**3GPP TSG-SA5 Meeting #162 *S5-253869d1***

Goteborg, Sweden, 25 - 29 August 2025

**Source: ZTE Corporation, Ericsson**

**Title: Rel-19 pCR TS 28.561 Clarification on the usage of NDT in stage 2**

**Document for: Approval**

**Agenda item: 6.19.5.1**

**Spec: 3GPP TS 28.561**

**Version: V1.0.0**

**Work Item: NDT**

**Comments**

The term “NDT” appears frequently in the Stage 2 NRM section, but it is not made clear whether it refers to the NDTJob instance or the NDTFunction instance. This ambiguity makes it difficult for readers to map the NRM description to the correct information object and may cause misunderstandings of the design. Therefore, this contribution proposes to clarfiy the usage of “NDT”.

DTFunction instances are created by the MnS producer or are pre-installed. This contribution propose to improve the documentation.

**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 a specific NDT Function of MnS Producer. NDTFunction instances are created by the MnS producer or are pre-installed, and also are modified, deleted by the MnS producer if needed. MnS consumers cannot request to create, modify or delete NDTFunction instances.

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

###### 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.

The NDTFunction has a relationship 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.

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** | | | | | |
| ndtRef | M | 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 MnSProducer 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 MnS Producer. If the NDT MnS Producer 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 MnS Producer to use defaults for all other features. The ndtJobScenario can be network configurations or automation functionality configurations, network events, issues that are defined by the MnS consumer and will be sent to the NDT MnS Producer.

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 building NDT models. It is up to implementation how the NDT model is built and used to execute the simulation/emulation task.

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

###### 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 |
| collaboratingNDT | O | T | T | F | T |
| **Attribute related roles** | | | | | |
| ndtReportRefList | M | T | T | 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.

##### 6.2.1.3.3 NDTFunctionScope << dataType >>

###### 6.2.1.3.3.1 Definition

This IOC represents the properties of a scope that can be modelled by an NDT MnS Producer

###### 6.2.1.3.3.2 Attributes

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

Table 6.2.1.3.3.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| nDTRANScope | M | T | T | F | T |
| nDTCNScope | M | T | T | F | T |

###### 6.2.1.3.3.3 Attribute constraints

None.

###### 6.2.1.3.3.4 Notifications

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

##### 6.2.1.3.4 NDTInputDescription<<dataType>>

###### 6.2.1.3.4.1 Definition

This dataType represents a description of the network. It may be used to describe any of the following:

- aspects of the network that should be modelled in the NDT MnS Producer for a specific NDT Job,

- configurations that should be applied or have been applied by the NDT MnS Producer for a specific NDT Job.

The objects to be considered may be described in terms of the attribute networkObjectType or by specific network object instances represented by objectInstance. If a list of specific managed objects are to be modelled, they are listed in the attribute objectInstance. Otherwise, their type if listed in the attribute networkObjectType and their specific characteristics listed in objectAttributeList.

###### 6.2.1.3.4.2 Attributes

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

Table 6.2.1.3.4.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| NDTInputDescriptionId | M | T | T | F | T |
| simulationData | O | T | T | F | T |
| networkEventInfo | O | T | T | F | T |
| condition | M | T | T | F | T |

###### 6.2.1.3.4.3 Attribute constraints

None

###### 6.2.1.3.4.4 Notifications

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

##### 6.2.1.3.5 NDTOutputDescription <<dataType>>

###### 6.2.1.3.5.1 Definition

This dataType represents a description of the individual outputs of the NDT Job. It may be used to describe any of the following:

- states of the network that have been modelled and are being reported by the NDT MnS Producer,

- characteristics of the network that are being reported by the NDT MnS Producer.

The objects that have been modelled are described by specific network object instances represented by objectInstance and their specific characteristics (PMs, alarms, etc.) listed in objectAttributeList.

###### 6.2.1.3.5.2 Attributes

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

Table 6.2.1.3.5.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| NDTInputDescriptionId | M | T | T | F | T |
| objectInstance | M | T | T | F | F |
| objectAttributeList | M | T | T | F | T |

###### 6.2.1.3.5.3 Attribute constraints

None

###### 6.2.1.3.5.4 Notifications

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

***End of First change***

***Start of Second change***

##### 6.2.1.3.8 NDTReport <<InformationObjectClass>>

###### 6.2.1.3.8.1 Definition

This IOC represents the properties of an NDT report corresponding to an NDT job.

An NDT job may run more than one task at the same time, e.g., a network configuration task and a network response task. The NDTReport contains an output for each task that is executed by the NDT job.

The attribute "NDTJobOutputData" specified performance metrics and/or alarm types that are collected and reported by NDT MnS Producer after the behaviour is modelled in NDT MnS Producer is put in a list for which each entry is an NDTOutputDataPoint.

###### 6.2.1.3.8.2 Attributes

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

Table 6.2.1.3.8.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| NDTJobOutputData | M | T | F | F | T |
| **Attribute related roles** | | | | | |
| ndtJobRef | M | T | F | F | T |
| ndtFunctionRef | M | T | F | F | T |

###### 6.2.1.3.8.3 Attribute constraints

None.

###### 6.2.1.3.8.4 Notifications

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

##### 6.2.1.3.9 NDTOutputDataPoint <<dataType>>

###### 6.2.1.3.9.1 Definition

This dataType represents a single output correspongding to the NDT Job.

###### 6.2.1.3.9.2 Attributes

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

The nDTOutputDataPoint indicates three different types of information about the network. The networkState indicates the state of the network at which a specific networkConfiguration (i.e. a delta of the network state or new state of the netwrok) is applied. The observations shows the outcome on the network when the stated networkConfiguration is applied in the stated networkState.

Table 6.2.1.3.9.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| networkState | M | T | F | T | T |
| networkConfiguration | M | T | F | T | T |
| observations | M | T | F | T | T |

###### 6.2.1.3.9.3 Attribute constraints

None.

###### 6.2.1.3.9.4 Notifications

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

***End of Second change***

***Start of Third 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 an DN of a NDTFunction Instance.  allowedValues: N/A | type: DN  multiplicity: 1  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 scenario specific capability which the NDT MnS Producer 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 MnS Producer 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  - Generation of ML training data  - Generation 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 by the NDT MnS Producer.  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 MnS Producer. 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 simulation/emulation by NDT MnS Producer, 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 by the NDT MnS Producer.  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 by the NDT MnS Producer) 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 according to the NDT Job 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 |
| collaboratingNDT | 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: string  multiplicity: \*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: False |

***Start of Third change***