**3GPP TSG-CT WG3 Meeting #138 *C3-246456***

**Orlando, US, 18 - 22 November, 2024 (Revision of C3-246268)**

|  |  |
| --- | --- |
| *CR-Form-v12.3* |  |
| **CHANGE REQUEST** |  |
|  |  |
|  | **29.522** | **CR** | **1448** | **rev** | **1** | **Current version:** | **19.0.0** |  |  |
|  |  |
| *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)*.* |  |
|  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Update TTC predictions in Relative Proximity Analytics Exposure |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | UAS\_Ph3 |  | ***Date:*** | 2024-11-06 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-19 |
|  | *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 canbe 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | SA2#165 agreed TS 23.288 CR 1241 (S2-2410859) added sub-predictions under Time To Collision for Collision space and Collision direction in the Output of Relative Proximity Analytics for UAS, hence needs to be updated accordingly in this TS. |
|  |  |
| ***Summary of change:*** | Update TTC predictions in Relative Proximity Analytics with new feature support. |
|  |  |
| ***Consequences if not approved:*** | Not supporting stage 2 requirement on adding sub-predictions under Time To Collision for Collision space and Collision direction in the Relative Proximity Analytics. |
|  |  |
| ***Clauses affected:*** | 5.6.3.3.4, 5.6.3.3.14, 5.6.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 23.288 CR 1241 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR does not impact the OpenAPI file. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

