**3GPP TSG SA WG5 Meeting #141e S5-221288**

**Online, , 15 Nov 2021- 24 Nov 2021**

**Source: Samsung**

**Title: pCR 28.538 EASFunction Definition**

**Document for: Approval**

**Agenda Item: 6.4.18**

# 1 Decision/action requested

***The group is asked to discuss and approve the proposals.***

# 2 References

None

# 3 Rationale

This contribution provides ECS performance assurance procedures.

# 4 Detailed proposal

|  |
| --- |
| **First modification** |

# 6 Edge NRM

*Editors Note: This section will contain the edge related NRM or just the reference to it in 28.541.*

## 6.1 Information Model definitions for Edge NRM

### 6.1.1 Imported information entities and local labels

|  |  |
| --- | --- |
| Label reference | Local label |
| TS 28.622 [4], IOC, Top | Top |
| TS 28.622 [4], IOC, SubNetwork | SubNetwork |
| TS 28.622 [4], IOC, ManagedFunction | ManagedFunction |
| TS 28.541 [3], IOC, PCFFunction | PCFFunction |
| TS 28.541 [3], IOC, NEFFunction | NEFFunction |
| TS 28.541 [3], IOC, EP\_N5 | EP\_N5 |
| TS 28.541 [3], IOC, EP\_N33 | EP\_N33 |
| TS 28.541 [3], attribute, tAI | tAI |

## 6.2 Class diagram

### 6.2.1 Relationships



**Figure 6.2.1-2 Edge NRM containment/naming relationship**



**Figure 6.2.1-3 Transport view of EES NRM**



**Figure 6.2.1-4 Transport view of ECS NRM**



**Figure 6.2.1-5 Transport view of EAS NRM**

### 6.2.2 Inheritance

 

**Figure 6.2.2-1 Edge Inheritance Relationship**

Editor's NOTE 4: Whether EASProfile is dataType or IOC is FFS.

## 6.3 Class definition

### 6.3.1 EASFunction

6.3.1.1 Definition

This IOC represent the properties of a EAS in a 3GPP network. For more information about EAS, see 3GPP TS 23.558.

6.3.1.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| eASIdentifier | M | T | T | F | T |
| eESAddress | M | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| eASRequirementsRef | M | T | T | F | T |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

#### 6.3.1.3 Attribute constraints

#### 6.3.1.4 Notifications

TBD.

### 6.3.2 EASRequirements

6.3.2.1 Definition

This represent the requirements needed to deploy EAS(s).

6.3.2.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| requiredEASservingLocation | M | T | F | F | T |
| affinityAntiAffinity | M | T | F | F | T |
| serviceContinuity | M | T | F | F | T |
| virtualResource | M | T | F | F | T |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Editor’s Note: The definition of IOCs is not complete. It is expected additional attributes, as needed.

#### 6.3.2.3 Attribute constraints

#### 6.3.2.4 Notifications

TBD.

### 6.3.3 ServingLocation <<datatype>>

6.3.3.1 Definition

This datatype represent the location which is to be served by the node.

6.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| geographicalLocation | CM | T | F | F | T |
| tAI | CM | T | T | F | T |
|  |  |  |  |  |  |

#### 6.3.3.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| geographicalLocation Support Qualifier | Condition: If the serving location is described with Geographical Service Area [2]. |
| tAI Support Qualifier | Condition: If the serving location is described with Topological Service Area [2]. |

#### 6.3.3.4 Notifications

TBD.

### 6.3.3 AffinityAntiAffinity <<datatype>>

6.3.3.1 Definition

This datatype represent the affinity and anti-affinity requirements of the EAS with other EAS on the same EDN.

6.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| affinityEAS | M | T | F | F | T |
| antiAffinityEAS | M | T | T | F | T |
|  |  |  |  |  |  |

#### 6.3.3.3 Attribute constraints

None

#### 6.3.3.4 Notifications

TBD.

### 6.3.3 VirtualResource <<datatype>>

6.3.3.1 Definition

This datatype represent the virtual resource requirements of an EAS.

6.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
|  |  |  |  |  |  |
| virtualMemory | M | T | T | F | T |
| virtualDisk | M | T | T | F | T |

#### 6.3.3.3 Attribute constraints

None

#### 6.3.3.4 Notifications

TBD.

