | Average packet delay predicted for UEs communicating with the application. |
| >> Maximum Packet Delay (NOTE 2) | Maximum packet delay for predicted for UEs communicating with the application. |
| >> Average Packet Loss Rate (NOTE 2) | Average packet loss predicted for UEs communicating with the application. |
| > Spatial Validity Condition | Area where the DN performance analytics applies. |
| > Temporal Validity Condition | Validity period for the DN performance analytics. |
| > Confidence | Confidence of this prediction. |
| NOTE 1: The item "Serving anchor UPF info" shall not be included if the consumer is an AF.  NOTE 2: Analytics subset that can be used in "list of analytics subsets that are requested", "Preferred level of accuracy per analytics subset" and "Reporting Thresholds". | |

*END OF CHANGES*