##### 5.6.3.3.4 Type: AnalyticsEventNotif

Table 5.6.3.3.4-1: Definition of type AnalyticsEventNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyEvent | AnalyticsEvent | M | 1 | Detected analytics event. |  |
| expiry | DateTime | O | 0..1 | Defines the expiration time after which the analytics information will become invalid. (NOTE 2) |  |
| timeStamp | DateTime | M | 1 | Time at which the event is observed. |  |
| failNotifyCode | NwdafFailureCode | C | 0..1 | Identifies the failure reason for the event notification.It shall only be included if the event notification is failed or the analytics information is not ready. (NOTE 1) | EneNA |
| rvWaitTime | DurationSec | O | 0..1 | Indicates a recommended time interval (in seconds) which is used to determine the time when analytics information is needed in similar future event subscriptions. It may only be included if the "failNotifyCode" attribute sets to "UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME". | EneNA |
| ueMobilityInfos | array(UeMobilityExposure) | C | 1..N | Contains the UE mobility information.Shall be present if the "analyEvent" attribute sets to "UE\_MOBILITY".(NOTE 7) | Ue\_Mobility |
| ueCommInfos | array(UeCommunication) | C | 1..N | Contains the application communication information.Shall be present if the "analyEvent" attribute sets to "UE\_COMM".(NOTE 5) (NOTE 7) | Ue\_Communication |
| abnormalInfos | array(AbnormalExposure) | C | 1..N | Contains the user's abnormal behavior information.Shall be present if the "analyEvent" attribute sets to "ABNORMAL\_BEHAVIOR".(NOTE 7) | Abnormal\_Behavior |
| congestInfos | array(CongestInfo) | C | 1..N | Contains the UE's user data congestion information.Shall be present if the "analyEvent" attribute sets to "CONGESTION".(NOTE 7) | Congestion |
| nwPerfInfos | array(NetworkPerfExposure) | C | 1..N | Contains the network performance information.Shall be present if the "analyEvent" attribute is set to "NETWORK\_PERFORMANCE".(NOTE 7) | Network\_Performance |
| qosSustainInfos | array(QosSustainabilityExposure) | C | 1..N | Contains the QoS sustainability information.Shall be present if the "analyEvent" attribute is set to "QOS\_SUSTAINABILITY".(NOTE 7) | QoS\_Sustainability |
| disperInfos | array(DispersionInfo) | C | 1..N | Contains the Dispersion information.Shall be present if the "analyEvent" attribute is set to "DISPERSION".(NOTE 7) | Dispersion |
| dnPerfInfos | array(DnPerfInfo) | C | 1..N | Contains the DN performance information.Shall be present if the "analyEvent" attribute is set to "DN\_PERFORMANCE".(NOTE 4) (NOTE 7) | DnPerformance |
| svcExps | array(ServiceExperienceInfo) | C | 1..N | Contains the service experience information.Shall be present if the "analyEvent" attribute is set to "SERVICE\_EXPERIENCE".(NOTE 7) (NOTE 8) | ServiceExperience |
| timeStampGen | DateTime | O | 0..1 | It defines the timestamp of analytics generation. | EneNA |
| start | DateTime | O | 0..1 | It defines the start time of which the analytics information will become valid. (NOTE 2) | EneNA |
| locArea | LocationArea5G | O | 0..1 | Identification of locationarea to which the notification applies within the subscribed location area.(NOTE 3) | Abnormal\_BehaviorExt\_eNADnPerformanceExt\_eNAServiceExperienceExt\_eNAUeCommunicationExt\_eNAE2eDataVolTransTimeNSLoad |
| dataVlTrnsTmIfs | array(E2eDataVolTransTimeInfo) | C | 1..N | E2E data volume transfer time information.Shall be present if the subscribed event is "E2E\_DATA\_VOL\_TRANS\_TIME".(NOTE 7) | E2eDataVolTransTime |
| accuInfo | AccuracyInfo | C | 0..1 | The analytics accuracy information. It shall be provided when accuracyReq was provided in the subscription request and the "cancelAccuInd" attribute is set to "false" or omitted. | AnalyticsAccuracy |
| cancelAccuInd | boolean | O | 0..1 | Indicates cancelled subscription of the analytics accuracy information.Set to "true" indicates the NWDAF cancelled subscription of analytics accuracy information as the NWDAF does not support the accuracy checking capability.Otherwise set to "false". Default value is "false" if omitted. | AnalyticsAccuracy |
