**3GPP TSG CT WG3 Meeting #142 *C3-253498***

**Goteborg, SE, 25th – 29th August, 2025 was C3-253317**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **1682** | **rev** | **1** | **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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | |
| ***Title:*** | Complete the definition of the Nnef\_AIoT\_Notify service operation | | | | | | | | |
|  |  | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | |
|  |  | | | | | | | | |
| ***Work item code:*** | AmbientIoT-CT | | | | |  | ***Date:*** | | 2025-08-18 |
|  |  | | | |  | |  | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | |
| ***Reason for change:*** | | | As per the latest stage 2 updates in TS 23.369 (v19.0.0):   * The requirements on the content of the AIoT Operations Notification request/response body are now completed in stage 2 as per the updates in clauses 6.2.2, 6.2.3 and 7.4.4 of TS 23.369. This needs hence to be reflected in the stage 3 definition of the AIoT Operations Notification procedure with one additional conditional attribute to convey the Read command specific report information.   In addition:   * The attribute conveying the supported features in the AIoT Notification request needs to be removed as there is no feature negotiation in notifications, the features applicable for the operation that created the subscription (e.g., the Inventory/Command request in this case), either implicitly or explicitly, also apply for the notification. * Further corrections and alignments/enhancements of the AIoT Operations Notification related requirements. | | | | | | |
|  | | |  | | | | | | |
| ***Summary of change:*** | | | This CR proposes to:   * Address the above-detailed stage 2 requirements and necessary updates/corrections. | | | | | | |
|  | | |  | | | | | | |
| ***Consequences if not approved:*** | | | * The above-detailed stage 2 requirements are not defined in stage 3. | | | | | | |
|  | |  | | | | | | | |
| ***Clauses affected:*** | | 4.4.49.4, 5.45.5.2.6, A.43 | | | | | | | |
|  | |  | | | | | | | |
|  | | **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:*** | | This CR introduces backwards compatible new feature and corrections to the OpenAPI descriptions of the following APIs:   * TS29522\_AIoT.yaml | | | | | | | |
|  | |  | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | |

\* \* \* \* Start of changes \* \* \* \*

#### 4.4.49.4 Procedures for AIoT Operations Notification

This procedure is used by the NEF to notify a previously subscribed AF on AIoT operations related event(s) (see also clauses 6.2.2 and 6.2.3 of 3GPP TS 23.369 [81]).

NOTE: In this release of the specification, when there are multiple AIOTF(s) involved in the AIoT Inventory or Command procedure to which the AIoT Operations Notification is related, whether the NEF performs aggregation or not is implementation specific, based on operator policies and/or SLA with the AF provider.

In order to notify a previously subscribed AF on AIoT operations related event(s), the NEF shall send an HTTP POST request message to the AF targeting the notification URI provided within the request used to trigger the corresponding AIoT service operation (e.g., Inventory, Command) as defined in clause 4.4.49.2 or clause 4.4.49.3, with the request body including the AIoTNotif data structure.

Upon reception of this notification request, the AF shall acknowledge its successful reception by returning an HTTP "204 No Content" status code.

On failure, the AF shall take proper error handling actions, as specified in clause 5.45.7, and respond to the NEF with an appropriate error status code.

\* \* \* \* Next changes \* \* \* \*

#### 5.45.5.1 General

This clause specifies the application data model supported by the AIoT API. Table 5.45.5.1-1 specifies the data types defined for the AIoT API.

Table 5.45.5.1-1: AIoT service specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| AIoTNotif | 5.45.5.2.6 | Represents the AIoT Operations Notification. |  |
| CommandReq | 5.45.5.2.4 | Represents the AIoT Command request. |  |
| CommandResp | 5.45.5.2.5 | Represents the AIoT Command response. |  |
| CommandType | 5.45.5.3.3 | Represents the type of AIoT Command. |  |
| ExtAIoTArea | 5.45.5.2.7 | Represents the External AIoT Service Area. |  |
| InventoryReq | 5.45.5.2.2 | Represents the AIoT inventory request. |  |
| InventoryResp | 5.45.5.2.3 | Represents the AIoT inventory response. |  |

Table 5.45.5.1-2 specifies data types re-used by the AIoT API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the AIoT API.

Table 5.45.5.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AiotAreaId | 3GPP TS 29.571 [8] | Represents the identifier or an AIoT Service Area. |  |
| AIoTDevices | 3GPP TS 29.5xx [yy] | Represents the AIoT device(s) related information. |  |
| AiotDevPermId | 3GPP TS 29.571 [8] | Represents the permanent identifier of the AIoT Device. |  |
| CivicAddress | 3GPP TS 29.572 [34] | Represents a civic address. |  |
| DevicesRepInfo | 3GPP TS 29.569 [82] | Represents the AIoT device(s) related reporting information. |  |
| GeographicArea | 3GPP TS 29.572 [34] | Represents a geographical area. |  |
| ProblemDetails | 3GPP TS 29.571 [8] | Represents error related information. |  |
| SupportedFeatures | 3GPP TS 29.571 [8] | Represents the list of supported feature(s) and is used to negotiate the applicability of the optional features. |  |
| Uinteger | 3GPP TS 29.571 [8] | Represents an unsigned integer. |  |
| Uri | 3GPP TS 29.122 [4] | Represents a URI. |  |