### 6.3.3 Availability <<datatype>>

6.3.3.1 Definition

This datatype represent the availability schedule of an EAS.

6.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| fromAvailability | M | T | T | F | T |
| toAvailability | M | T | T | F | T |

#### 6.3.3.3 Attribute constraints

None

#### 6.3.3.4 Notifications

TBD.

### 6.3.4 GeoLoc <<datatype>>

6.3.4.1 Definition

This datatype represent the geographical location.

6.3.4.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| lat | M | T | T | F | T |
| long | M | T | T | F | T |
| civicAddress | O | T | T | F | T |

#### 6.3.4.3 Attribute constraints

None

#### 6.3.4.4 Notifications

TBD

### 6.3.5 ECSFunction

Editor’s Note: The definition of IOCs is not complete. It is expected additional attributes, as needed

#### 6.3.5.1 Definition

This IOC represents the ECS functionality for supporting Edge Computing. For more information about the ECS, see 3GPP TS 23.558 [2].

#### 6.3.5.2 Attributes

The ECSFunction IOC includes attributes inherited from ManagedFunction IOC (defined in TS 28.622[4]) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| ecsAddress | M | T | T | F | T |
| providerIdentifier | O | T | T | F | T |
| eDNConnectionInfo | M | T | T | F | T |

#### 6.3.5.3 Attribute constraints

None

### 6.3.6 EDNConnectionInfo <<datatype>>

6.3.6.1 Definition

This datatype represent the EDN connection information.

6.3.6.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Support Qualifier** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| dNN | M | T | T | F | T |
| eDNServiceArea | M | T | T | F | T |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

6.3.6.3 Attribute constraints

None

## 6.4 Attribute definition

6.4.1 Attribute Properties

Editors Note: The definition of attributes are not complete, and are subject to changes.

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| eASIdentifier | It identifies the EAS, see 3GPP TS 23.558. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| eASREquirementsRef | This is the DN of EASRequirements. allowedValues: Not applicable | type: DNmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| requiredEASservingLocation | It defines the location where the EAS service should be available. | type: ServingLocationmultiplicity: 1..\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| geographicalLocation | This refers to the Geographical Service Area, see 3GPP TS 23.558. | type: GeoLocmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| lat | This defines the single latitude coordinate. | type: Floatmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| long | This defines the single longitudecoordinate. | type: Floatmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| civicAddress | This defines the location in terms of a civic address | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
|  |  |  |
| ecsAddress | One or more URLs and/or IP Address(es) of ECS(s) (See TS 23.558 [2]). allowedValues: N/A | type: Stringmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| providerIdentifier | The identifier of the ECSP that provides the ECS(See TS 23.558 [2]).allowedValues: N/A | type: stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| eDNConnectionInfo | It defines the set of information needed to connect to an EDN. | type: EDNConnectionInfomultiplicity: 1..\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| eDNServiceArea | This parameter defines the service location for the EDN. | type: ServingLocationmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| affinityAntiAffinity | This parameter defines the affinity and anti-requirements of the EAS with other EAS on the same EDN. | type: AffinityAntiAffinitymultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| affinityEAS | This parameter defines the EAS identifier with which the affinity is required. | type: Stringmultiplicity: 1...\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| antiAffinityEAS | This parameter defines the EAS identifier with which the anti-affinity is required. | type: Stringmultiplicity: 1...\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| serviceContinuity | This parameter defines if the service continuity is required by the EAS. If the value is TRUE, the EAS will be deployed with an EES supporting service continuity.The default value is FALSE. | type: Booleanmultiplicity: 1...\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| virtualResource | This parameter defines the virtual resource requirements of an EAS. | type: VirtualResourcemultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
|  |  |  |
| virtualMemory | It indicates the minimum virtual memory size requirements for EAS in megabites. (see clause 7.1.9.3.2.2 in in ETSI NFV IFA-011 [7]). | type: Integermultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| virtualDisk | It indicates the minimum virtual storage requirement for the EAS (see clause 7.1.9.4.3.2 in ETSI NFV IFA-011 [7]). | type: Integermultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| eESAddress | One or more URLs and/or IP Address(es) of EES(s) (See TS 23.558 [2]). allowedValues: N/A | type: Stringmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
|  |  |  |

|  |
| --- |
| **Next modification** |

# P.1 General

This annex contains the OpenAPI definition of the Edge NRM in YAML format.