| movBehavInfos | array(MovBehavInfo) | C | 1..N | The Movement Behaviour information.Shall be present if the "analyEvent" attribute is set to "MOVEMENT\_BEHAVIOUR".(NOTE 7) | MovementBehaviour |
| relProxInfos | array(RelProxInfo) | C | 1..N | The Relative Proximity information.Shall be present if the "analyEvent" attribute is set to "RELATIVE\_PROXIMITY". The "supis" attribute inside the RelProxInfo data type is not applicable in this API and only the "gpsis" attribute can be used.(NOTE 7) (NOTE 10) | RelativeProximity |
| wlanInfos | array(WlanPerformInfo) | C | 1..N | The WLAN performance related information.Shall be present if the "analyEvent" attribute is set to "WLAN\_PERFORMANCE".(NOTE 7) | WlanPerformance\_AIML |
| pauseInd | boolean | O | 0..1 | Pause analytics consumption indication applicable on analytics ID level. Set to "true" to indicate the consumer to stop the consumption of the analytics because the accuracy level needs to be increased.Default value is "false" if omitted. | AnalyticsAccuracy |
| resumeInd | boolean | O | 0..1 | Resume analytics consumption indication applicable on analytics ID level. Set to "true" to indicate the consumer to resume the consumption of the analytics because the accuracy has been improved.Default value is "false" if omitted. | AnalyticsAccuracy |
| nsiLoadLevelData | array(NsiLoadLevelInfo) | C | 1..N | Contains the network slice load level analytics information for each S-NSSAI.This attribute shall be present if the subscribed event is "NS\_LOAD\_LEVEL".(NOTE 6) (NOTE 7) | NSLoad |
| NOTE 1: The values of "BOTH\_STAT\_PRED\_NOT\_ALLOWED" of the NwdafFailureCode data type is not applicable for the "failNotifyCode" attribute. The value of "UNAVAILABLE\_DATA" of the NwdafFailureCode data type is applicable for the "failNotifyCode" attribute only when the "StatisticsFailure" feature is supported.NOTE 2: If the "start" attribute and the "expiry" attribute are both provided, the DateTime of the "expiry" attribute shall not be earlier than the DateTime of the "start" attribute.NOTE 3: The NetworkAreaInfo data type within the "locArea" attribute is not applicable for the untrusted AF unless the corresponding SLA is agreed between the operator and application provider. The NEF may translate the network area information (received from the NWDAF, e.g. for "ABNORMAL\_BEHAVIOR", "DN\_PERFORMANCE", "SERVICE\_EXPERIENCE", "UE\_COMM" or "NS\_LOAD\_LEVEL" event) to an external representation of the area, which is provided within the "locArea" attribute.NOTE 4: The "minTrafficRate", "aggTrafficRate", "varTrafficRate", "trafRateUeIds", "avePacketDelay", "maxPacketDelay", "varPacketDelay", "packDelayUeIds", "maxPacketLossRate", "varPacketLossRate" and "packetLossUeIds" attribute(s) within the DnPerfInfo data type is applicable only if the "DnPerformanceExt\_AIML" feature is supported.NOTE 5: If the "UeMobilityExt\_eNA" feature is supported and the "locGranularity" attribute value "LON\_AND\_LAT\_LEVEL" is subscribed, the "geoLoc" attribute within the "UeMobility" type may be provided to report the geographical location (longitude and latitude level).NOTE 6: When the "NSLoad" feature is supported, the "nsiId" attribute and NSI related analytics information within the NsiLoadLevelInfo data structure is not applicable for the "NS\_LOAD\_LEVEL" event within each array element of this attribute. NOTE 7: If the "AnalyticsAccuracy" feature is supported and the notification is only for notifying about the accuracy information of subscribed events, this attribute is not required to be included even if the respective event was subscribed.NOTE 8: The "geoLoc" attribute within the ServiceExperienceInfo data type is applicable only if the "ServiceExperienceExt\_eNA" feature is supported.NOTE 10: The attributes for time to collision within the "ttcInfo" attribute supported by the "RelativeProximityExt" feature may be provided only when the "RelativeProximityExt" feature is supported. |

