**3GPP TSG-SA5 Meeting #155 *S5-242602***

**Jeju, South Korea, 27 - 31 May 2024**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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 | **X** | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Rel-17 TS 28.104 Generalize issue identifier | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | | 2024-05-13 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | The analytics output of a number of Data definitions for MDA capabilities have an identifier to identify an issue related to the MDA capability. The attribute is calledproblemId, issueId or XXXIssueId. The use of the issueIdentifier is not consistent either all issues are identified with an issueId as part of the capability or all are identified with capability name (XXX) attached to the issueId or problemId. Since the issueId is a local indentfier within the MDA capability is proposed to use a more generic name like issueId with a generic description. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 8.4.1.1 Coverage related analytics  8.4.2.1 Service experience analysis  8.4.2.2 Network slice throughput analysis  8.4.2.4 E2E latency analysis  8.4.2.5 Network slice load analysis  8.4.3.1 MDA assisted failure prediction  8.4.5.1 Mobility performance analysis  For each of the above clauses the problemId and the named issueId including XXXIssueId are replaced with “issueId” and the description is replaced by the following description “The issueId holds the identifier of the capability for which the output is reported.”  The type for “mobility performance analysis issueId” has been changed to string to be aligned with other issueId’s. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The use too many parameters with same meaning but different names places unnecessary requirements and may lead to mistakes that could have been prevented. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | No stage 3 impacts | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**First change**

### 8.4.1 Coverage related analytics

#### 8.4.1.1 Coverage problem analysis

##### 8.4.1.1.1 MDA type

The MDA type for coverage problem analysis is: CoverageAnalytics.CoverageProblemAnalysis.

##### 8.4.1.1.2 Enabling data

The enabling data for CoverageAnalytics.CoverageProblemAnalysis MDA type are provided in table 8.4.1.1.2-1.

For general information about enabling data, see clause 8.2.1.