The Information Service (IS) of the Edge NRM is defined in clause 6.

Mapping rules to produce the OpenAPI definition based on the IS are defined in TS 32.160 [10].

# P.2 Solution Set (SS) definitions

## P.2.1 OpenAPI document "edgeNrm.yml"

openapi: 3.0.1

info:

 title: 3GPP Edge NRM

 version: 17.1.0

 description: >-

 OAS 3.0.1 specification of the Edge NRM

 © 2020, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

 All rights reserved.

externalDocs:

 description: 3GPP TS 28.538; Edge NRM

 url: http://www.3gpp.org/ftp/Specs/archive/28\_series/28.538/

paths: {}

components:

 schemas:

#-------- Definition of types-----------------------------------------------------

 ServingLocation:

 type: object

 properties:

 geographicalLocation:

 $ref: '#/components/schemas/GeoLoc'

 tAi:

 $ref: 'genericNrm.yaml#/components/schemas/TAI'

 GeoLoc:

 type: object

 properties:

 civicAddress:

 type: string

 lat:

 type: integer

 long:

 type: integer

 EDNConnectionInfo:

 type: object

 properties:

 dNN:

 type: string

 eDNServiceArea:

 $ref: '#/components/schemas/ServingLocation'

 AffinityAntiAffinity:

 type: object

 properties:

 affinityEAS:

 type: string

 antiAffinityEAS:

 type: string

 VirtualResource:

 type: object

 properties:

 virtualMemory:

 type: integer

 virtualDisk:

 type: integer

#-------- Definition of concrete IOCs --------------------------------------------

 SubNetwork-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-Attr'

 - type: object

 properties:

 Subnetwork:

 $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-Multiple'

 ECSFunction:

 $ref: '#/components/schemas/ECSFunction-Multiple'

 EdgeDataNetwork:

 $ref: '#/components/schemas/EdgeDataNetwork-Multiple'

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-ncO'

 EdgeDataNetwork-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 EASFunction:

 $ref: '#/components/schemas/EASFunction-Multiple'

 EESFunction:

 $ref: '#/components/schemas/EESFunction-Multiple'

 EASFunction-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/ManagedFunction-Attr'

 - type: object

 properties:

 eASIdentifier:

 type: string

 eESAddress:

 type: string

 eASRequirementsRef:

 $ref: '#/components/schemas/EASRequirements'

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-ncO'

 EESFunction-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/ManagedFunction-Attr'

 - type: object

 properties:

 eESIdentifier:

 type: string

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-ncO'

 ECSFunction-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/ManagedFunction-Attr'

 - type: object

 properties:

 eCSAddress:

 type: string

 providerIdentifier:

 type: string

 eDNConnectionInfo:

 $ref: '#/components/schemas/EDNConnectionInfo'

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-ncO'

 EASRequirements:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top'

 - type: object

 properties:

 requiredEASservingLocation:

 $ref: '#/components/schemas/ServingLocation'

 affinityAntiAffinity:

 $ref: '#/components/schemas/AffinityAntiAffinity'

 serviceContinuity:

 type: boolen

 virtualResource:

 $ref: '#/components/schemas/VirtualResource'

#-------- Definition of JSON arrays for name-contained IOCs ----------------------

 SubNetwork-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/SubNetwork-Single'

 EASFunction-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/EASFunction-Single'

 ECSFunction-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/ECSFunction-Single'

 EESFunction-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/EESFunction-Single'

 EdgeDataNetwork-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/EdgeDataNetwork-Single'

#--------------------------------- Definition ------------------------------------

 resources-edgeNrm:

 oneOf:

 - $ref: '#/components/schemas/SubNetwork-Single'

 - $ref: '#/components/schemas/EASFunction-Single'

 - $ref: '#/components/schemas/ECSFunction-Single'

 - $ref: '#/components/schemas/EESFunction-Single'

 - $ref: '#/components/schemas/EdgeDataNetwork-Single'