\*\*\* 2nd Change \*\*\*

##### 5.6.3.3.14 Type AnalyticsData

Table 5.6.3.3.14-1: Definition of type AnalyticsData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| start | DateTime | O | 0..1 | It defines the start time of which the analytics information will become valid. (NOTE 1) | EneNA |
| expiry | DateTime | O | 0..1 | Defines the expiration time after which the analytics information will become invalid. (NOTE 1) |  |
| timeStampGen | DateTime | O | 0..1 | It defines the timestamp of analytics generation. | EneNA |
| ueMobilityInfos | array(UeMobilityExposure) | C | 1..N | Contains the UE mobility information.Shall be present if the "analyEvent" attribute sets to "UE\_MOBILITY".(NOTE 4) | Ue\_Mobility |
| ueCommInfos | array(UeCommunication) | C | 1..N | Contains the application communication information.Shall be present if the "analyEvent" attribute sets to "UE\_COMM" | Ue\_Communication |
| nwPerfInfos | array(NetworkPerfExposure) | C | 1..N | Contains the network performance information.Shall be present if the "analyEvent" attribute is set to "NETWORK\_PERFORMANCE". | Network\_Performance |
| abnormalInfos | array(AbnormalExposure) | C | 1..N | Contains the user's abnormal behavior information.Shall be present if the "analyEvent" attribute sets to "ABNORMAL\_BEHAVIOR". | Abnormal\_Behavior |
| congestInfos | array(CongestInfo) | C | 1..N | Contains the UE's user data congestion information.Shall be present if the "analyEvent" attribute sets to "CONGESTION". | Congestion |
| dataVlTrnsTmInfos | array(E2eDataVolTransTimeInfo) | C | 1..N | Contains the E2E data volume transfer time information.Shall be present if the "analyEvent" attribute is set to "E2E\_DATA\_VOL\_TRANS\_TIME". | E2eDataVolTransTime |
| qosSustainInfos | array(QosSustainabilityExposure) | C | 1..N | Contains the QoS sustainability information.Shall be present if the "analyEvent" attribute is set to "QOS\_SUSTAINABILITY".(NOTE 2) | QoS\_SustainabilityE2eDataVolTransTime |
| disperInfos | array(DispersionInfo) | C | 1..N | Contains the Dispersion information.Shall be present if the "analyEvent" attribute is set to "DISPERSION". | Dispersion |
| dnPerfInfos | array(DnPerfInfo) | C | 1..N | Contains the DN performance information.Shall be present if the "analyEvent" attribute is set to "DN\_PERFORMANCE".(NOTE 3) | DnPerformance |
| movBehavInfos | array(MovBehavInfo) | C | 1..N | The Movement Behaviour information.Shall be present if the "analyEvent" attribute is set to "MOVEMENT\_BEHAVIOUR". | MovementBehaviour |
| relProxInfos | array(RelProxInfo) | C | 1..N | The Relative Proximity information.Shall be present if the "analyEvent" attribute is set to "RELATIVE\_PROXIMITY".(NOTE 6) | RelativeProximity |
| svcExps | array(ServiceExperienceInfo) | C | 1..N | Contains the service experience information.Shall be present if the "analyEvent" attribute is set to "SERVICE\_EXPERIENCE". | ServiceExperience |
| wlanInfos | array(WlanPerformInfo) | C | 1..N | The WLAN performance related information.Shall be present if the "analyEvent" attribute is set to "WLAN\_PERFORMANCE". | WlanPerformance\_AIML |
| accuInfo | AccuracyInfo | C | 0..1 | The analytics accuracy information. It shall be provided when accuracyReq was provided in the request and the "cancelAccuInd" attribute is set to "false" or omitted. | AnalyticsAccuracy |
| cancelAccuInd | boolean | O | 0..1 | Indicates cancelled request of the analytics accuracy information.Set to "true" indicates the NWDAF cancelled request of analytics accuracy information as the NWDAF does not support the accuracy checking capability.Otherwise set to "false". Default value is "false" if omitted. | AnalyticsAccuracy |
| suppFeat | SupportedFeatures | M | 1 | Represents the features supported by both the AF and the NEF. |  |
| NOTE 1: If the "start" attribute and the "expiry" attribute are both provided, the DateTime of the "expiry" attribute shall not be earlier than the DateTime of the "start" attribute.NOTE 2: The "qosFlowRetThd" and "ranUeThrouThd" attributes in QosSustainabilityExposure data type are not applicable.NOTE 3: The "minTrafficRate", "aggTrafficRate", "varTrafficRate", "trafRateUeIds", "avePacketDelay", "maxPacketDelay", "varPacketDelay", "packDelayUeIds", "maxPacketLossRate", "varPacketLossRate" and "packetLossUeIds" attribute(s) within the DnPerfInfo data type is applicable only if the "DnPerformanceExt\_AIML” feature is supported.NOTE 4: If the "UeMobilityExt\_eNA" feature is supported and the "locGranularity" attribute value "LON\_AND\_LAT\_LEVEL" is requested, the "geoLoc" attribute within the "UeMobility" type may be provided to report the geographical location (longitude and latitude level).NOTE 6: The attributes for time to collision within the "ttcInfo" attribute supported by the "RelativeProximityExt" feature may be provided only when the "RelativeProximityExt" feature is supported.. |

