**3GPP TSG-SA5 Meeting #162 *S5-253868d1***

Goteborg, Sweden, 25 - 29 August 2025

**Source: ZTE Corporation**

**Title: Rel-19 pCR TS 28.561 Clarification on collaboratingNDT**

**Document for: Approval**

**Agenda item: 6.19.5.1**

**Spec: 3GPP TS 28.561**

**Version: V1.0.0**

**Work Item: NDT**

**Comments**

The current NRM design for NDT collaboration is ambiguous and incomplete. Two distinct collaboration scenarios exist, yet neither is fully captured in the use-case description nor properly supported by the present NRM:

• Case 1 – Inter-Function Collaboration (among different NDT Functions)

Without introducing multi-level NDT Functio, the specification must clarify which NDT Job (and under which NDT Function) is responsible for driving the collaborative task. The current text implies that all participating NDT Functions share the same NDT Job, but this is not explicitly stated. Besides, the handling of the NDTReport, whether it is aggregated, duplicated, or distributed, it remains undefined.

• Case 2 – Intra-Function Collaboration (among NDT Models within one NDT Function)

The NRM does not yet define the NDT Model or describe how multiple NDT Models within the same NDT Function cooperate. Both the NDT Model definition and its reflection in the NRM are required.

Addressing these gaps is essential for a consistent and implementable NDT collaboration framework in Rel-19.

**Proposed Changes**

***Start of First change***

#### 6.2.1.3 Class definition

##### 6.2.1.3.1 NDTFunction <<InformationObjectClass>>

###### 6.2.1.3.1.1 Definition

This IOC represents the properties of an NDT Function.

The NDTFunction includes a reference to one or more NDTFunction instances which act as component NDTs contributing to the functionality of the NDTFunction for NDT Collaboration.

To support collaboration among NDT Functions, the NDTFunction includes “nDTFunctionRef” attribute indicating that an NDT Function may be associated with one or more other NDT Functions. For example, one or more NDT Functions with small scope might support the operation of an NDT Function with a wider scope.

Note: The relationship among NDTReport of collaborating NDTFunctions is not defined

###### 6.2.1.3.1.2 Attributes

The NDTFunction IOC includes attributes inherited fromTop IOC (defined in 3GPP TS 28.622 [7]) and the following attributes.

Table 6.2.1.3.1.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| supportedNDTCapabilities | M | T | F | T | T |
| nDTFunctionScope | M | T | F | F | T |
| **Attribute related roles** | | | | | |
| nDTFunctionRef | O | T | T | F | T |
|  |  |  |  |  |  |

###### 6.2.1.3.1.3 Attribute constraints

None.

###### 6.2.1.3.1.4 Notifications

The common notifications defined in clauses 6.1 are valid for this IOC.

##### 6.2.1.3.2 NDTJob <<InformationObjectClass>>

###### 6.2.1.3.2.1 Definition

This IOC represents the properties of an NDT job demand created by an MnS consumer.

The attribute "nDTJobSynchScope” indicates the scope of the network that should be synchronized into and modelled by the NDT for the specific NDT job. If the NDTjob is not meant to synchronize with the network, no cnten tis provided in the nDTJobSynchScope attribute.

The attribute "ndtJobScenario" indicates the input that is defined by MnS consumer for the characteristics of network objects that should be simulated/emulated by NDT. If the NDT is able to synchronize with an actual network, the ndtJobScenario indicates the delta between the actual network and twin network that is simulated/emulated. Otherwise, it indicates the critical features that should be modelled, allowing the NDT to use defaults for all other features. The ndtJobScenario can be network configurations or automation functionality configurations, network events, issues that are defined by MnS consumer and will be injected to NDT.

The ndtJobScenario also captures requirements to be simulated to see the network’s response to specific network events or issues. The network issue or events that ned to be simulated/emulated (including configuration, performance and fault characteristics may result in a particular network issue) are added into the networkResponseTask attribute.

The attribute "ndtJobExecutionRequirements" represents the execution-related requirements for an NDT job, e.g., maximum run time for each simulation/emulation task, precision, etc which are used to select the model parameters (e.g., simulation/emulation step and number of simulation/emulation times) for NDT modelling. It is up to implementation how the NDT modelling is built and used to execute the simulation/emulation task.