Table 8.4.1.1.2-1: Enabling data for coverage problem analysis

| Data category | Description | References |
| --- | --- | --- |
| Performance measurements | SS-RSRP distribution per SSB (beam) of serving NR cell | SS-RSRP distribution per SSB (clause 5.1.1.22.1 of TS 28.552 [4]). |
| SS-RSRP distribution per SSB (beam) of neighbor NR cell | SS-RSRP distribution per SSB of neighbor NR cell (clause 5.1.1.22.2 of TS 28.552 [4]) |
| RSRP distribution of neighbor E-UTRA cell for an NR cell | RSRP distribution per neighbor E‑UTRAN cell (clause 5.1.1.22.3 of TS 28.552 [4]) |
| Power headroom distribution for NR cell | Type 1 power headroom distribution (clause 5.1.1.26.1 of TS 28.552 [4]). |
| Wideband CQI distribution for NR cell | Wideband CQI distribution (clause 5.1.1.11.1 of TS 28.552 [4]). |
| Timing Advance distribution for NR cell | Timing Advance distribution for NR Cell (clause 5.1.1.33.1 of TS 28.552 [4]) |
| Number of UE Context Release Request (gNB-DU initiated) | Number of UE Context Release Request (gNB-DU initiated) (clause 5.1.3.5.1 of TS 28.552 [4]). |
| Number of UE Context Release Request per SSB (gNB-DU initiated) | Number of UE Context Release Request (gNB-DU initiated) (clause 5.1.3.5.1 of TS 28.552 [4]). |
| Number of UE Context Release Requests (gNB-CU initiated) | Number of UE Context Release Request (gNB-CU initiated) (clause 5.1.3.5.2 of TS 28.552 [4]). |
| Number of UE Context Release Requests per SSB (gNB-CU initiated) | Number of UE Context Release Request (gNB-CU initiated) (clause 5.1.3.5.2 of TS 28.552 [4]). |
| RSRP related measurements for ng-eNB | RSRP related measurements (clause 6.1 of TS 32.425 [12]). |
| UE power headroom related measurements for ng-eNB | UE power headroom related measurements (clause 6.3 of TS 32.425 [12]). |
| Wideband CQI distribution for ng-eNB | Wideband CQI distribution (clause 4.10.1.1 of TS 32.425 [12]). |
| Average sub-band CQI for ng-eNB | Average sub-band CQI (clause 4.10.1.2 of TS 32.425 [12]). |
| UE Rx - Tx time difference related measurements for ng-eNB | UE Rx - Tx time difference related measurements (clause 6.4 of TS 32.425 [12]). |
| AOA related measurements for ng-eNB | AOA related measurements (clause 6.5 of TS 32.425 [12]). |
| Timing Advance distribution for ng-eNB | Timing Advance Distribution (clause 4.10.2 of TS 32.425 [12]). |
| Number of UE CONTEXT Release Request initiated by ng-eNodeB | Number of UE CONTEXT Release Request initiated by eNodeB/RN (clause 4.1.5.1 of TS 32.425 [12]). |
| MDT reports | MDT reports containing RSRPs of the serving cell and neighbour cells, and UE location. | RSRPs and UE location of M1 measurements for NR in TS 32.422 [6] and TS 32.423 [7]. |
| RLF reports | RLF reports containing RSRPs of the last serving cell and neighbour cells, and UE location. | RLF data collection and RLF reporting in TS 32.422 [6], and rlf-Report-r16 in TS 38.331 [13]. |
| RCEF reports | RCEF reports containing RSRPs of NR cell where the RRC connection establishment failed and neighbour cells, and UE location. | RCEF data collection and RCEF reporting in TS 32.422 [6], and ConnEstFailReport-r16 in TS 38.331 [13]. |
| UE location reports | UE location information provided by the LMF services which can be used to correlate with the MDT reports. | The UE location information provided by LMF via service-based interface (see TS 23.273 [14]). |
| Geographical data | The geographical information (longitude, latitude, altitude) of the deployed RAN (NG-RAN and E-UTRAN). | The geographical information (longitude, latitude, altitude) information (see the peeParametersList attribute of the ManagedFunction IOC in TS 28.622 [19]). |
| Configuration data | The NRMs containing the attributes affecting the coverage for (NG-RAN and E-UTRAN). | NRCellDU IOC, NRSectorCarrier IOC, BWP IOC, CommonBeamformingFunction IOC, and Beam IOC in TS 28.541 [15];  EUtranGenericCell IOC in TS 28.658 [16];  SectorEquipmentFunction IOC, AntennaFunction IOC, and TMAFunction IOC in TS 28.662 [17]. |

##### 8.4.1.1.3 Analytics output

The specific information elements of the analytics output for coverage problem analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.1.1.3-1.

Table 8.4.1.1.3-1: Analytics output for coverage problem analysis

| Information element | Definition | Support qualifier | Properties |
| --- | --- | --- | --- |
| issueId | The issueId holds the identifier of the capability for which the output is reported. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| coverageProblemType | Indication of type of the coverage Problem.  The allowed value is one of the enumerated values: WeakCoverage, CoverageHole, PilotPollution, Overshoot coverage, DlUlChannelCoverageMismatch, Other. | M | type: enumeration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| coverageProblemAreas | Geographical location areas where the coverage problem occurred. | O | type: GeoArea (see TS 28.622 [19])  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| problematicCells | The CGIs of cells where the coverage problem occurred. | M | type: Integer  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| recommendedActions | The recommended actions to solve the coverage problem.  The recommended action may be (but not limited to):  - creation of new beam(s), or cell(s);  - change the transmission power of the NR sector carrier;  - delete some unwanted beam(s) or cell(s). | M | type: RecommendedAction  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| radioEnvironmentMap | The graphical description of the observed radio coverage characteristics. The graphic may be for the RSRP or SINR of the selected cluster of cells mapped against the physical geographical information (longitude, latitude, altitude) of the area where the RAN (NG-RAN and E-UTRAN) cells are deployed.  It is a list of paired tuples of geographical information (longitude, latitude, altitude) and coverage (RSRP or SINR) values. | O | type: List  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| cellConfigurations | The cell configurations for a new cell or reconfigurations of existing cells derived based on the characteristics in the radioEnvironmentMap.  The cell configurations are the changes to the NRMs attributes affecting the cell coverage (NG-RAN and E-UTRAN). | O | type: may differ as defined in  NRCellDU IOC, NRSectorCarrier IOC, BWP IOC, CommonBeamformingFunction IOC, and Beam IOC in TS 28.541 [15]; EUtranGenericCell IOC in TS 28.658 [16];  SectorEquipmentFunction IOC, AntennaFunction IOC, and  TMAFunction IOC in TS 28.662 [17].  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

