**3GPP TSG-SA5 Meeting #155S5-243081**

**Jeju, South Korea, 27 - 31 May 2024** revision of S5-242496

**Source: Nokia, Nokia Shanghai Bell**

**Title: TR28.866 pCR add NF Scaling & dimensioning and threshold assessment use case in MDA management data correlation analytics**

**Agenda Item: 6.19.2**

**Document for: Approval**

# 1 Decision/action requested

***The group is asked to discuss and agree on the proposal.***

# 2 References

[1] 3GPP TR 28.866-000 “Study on Management Data Analytics (MDA) – Phase 3”.

# 3 Rationale

The data from different aspects of the network are correlated, that in many cases real analytics value comes from leveraging the correlation among the data. This pCR is to add an MDA use cases on correlation of data for different uses and from different sources.

# 4 Detailed proposal

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| **1st Change** |

## 5.3 Data correlation analytics

### 5.3.1 Description

This MDA capability is for data correlation analytics on network, computing and slice resources across different aspects consisting of network domains(RAN/ core/ transport), resource domain (network and cloud) and slice / slice subnet aspects.

### 5.3.2 Use case 1: Measurement data correlation analytics for ML training

#### 5.3.2.1 Description

For a ML model training, a large amount of measurement data instances may be collected and does not necessarily add value to training performance. The collected measurement data for ML training can be highly correlated (linear or non-linear), hence there may be high redundancy among the collected measurement data. Hence using all measurement data for a model training (and inference) can be a waste of computing resources and energy. Therefore, it’s necessary to optimise the training data preparation based on the correlation analytics and redundancy information. A correlation analytics may help to detect the redundancy pattern among the measurement data for ML training, such as:

- For a given task (e.g., an analytics, model training), analyses the correlation among the given set of measurement data, the output can be a (much) smaller set of measurement data, with which ML model (re-)training could be much more efficient with limited (or managed) impact to model training performance (comparing to use full set of data). The output may include a recommendation, for example recommendation to optimize measurement data collection for the model training.

- Regularly renew the correlation analytics as time progresses, since the correlation relationship might change; this is especially useful when there is a need to regularly re-train the ML model.

#### 5.3.2.2 Potential requirements

**REQ-MDA-CORE-1:** MDA capability for Measurement data correlation analytics for ML training should include the capability to provide the measurement data redundancy analysis including which measurement data correlate to which measurement data, the rate of redundancy, and recommendation to optimize measurement data collection for the model training.

#### 5.3.2.3 Potential solutions

##### 5.3.2.3.1 Possible solution for measurement data correlation analytics for ML training

* Introduce a data type for measurement data correlation analytics recommendation, called measurementDataCorrelationRecommendation. The data type can be the contents of the analytics report representing the recommendations from MDA for the measurement data correlation analytics for ML training.
  + The contents of this data type may be a set of 3GPP and non-3GPP recommendations.
* An optional attribute may configure the analytics context in MDARequest. The context may include attributes
  + An optional attribute may indicate the training performance requirement.
  + An attribute may configure the scenario type of correlation as an enumeration.
    - For measurement data correlation analytics, the value may be MEASUREMENTDATACORRELATIONFORMLTRAINING
    - For correlation analytics for NF scaling and dimensioning, the value may be NFRESOURCEOPTIMIZATION
    - For correlation analytics for threshold assessment, the value may be THRESHOLDASSESSMENT

#### 5.3.2.4 Evaluation of solutions

TBD

### 5.3.x Use case x: correlation analytics for NF Scaling and dimensioning

#### 5.3.x.1 Description

The performance metric (performance measurement, KPI) from a network Function or related Network Functions, there may be potential correlation and association patterns, which can be used to generate the correlation or dependency relationship among the NF, and the patterns may be used in network performance optimization scenario, e.g., NF scaling, NF dimensioning, etc.

- For a performance optimization scenario (e.g., NF Scaling, dimensioning), automatically analyses the correlation/association among the measurement data from the NFs, the output can be the NF dependency/correlation pattern with respect to NF scaling/network resource usage for NF dimensioning, and recommendations of NF scaling and dimensioning optimization.

- Regularly renew the correlation analytics as time progresses since the correlation relationship might change in different location and at different time point.

##### 5.3.x.2 Potential requirements

**REQ-MDA-CORE-X:** MDA capability for correlation analytics for NF scaling and dimensioning should include the capability for NF dependency/correlation analytics with respect to NF scaling or NF resource usage for dimensioning, and predict recommendations of NF scaling and dimensioning optimization.

#### 5.3.x.3 Potential solutions

* Enhance the existing data type Recommended3GPPAction to support the recommendations from MDA for the set of NF which may be scaled in a coordinated manner, and/or dimensioning dependency indications, including 3GPP recommendations and non-3gpp recommendations.

#### 5.3.x.4 Evaluation of solutions

TBD.

### 5.3.y Use case y: Measurement data correlation analytics for threshold assessment and adjustment

#### 5.3.y.1 Description

To monitor the threshold crossings of performance metric values related to specified managed objects, the consumer may firstly configure the performance metric threshold.

Current MDA supports recommendation threshold for ES use cases, but recommending or assessing the threshold may need to be more generic.

If the threshold is configured too high or too low or not reflect with fluctuation of the actual traffic, there may be alarms generated. Hence the threshold related alarms may have potential correlation with the threshold configuration of the performance metric. The potential correlation information, may be used to assess the configuration of threshold and possible to support the auto-configure the threshold.

After getting the threshold assessment result, MDA may predict the recommended actions to optimize threshold configuration for possible auto adjustment of the threshold configuration.

#### 5.3.y.2 Potential requirements

**REQ-MDA-CORE-y1:** MDA capability for threshold assessment and adjustment should include the capability to provide the threshold configuration assessment analytics, and recommendations of how to optimize the threshold.

**REQ-MDA-CORE-y2:** The 3GPP management system should include the capability to allow the authorized consumer get assessment analytics and recommendations of how to optimize the threshold.

**REQ-MDA-CORE-y3:** The 3GPP management system should include the capability to allow the authorized consumer to configure the threshold according to the recommendations of optimizing the threshold.

#### 5.3.y.3 Potential solutions

* Enhance the existing data type Recommended3GPPAction to support the recommendations from MDA for the threshold assesment and adjustment optimization actions.
* Introduce two data types in generic NRM (e.g., to dataType ThresholdInfo) to enable the configuration of threshold assessment and threshold adjustment optimization. It may includes attributes, namely thresholdAssessment, to indicate whether the threshold is optimal, and thresholdAdjustment for a more optimal threshold configuration from recommendations.

#### 5.3.y.4 Evaluation of solutions

TBD.

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| **End Change** |