NOTE: the model for the specific tasks can be extended as needed.

To support collaboration among NDT Functions, the NDTJob includes the attribute “ndtJobRef” representing the NDT Job is associated with one or more other NDT Jobs that are contributing to the NDT Collaboration.

###### 6.2.1.3.2.2 Attributes

The NDTJob IOC includes attributes inherited fromTop IOC (defined in 3GPP TS 28.622 [7]) and the following attributes.

Table 6.2.1.3.2.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| NDTCapability | M | T | T | F | T |
| nDTJobSynchScope | M | T | T | F | T |
| ndtJobScenario | M | T | T | F | T |
| ndtJobExecustionRequirements | O | T | T | F | T |
| **Attribute related roles** | | | | | |
| ndtReportRefList | M | T | T | F | T |
| ndtJobRef | O | T | F | F | T |

###### 6.2.1.3.2.3 Attribute constraints

None.

###### 6.2.1.3.2.4 Notifications

The common notifications defined in clauses 6.1 are valid for this IOC.

***End of First change***

***Start of Second change***

## 6.3 Attribute definitions

6.3.1 Attribute properties

Table 6.3.1-1

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| ndtJobRef | It indicates an DN of a NDTJob Instance.  allowedValues: N/A | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ndtFunctionRef | It indicates a DN of NDTFunction Instance(s) that may be involved in the NDT collaboration.  allowedValues: N/A | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ndtReportRefList | It indicates a list of DN for NDTReport Instances.  allowedValues: N/A | type: DN  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| supportedNDTCapabilities | It indicates the different types of NDT application use cases which the NDT is capable of undertaking.  allowedValues:  "RISKY-ACTIONS\_PREDICTION",  "EVENTS-IMPACTS\_VERIFICATION",  "FAULT\_INJECTION",  "NETWORK\_EVENTS\_VERIFICATION"  "NETWORK\_CONFIGURATIONS\_VERIFICATION",  "AUTOMATION\_CONFIGURATION\_VERIFICATION"  "ML-TRAINING\_DATA\_GENERATION",  "USER\_EXPERIENCE\_DATA\_GENERATION"  New values can be added to this list in future releases to support new use cases.  The meaning of these values is as follows:  "RISKY-ACTIONS\_PREDICTION" means NDTFunction supports the use case described in 5.2.2.2.  "EVENTS-IMPACTS\_VERIFICATION" means NDTFunction supports the use case described in 5.2.2.3.  "FAULT\_INJECTION" means NDTFunction supports the use case described in 5.2.2.4.  "NETWORK\_EVENTS\_VERIFICATION" means NDTFunction supports the use case described in 5.3.2.2.  "NETWORK\_CONFIGURATIONS\_VERIFICATION" means NDTFunction supports the use case described in 5.3.2.3.  "AUTOMATION\_CONFIGURATION\_VERIFICATION" means NDTFunction supports the use case described in 5.3.2.4.  "ML-TRAINING\_DATA\_GENERATION" means NDTFunction supports the use case described in 5.4.2.2.  "USER\_EXPERIENCE\_DATA\_GENERATION" means NDTFunction supports the use case described in 5.4.2.3. | type: ENUM  multiplicity:1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| nDTCapability | It indicates the type of application use cases that is desired to be executed.  allowedValues:  "RISKY-ACTIONS\_PREDICTION",  "EVENTS-IMPACTS\_VERIFICATION",  "FAULT\_INJECTION",  "NETWORK\_EVENTS\_VERIFICATION"  "NETWORK\_CONFIGURATIONS\_VERIFICATION",  "AUTOMATION\_CONFIGURATION\_VERIFICATION"  "ML-TRAINING\_DATA\_GENERATION",  "USER\_EXPERIENCE\_DATA\_GENERATION"  New values can be added to this list in future releases to support new use cases.  The meaning of these values is as follows:  "RISKY-ACTIONS\_PREDICTION" means NDTFunction supports the use case described in 5.2.2.2.  "EVENTS-IMPACTS\_VERIFICATION" means NDTFunction supports the use case described in 5.2.2.3.  "FAULT\_INJECTION" means NDTFunction supports the use case described in 5.2.2.4.  "NETWORK\_EVENTS\_VERIFICATION" means NDTFunction supports the use case described in 5.3.2.2.  "NETWORK\_CONFIGURATIONS\_VERIFICATION" means NDTFunction supports the use case described in 5.3.2.3.  "AUTOMATION\_CONFIGURATION\_VERIFICATION" means NDTFunction supports the use case described in 5.3.2.4.  "ML-TRAINING\_DATA\_GENERATION" means NDTFunction supports the use case described in 5.4.2.2.  "USER\_EXPERIENCE\_DATA\_GENERATION" means NDTFunction supports the use case described in 5.4.2.3. | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| nDTRANScope | It indicates the scope of the RAN that can be modelled by the NDT function. | type: ScopeDefinition  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| nDTCNScope | It indicates the scope of the CN that can be modelled by the NDT function. | type: ScopeDefinition  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| nDTJobSynchScope | It indicates the scope of the network that should be synchronized into and modelled by the NDT for the specific NDT job. | type: ScopeDefinition  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| ndtJobScenario | It indicates a network scenario that should be modelled in the NDTJob as an extra beyond what is synchronized from the network. The ndtJobScenario can be used for  - Verification of network response to one or more events  - evaluation of the impact of one or more failure events, e.g. a signalling storm  - Evaluating one or more network issues, e.g. a coverage issue. The network issues involve one or more network events.  - Evaluation of high-risk network operations which are listed within the planned configuration  - Verification of network configurations which are listed within the planned configuration  - Using NDT to generate ML training data  - Using NDT to generate user experience data | type: NDTInputDescription  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| NDTInputDescriptionId | It indicates the identifier for a specific input to be modelled in the NDTJob | type: string  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| NDTInputDescriptionId | It indicates the identifier for a specific output provided as outcomes of the NDTJob | type: string  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| networkEveFntInfo | This defines the information related with a network event (a provisioning, performance measurement, KPI or fault/ alarm event) that can be introduced into the NDT.  The NetworkEventData can be used for  - Verification of network response to one or more events  - evaluation of the impact of one or more failure events, e.g. a signalling storm  - Evaluating one or more network issues, e.g. a coverage issue. The network issues involve one or more network events.  Editor’s note: The definition and modelling of networkEventInfo is to be clarified | Type: TBD  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| simulationData | This will define which management data is to be updated artificially in order to induce a particular network issue. The management data includes:   * Performance data: The name of the performance measurement or the KPI as defined in 3GPP TS 28.552 and TS 28.554 * MDT/Trace data: The name of MDT measurements as defined in 3GPP TS 32.422 * Configuration data: The name of the attribute from any of the available MOIs.   Editor’s note: The definition and modelling of simulationData is to be clarified | type: TBD  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| condition | This will define the condition that has to be satisfied in order to update the simulation data for the task that is executed by the NDT. This can be defined in terms of location and time.  This will be the DN of ConditionMonitor[7]. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| ndtJobExecustionRequirements | It describes the performance requirements for NDT modelling, e.g., maximum run time for each simulation/emulation job, precision, etc | type: NdtJobExecutionReqts  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| NDTJobOutputData | It indicates the list of NDTOutput(s) that are provided by the NDT function as the output for any task executed in an instantiated NDT job. | type: NDTOutputDataPoint  multiplicity: 1 ..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| maxRuntime | Maximum run time for each simulation task executed in NDT  Editor’s note: The unit of this attribute is to be added | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| networkState | It indicates a state of the twin network (the modelled network in the NDT) for which a configuration or reconfiguration is applied.  The networkState is the desvription of what exists in the network at the time when the networkConfiguration is made | type: NDTOutputDescription  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| networkConfiguration | It indicates a network configuration that is executed by the NDT and being reported in the NDT report | type: NDTOutputDescription  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| observations | It indicates an impact on the network. It shows the list of network objects that are affected and the effects on the specific objects | type: NDTOutputDescription  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |
| ndtJobRef | It indicates the related NDT Job contributing as a collaborator to the executed NDT Job. It describes a relationship to an NDT job, i.e. it indicates the DN of a component NDT which provides input to the NDT job. | type: DN  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***End of Second change***

***Start of Third change***

***End of Third change***

***Start of Fourth change***