#### 8.4.1.2 Paging Optimization

##### 8.4.1.2.1 MDA type

The MDA type for Capability-Paging Optimization: CoverageAnalytics.PagingOptimization.

##### 8.4.1.2.2 Enabling data

The enabling data for paging optimization are provided in table 8.4.1.2.2-1.

Table 8.4.1.2.2-1: Enabling data for Paging Optimization Analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| MDT reports | MDT reports indicating UE location information | MDT measurements defined in TS 32.422 [6] and TS 32.423 [7]. |
| Performance measurements | Measurement for 5G Paging from AMF | See clause 5.2.5.2 in TS 28.552 [4]. |

##### 8.4.1.2.3 Analytics output

The specific information elements of the analytics output for paging optimization, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.1.2.3-1.

**Table 8.4.1.2.3-1: Analytics output for paging optimization analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| oOCDuration | This specify the time window during which UE is out-of-coverage. | M | type: ProjectionDuration  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| oOCLocation | This specifies the last known location of the UEs before it goes out-of-coverage. This would be within the area indicated by the "areaScope" of the MDA request. | CM | type: GeoCoordinate  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| oOCMap | This specifies the geographical region within which the paging issues are experienced by a group of UEs. This would be within the area indicated by the "areaScope" of the MDA request. | CM | type: GeoArea (see TS 28.622 [19])  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

**Second change**

#### 8.4.2.1 Service experience analysis

##### 8.4.2.1.1 MDA type

The MDA type for Capability-Service experience analysis is: SLSAnalysis.ServiceExperienceAnalysis.

##### 8.4.2.1.2 Enabling data

The enabling data for SLSAnalysis.ServiceExperienceAnalysis MDA type are provided in table 8.4.2.1.2-1.

Table 8.4.2.1.2-1: Enabling data for service experience analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | Average e2e uplink/downlink delay for a network slice | Average e2e uplink/downlink delay for a network slice (in clause 6.3.1.8 in TS 28.554 [5]). |
| Integrated uplink/downlink delay in RAN | Integrated downlink delay in RAN (clause 6.3.1.2 in TS 28.554 [5]); Integrated uplink delay in RAN (clause 6.3.1.7 in TS 28.554 [5]). |
| Round-trip packet delay | Round-trip packet delay between PSA UPF and NG‑RAN (clause 5.4.8 in TS 28.552 [4]). |
| UL/DL throughput for network and Network Slice Instance | Upstream throughput for network and Network Slice Instance (clause 6.3.2 in TS 28.554 [5]); Downstream throughput for Single Network Slice Instance (clause 6.3.3 in TS 28.554 [5]). |
| RAN UE Throughput | RAN UE Throughput (clause 6.3.6 in TS 28.554 [5]) |
| Throughput at N3 interface | Upstream Throughput at N3 interface (clause 6.3.4 in TS28.554 [5]); Downstream Throughput at N3 interface (clause 6.3.5 in TS28.554 [5]). |
| QoE Data | The QoE data of the different services | QoE data (TS 26.247 [22] and TS 26.114 [23] can be acquired through the procedures defined in TS 28.405 [8]). |

##### 8.4.2.1.3 Analytics output

The specific information elements of the analytics output for service experience analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.1.3-1.