\* \* \* \* Next changes \* \* \* \*

##### 5.45.5.2.6 Type: AIoTNotif

Table 5.45.5.2.6-1: Definition of type AIoTNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| afTransId | string | M | 1 | Contains the identifier of the AF transaction to which the notification is related. |  |
| devicesRepData | array(DevicesRepInfo) | C | 1..N | Contains the AIoT device(s) related reporting information.  (NOTE) |  |
| lastRepInd | boolean | O | 0..1 | Contains the Last Report Indication, i.e., indicates whether this is the last reporting from the AIOTF for the AIoT service operation identified by the "transId" attribute.  - "true" indicates that this is the last report.  - "false" indicates that this is not the last report.  - The default value is "false" when this attribute is omitted.  (NOTE) |  |
| NOTE: At least one of these attributes shall be present. | | | | | |

\* \* \* \* Next changes \* \* \* \*

# A.43 AIoT API

openapi: 3.0.0

info:

title: 3gpp-aiot

version: 1.0.0-alpha.1

description: |

API for UE Address service.

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externalDocs:

description: 3GPP TS 29.522 V19.3.0; 5G System; Network Exposure Function Northbound APIs.

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-aiot/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in subclause 5.2.4 of 3GPP TS 29.122.

paths:

/request-inv:

post:

summary: Request to perform an AIoT inventory operation.

operationId: InventoryRequest

tags:

- AIoT Inventory Request (custom operation without associated resources)

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'200':

description: >

OK. The AIoT inventory request is successfully received and processed, and the requested

AIoT inventory related information is returned in the response body.

content:

application/json:

schema:

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

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

callbacks:

AIoTOperationsNotif:

'{$request.body#/notifUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: >

No Content. The AIoT Operations Notification is successfully received and

acknowledged.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/request-cmd:

post:

summary: Request to perform an AIoT command operation.

operationId: CommandRequest

tags:

- AIoT Command Request (custom operation without associated resources)

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'200':

description: >

OK. The AIoT command request is successfully received and processed, and the requested

AIoT command related information is returned in the response body.

content:

application/json:

schema:

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

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

callbacks:

AIoTOperationsNotif:

'{$request.body#/notifUri}':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: >

No Content. The AIoT Operations Notification is successfully received and

acknowledged.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

#

# STRUCTURED DATA TYPES

#

InventoryReq:

description: Represents the AIoT inventory request.

type: object

properties:

afId:

type: string

targetArea:

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

targetDevices:

$ref: 'TS29abc\_Naiotf\_AIoT.yaml#/components/schemas/AIoTDevices'

numDevices:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

notifUri:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- afId

- notifUri

anyOf:

- required: [targetArea]

- required: [targetDevices]

InventoryResp:

description: Represents the AIoT inventory response.

type: object

properties:

afTransId:

type: string

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- afTransId

CommandReq:

description: Represents the AIoT command request.

type: object

properties:

afId:

type: string

commandType:

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

targetArea:

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

targetDevices:

$ref: 'TS29abc\_Naiotf\_AIoT.yaml#/components/schemas/AIoTDevices'

numDevices:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

msgSize:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

notifUri:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- afId

- commandType

- notifUri

anyOf:

- required: [targetArea]

- required: [targetDevices]

CommandResp:

description: Represents the AIoT command response.

type: object

properties:

afTransId:

type: string

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- afTransId

AIoTNotif:

description: Represents the AIoT Operations Notification.

type: object

properties:

afTransId:

type: string

devicesRepData:

type: array

items:

$ref: 'TS29569\_Naiotf\_AIoT.yaml#/components/schemas/DevicesRepInfo'

minItems: 1

lastRepInd:

type: boolean

default: false

description: >

Contains the Last Report Indication, i.e., indicates whether this is the last reporting

from the AIOTF for the AIoT service operation identified by the transId attribute.

true indicates that this is the last report.

false indicates that this is not the last report.

The default value is false when this attribute is omitted.

required:

- afTransId

anyOf:

- required: [devicesRepData]

- required: [lastRepInd]

ExtAIoTArea:

description: Represents the AIoT area.

type: object

properties:

areaIds:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AiotAreaId'

minItems: 1

geographicAreas:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

minItems: 1

civicAddresses:

type: array

items:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

minItems: 1

oneOf:

- required: [areaIds]

- required: [geographicAreas]

- required: [civicAddresses]

#

# SIMPLE DATA TYPES

#

#

# ENUMERATIONS

#

CommandType:

anyOf:

- type: string

enum:

- READ

- WRITE

- PERMANENT\_DISABLE

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration and

is not used to encode content defined in the present version of this API.

description: |

Represents the type of AIoT command.

Possible values are:

- READ: Indicates that the AIoT command is Read (i.e., retrieve information).

- WRITE: Indicates that the AIoT command is Write (i.e., provision information).

- PERMANENT\_DISABLE: Indicates that the AIoT command is Permanent Disable (i.e., disable

the capability to transmit information).

#

# Data types describing alternative data types or combinations of data types

#

\* \* \* \* End of changes \* \* \* \*