\*\*\* 3rd Change \*\*\*

### 5.6.4 Used Features

The table below defines the features applicable to the AnalyticsExposure API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

Table 5.6.4-1: Features used by AnalyticsExposure API

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | Ue\_Mobility | This feature indicates support for the analytics event related to UE mobility. |
| 2 | Ue\_Communication | This feature indicates support for the analytics event related to UE communication information. |
| 3 | Abnormal\_Behavior | This feature indicates support for the analytics event related to UE's abnormal behaviour. |
| 4 | Congestion | This feature indicates support for the analytics event related to UE's user data congestion information. |
| 5 | Network\_Performance | This feature indicates support for the analytics event related to network performance. |
| 6 | QoS\_Sustainability | This feature indicates support for the analytics event related to QoS sustainability. |
| 7 | Notification\_websocket | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification\_test\_event feature is also supported. |
| 8 | Notification\_test\_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4]. |
| 9 | Dispersion | This feature indicates support for the analytics event related to Dispersion analytics. |
| 10 | EneNA | This feature indicates support for the enhancements of network data analytics requirements. |
| 11 | DnPerformance | This feature indicates the support of the analytics event related to DN performance. |
| 12 | ServiceExperience | This feature indicates support for the event related to service experience. |
| 13 | CongestionExt | This feature indicates support for the extensions to the event related to user data congestion, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature Congestion. |
| 14 | Abnormal\_Behavior\_Ext | This feature indicates support for the extensions to the event related to abnormal behavior, including support of exposing DNN and S-NSSAI information.Supporting this feature also requires the support of feature Abnormal\_Behavior. |
| 15 | QoS\_Sustainability\_Ext | This feature indicates support for the extensions to the event related to QoS sustainability, including support of exposing S-NSSAI information.Supporting this feature also requires the support of feature QoS\_Sustainability. |
| 16 | TermRequest | This feature indicates support for Analytics Exposure Subscription termination requests sent by the NEF to the NF service consumer. |
| 17 | QoS\_SustainabilityExt\_eNA | This feature indicates support for the extensions related to eNA to the event related to QoS sustainability, including support of exposing S-NSSAI information.Supporting this feature also requires the support of feature QoS\_Sustainability. |
| 18 | ServiceExperienceExt\_eNA | This feature indicates support for the extensions to the event related to service experience supporting eNA, including support for DNN, S-NSSAI, Location Area, PDU Session parameters information for service experience analytics. Supporting this feature also requires the support of feature ServiceExperience. |
| 19 | Abnormal\_BehaviorExt\_eNA | This feature indicates support for the extensions to the event related to abnormal behavior related to eNA, including support of exposing DNN and S-NSSAI information.Supporting this feature also requires the support of feature Abnormal\_Behavior. |
| 20 | CongestionExt\_eNA | This feature indicates support for the extensions to the event related to user data congestion related to eNA, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature Congestion. |
| 21 | DispersionExt\_eNA | This feature indicates support for the extensions associated with analytics event related to Dispersion analytics. Supporting this feature also requires the support of feature Congestion. |
| 22 | DnPerformanceExt\_eNA | This feature indicates the support of the analytics event related to DN performance. Supporting this feature also requires the support of feature DnPerformance. |
| 23 | UeCommunicationExt\_eNA | This feature indicates the support of the analytics event related to UE communication related to eNA. Supporting this feature also requires the support of feature Ue\_Communication. |
| 24 | Ue\_MobilityExt\_eNA | This feature indicates the support of the analytics event related to UE Mobility supporting eNA, including ordering criterion and preferred granularity of location. Supporting this feature also requires the support of feature Ue\_Mobility. |
| 25 | DnPerformanceExt\_AIML | This feature indicates support for extensions to the event related to DN Performance supporting AIML, including support of extended DN Performance Analytics for group of UEs. Supporting this feature also requires the support of feature DnPerformance. |
| 26 | UeMobilityExt\_AIML | This feature indicates support for further extensions to the event related to UE mobility supporting AIML, including support of UE’s geographical distribution and direction analytics. Supporting this feature also requires the support of feature UeMobility. |
| 27 | NetworkPerformanceExt\_AIML | This feature indicates support of the network performance enhancements for AI/ML-based Services. Within this feature the following enhacements are covered:- support of providing gNB resource usage for GBR traffic and Delay-critical GBR traffic.Supporting this feature also requires the support of Network\_Performance feature. |
| 28 | E2eDataVolTransTime | This feature indicates support for E2E data volume transfer time analytics |
| 29 | ENAExt | This feature indicates support for the general enhancements of analytics exposure requirements, including support for use case context sent by the NF service consumer to the NEF. |
| 30 | NetworkPerfExt\_eNA | This feature indicates support for the enhancements of network performance. Within this feature the following enhacements are covered:- support of providing target period subset in the analytics.Supporting this feature also requires the support of Network\_Performance feature. |
| 31 | MovementBehaviour | This feature indicates support for the Movement Behaviour information. |
| 32 | WlanPerformance\_AIML | This feature indicates support for the WLAN Performance information supporting AIML. |
| 33 | NSLoad | This feature indicates the support of Network Slice load level information reporting subscription/notification functionality as part of the support of network slice capability exposure application layer framework.The following functionalities are supported:- support to subscribe and get notified of Network Slice load level analytics information. |
| 34 | AnalyticsAccuracy | This feature indicates support for the Analytics Accuracy information. |
| 35 | RelativeProximity | This feature indicates support for the Relative Proximity analytics. |
| 36 | StatisticsFailure | This feature indicates support for partial failure report for statistics during event notification.This feature requires the support of the "EneNA" feature. |
| 37 | RoamingAnalytics | This feature indicates support for forwarding errors related to roaming analytics. |
| 39 | RelativeProximityExt | This feature indicates support for the enhancements of Relative Proximity Analytics in Rel-19.The following functionalities are supported:- Support enhancement of TTC prediction in Relative Proximity Analytics.Supporting this feature also requires the support of RelativeProximity feature. |

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