Table 8.4.2.1.3-1: Analytics output for Service experience analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| issueId | The issueId holds the identifier of the capability for which the output is reported.. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| serviceInformation | This field include the service information related to this analysis such as service name.  See NOTE 1. | O | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| serviceExperienceIssueType | Indication of the service experience issue type.  The allowed value is one of the enumerated values:  - RAN issue;  - CN issue;  - both | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| affectedObjects | The managed object instances where the service experience is applicable, e.g. SubNetwork Instance, NetworkSlice Instance, NetworkSlice subnetwork Instance. The subset values of this field may be different due to cross domain management and domain management. | O | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| serviceExperienceStatistics | The statistics of the level of service experience for a service in a certain time period, e.g. there are five levels which are represented by 1, 2, 3, 4, 5 where level 1 represents the users are enduring bad experience while level 5 represents the users' requirements are perfectly satisfied. | O | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| serviceExperiencePredictions | The predictions of the level of service experience for a service in a certain time period. | O | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| NOTE 1: This field of serviceInformation is used for MDA MnS producer to include the names of e2e services (e.g., browsring, video streaming etc.) and detail information (specific information of an e2e service). | | | |

**Third change**

#### 8.4.2.2 Network slice throughput analysis

##### 8.4.2.2.1 MDA type

The MDA type for Capability-Network slice throughput analysis is: SLSAnalysis.NetworkSliceThroughputAnalysis.

##### 8.4.2.2.2 Enabling data

The enabling data for SLSAnalysis.NetworkSliceThroughputAnalysis MDA type are provided in table 8.4.2.2.2-1.

**Table 8.4.2.2.2-1: Enabling data for network slice throughput analysis**

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | UL/DL throughput for network and Network Slice Instance | Upstream throughput for network and Network Slice Instance as defined in clause 6.3.2 in TS 28.554 [5]; Downstream throughput for Single Network Slice Instance as defined in clause 6.3.3 in TS 28.554 [5]. |
| RAN UE Throughput | RAN UE Throughput as defined in clause 6.3.6 in TS 28.554 [5]. |
| Throughput at N3 interface | Upstream Throughput at N3 interface as defined in clause 6.3.4 in TS 28.554 [5]; Downstream Throughput at N3 interface as defined in clause 6.3.5 in TS 28.554 [5]. |

##### 8.4.2.2.3 Analytics output

The specific information elements of the analytics output for network slice throughput analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.2.3-1.

Table 8.4.2.2.3-1: Analytics output for network slice throughput analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| issueId | The issueId holds the identifier of the capability for which the output is reported. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputIssueType | Indication of the network slice throughput issue type  The allowed value is one of the enumerated values: None, RAN issue, CN issue, both | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputUserStatistics | The statistics of the UL and/or DL network slice throughput in a certain time period. The value indicates  the average percentage of users, for which the required SLS throughput is met.  Allowed values: 0 to 100 | O | type: integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputTimeStatistics | The statistics of the UL and/or DL network slice throughput in a certain time period. The value indicates the  average percentage of time, during which the required SLS throughput is met.  Allowed values: 0 to 100 | O | type: integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputUserPredictions | The predictions of the UL and/or DL network slice throughput in a certain time period. The value indicates the average percentage of users, for which the required SLS throughput is predicted to be met.  Allowed values: 0 to 100 | O | type: integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceThroughputTimePredictions | The predictions of the UL and/or DL network slice throughput in a certain time period. The value indicates the average percentage of time, during which the required SLS throughput is predicted to be met.  Allowed values: 0 to 100 | O | type: integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |

**Fourth change**

#### 8.4.2.4 E2E latency analysis

##### 8.4.2.4.1 MDA type

The MDA type for Capability-E2E latency analysis is: SLSAnalysis.E2ElatencyAnalysis.

##### 8.4.2.4.2 Enabling data

The enabling data for SLSAnalysis.E2ElatencyAnalysis MDA type are provided in table 8.4.2.4.2-1.

Table 8.4.2.4.2-1: Enabling data for E2E latency analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | Average e2e UL/DL delay for a network slice | Average e2e uplink delay for a network slice (clause 6.3.1.8.1 in TS 28.554 [5]); Average e2e downlink delay for a network slice (clause 6.3.1.8.2 in TS 28.554 [5]). |
| Integrated uplink/downlink delay in RAN | Integrated downlink delay in RAN (clause 6.3.1.2 in TS 28.554 [5]); Integrated uplink delay in RAN (clause 6.3.1.7 in TS 28.554 [5]). |
| Round-trip Packet Delay | Round-trip packet delay between PSA UPF and NG-RAN (clause 5.4.8 TS 28.552 [4]). |

##### 8.4.2.4.3 Analytics output

The specific information elements of the analytics output for E2E latency analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.4.3-1.

**Table 8.4.2.4.3-1: Analytics output for E2E latency analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| issueId | The issueId holds the identifier of the capability for which the output is reported. | M | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| e2ELatencyIssueType | Indication the type of the E2E latency issue.  The allowed value is one of the enumerated values: RAN latency issue, CN latency issue | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| affectedObjects | The managed object instances of subnetwork, managed elements or network slices where the latency issue happens | O | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

**Fifth change**

#### 8.4.2.5 Network slice load analysis

##### 8.4.2.5.1 MDA type

The MDA type for Capability- Network slice load analysis is: SLSAnalysis.NetworkSliceLoadAnalysis.

##### 8.4.2.5.2 Enabling data

The enabling data for SLSAnalysis.NetworkSliceLoadAnalysis MDA type are provided in table 8.4.2.5.2-1.

Table 8.4.2.5.2-1: Enabling data for network slice load analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | Number of PDU sessions of network slice | Mean number of PDU sessions of network and network Slice Instance (clause 6.4.1 in TS 28.554 [5]). |
| Number of PDU Sessions successfully setup | Number of PDU Sessions successfully setup (clause 5.1.1.5 in TS28.552 [4]). |
| Mean Number of PDU sessions | Number of PDU sessions(Mean) (clause 5.3.1.1 in TS 28.552 [4]). |
| Network Data Analytics | Analysis results from the control plane produced by NWDAF | Analytics data from NWDAF in TS 23.288 [10] including e.g. Slice load level related network data analytics clause 6.3, and the analytics for user plane performance (i.e. average/maximum traffic rate, average/maximum packet delay, average packet loss rate in clause 6.14. |
| Configuration data | MOIs of the cells, NW slice/NW slice subnet, 5GC NFs | NRM information TS 28.541 [15]. |

##### 8.4.2.5.3 Analytics output

The specific information elements of the analytics output for network slice load analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.2.5.3-1.

Table 8.4.2.5.3-1: Analytics output for network slice load analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| issueId | The issueId holds the identifier of the capability for which the output is reported. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceLoadIssueDomain | Indicates the domain of the network slice instance load issue  The allowed value is one of the enumerated values:  - RAN issue;  - CN issue | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceLoadIssuePhase | Indicates the phase of the network slice instance load issue  The allowed value is one of the enumerated values: historic network slice load issue, ongoing network slice load issue, potential network slice load issue | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| networkSliceLoadIssueType | Indicates the type of the network slice instance load issue  The allowed value is one of the enumerated values: overload network slice load issue, underutilized network slice load issue | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| affectedObjects | The managed object instances involved in the network slice instance load problem | O | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| networkSliceLoadDistribution | Describes the detailed load distribution or predictive distribution, e.g. load distribution for a network slice instance at a certain location or in a certain time period | O | type: Integer  multiplicity: \*  isOrdered: True  isUnique: False  defaultValue: None  isNullable: False |

**Sixth change**

#### 8.4.3.1 MDA assisted failure prediction

##### 8.4.3.1.1 MDA type

The MDA type for failure prediction analysis is: MDAAssistedFaultManagement.FailurePrediction.

##### 8.4.3.1.2 Enabling data

The enabling data for MDAAssistedFaultManagement.FailurePrediction MDA type are provided in table 8.4.3.1.2-1.

For general information about enabling data, see clause 8.2.1.

Table 8.4.3.1.2-1: Enabling data for fault prediction analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | The deteriorated performance or the abnormal performance measurements based on certain performance monitoring threshold.  3GPP management system may monitor a set of performance measurements and their thresholds, so as to support the analytics of prediction of a network service failure. | The performance measurements as defined in TS 28.552 [4] |
| Alarm notifications | Alarm information, e.g. the alarm notification of network functions. | Alarm information and notifications as per TS 28.532 [11] |
| Configuration data | MOIs of the cells and 5GC NFs. | TS 28.541 [15] |
| Network analytics data | The control plane analysis result from the NWDAF, e.g. observed service experience related network data analytics. | TS 23.288 [10] |

##### 8.4.3.1.3 Analytics output

The specific information elements of the analytics output for failure prediction and service failure recovery analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.3.1.3-1.

Table 8.4.3.1.3-1: Analytics output for fault prediction analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| failurePredictionObject | Indication of NR cells or NFs where the failure related issues occurred or potentially occur. | M | type: DN  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| potentialFailureType | Indication of type of issues that can cause the failures.  NOTE 1: The values can be defined as a list of example values: "Operational Violation", "Physical Violation" and "Time Domain Violation". See alarmType described in TS 28.532 [11]. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| eventTime | This field holds the time of potential failure predicted.  Examples: "20:15:00", "20:15:00-08:00" (for 8 hours behind UTC). | M | type: DateTime  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| issueId | The issueId holds the identifier of the capability for which the output is reported. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| perceivedSeverity | This field holds the value to indicate relative level of urgency for operator attention.  NOTE 2: The value can be Critical, Major, Minor, Warning, Indeterminate, Cleared, see Recommendation ITU-T X.733 [27]. | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| recommendedActions | This field holds the recommended actions to failure prevention and recovery.  The recommended action may be (but not limited to):  Update 5GC NF (e.g., AMF and SMF) profile | O | type: RecommendedAction  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

**Seventh change**

#### 8.4.5.1 Mobility performance analysis

##### 8.4.5.1.1 MDA type

The MDA type for mobility performance analysis is: MobilityManagementAnalytics.MobilityPerformanceAnalysis.

##### 8.4.5.1.2 Enabling data

The enabling data for MobilityManagementAnalytics.MobilityPerformanceAnalysis MDA type are provided in table 8.4.5.1.2-1.

For general information about enabling data, see clause 8.2.1.

Table 8.4.5.1.2-1: Enabling data for mobility performance analysis

|  |  |  |
| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | Inter-gNB handovers | Inter-gNB handovers (clause 5.1.1.6.1 of TS 28.552 [4]). |
| Intra-gNB handovers | Inter-gNB handovers (clause 5.1.1.6.4 of TS 28.552 [4]). |
| Inter-gNB DAPS handovers | Inter-gNB handovers (clause 5.1.1.6.2 of TS 28.552 [4]). |
| Intra-gNB DAPS handovers | Inter-gNB handovers (clause 5.1.1.6.3 of TS 28.552 [4]). |
| Inter-gNB conditional handovers | Inter-gNB handovers (clause 5.1.1.6.6 of TS 28.552 [4]). |
| Intra-gNB conditional handovers | Inter-gNB handovers (clause 5.1.1.6.7 of TS 28.552 [4]). |

##### 8.4.5.1.3 Analytics output

The specific information elements of the analytics output (MDA report) for mobility performance analysis, in addition to the common information elements of the analytics outputs (see clause 8.3), are provided in table 8.4.5.1.3‑1.

Table 8.4.5.1.3-1: Analytics output for Mobility Performance analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Information element | Definition | Support qualifier | Properties |
| IssueId | The issueId holds the identifier of the capability for which the output is reported. | M | type: string  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| mobilityPerformance IssueRootCause | The root cause of mobility performance issues.  The allowed value is one of the enumerated values: too long mobility interruption time, poor coverage of the cell-edge, inappropriate handover parameters, other. | M | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| mobilityPerformance IssueLocation | Geographical location areas where the mobility performance issue occurred. | O | type: GeoArea (see TS 28.622 [19])  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

**End of changes**