**3GPP TSG-CT WG1 Meeting #133e-bisC1-220321**

**E-meeting, 17-21 Jauary 2022**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.546** | **CR** | **0021** | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  |
| *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 | **x** | Radio Access Network |  | Core Network | **x** |

|  |
| --- |
|  |
| ***Title:***  | Addition of CoAP Resource representation and APIs for UE configuration |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | eSEAL |  | ***Date:*** | 2022-01-10 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *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 canbe 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The CoAP annex of 24.546 lacks information on Resource representation and APIs for UE configuration and this is proposed to be added. |
|  |  |
| ***Summary of change:*** | Resource representation and APIs for UE configuration clause added to the CoAP annex |
|  |  |
| ***Consequences if not approved:*** | Specification of CoAP in 24.546 remains incomplete |
|  |  |
| ***Clauses affected:*** | 2, C.x (new)  |
|  |  |
|  | **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's revision history:*** |  |

\* \* \* First Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows;".

[3] IETF RFC 4825: "The Extensible Markup Language (XML) Configuration Access Protocol (XCAP)".

[4] OMA OMA-TS-XDM\_Core-V2\_1-20120403-A: "XML Document Management (XDM) Specification".

[5] 3GPP TS 24.547: "Identity management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification;".

[6] IETF RFC 6750: "The OAuth 2.0 Authorization Framework: Bearer Token Usage".

[7] IETF RFC 7159: "The JavaScript Object Notation (JSON) Data Interchange Format".

[8] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[9] IETF RFC 5875: "An Extensible Markup Language (XML) Configuration Access Protocol (XCAP) Diff Event Package".

[10] IETF RFC 6050 (November 2010): "A Session Initiation Protocol (SIP) Extension for the Identification of Services".

[11] IETF RFC 6665 (July 2012): "SIP-Specific Event Notification".

[12] IETF RFC 7252: "The Constrained Application Protocol (CoAP)".

[13] IETF RFC 7959: "Block-Wise Transfers in the Constrained Application Protocol (CoAP) ".

[14] IETF RFC 7641: "Observing Resources in the Constrained Application Protocol (CoAP)".

[15] IETF RFC 8323: "CoAP (Constrained Application Protocol) over TCP, TLS, and WebSockets".

[16] IETF RFC 8516: ""Too Many Requests" Response Code for the Constrained Application Protocol".

[17] IETF RFC 8949: “Concise Binary Object Representation (CBOR)”.

[18] IETF RFC 8610: "Concise Data Definition Language (CDDL): A Notational Convention to Express Concise Binary Object Representation (CBOR) and JSON Data Structures".

[19] Constrained RESTful Environments (CoRE) Parameters at IANA, <https://www.iana.org/assignments/core-parameters/core-parameters.xhtml>

[20] Internet draft draft-ietf-core-problem-details-01: "Problem Details For CoAP APIs".

[21] Internet draft draft-ietf-core-new-block-14: "Constrained Application Protocol (CoAP) Block-

[ts23003] 3GPP TS 23.003: "Numbering, addressing and identification".

\* \* \* Next Change \* \* \* \*

# C.X Resource representation and APIs for UE configuration

## C.X.1 SU\_UeConfig API

### C.X.1.1 API URI

The CoAP URIs used in CoAP requests from SCM-C towards the SCM-S shall have the Resource URI structure as defined in clause C.1.1 with the following clarifications:

- the <apiName>shall be "su-uc";

- the <apiVersion> shall be "v1"; and

- the <apiSpecificSuffixes> shall be set as described in clause C.X.1.2.

### C.X.1.2 Resources

#### C.X.1.2.1 Overview



Figure C.X.1.2.1-1: Resource URI structure of the SU\_UeConfig API

Table C.X.1.2.1-1 provides an overview of the resources and applicable CoAP methods.

Table C.X.1.2.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | CoAP method | Description |
| UE Configurations | /val-services/{valServiceId}/ue-configurations | GET | Retrieve UE configurations for a given VAL service, according to query criteria. |
| POST | Create UE configuration. |
| Individual UE Configuration | /val-services/{valServiceId}/ue-configurations/{ueConfigDocId} | GET | Retrieve an individual UE configuration. |
| PUT | Update an individual UE configuration. |
| DELETE | Delete an individual UE configuration. |

Editor’s note: Whether any changes required in the API along with its data model based on limitations of constrained devices is FFS.

#### C.X.1.2.2 Resource: UE Configurations

##### C.X.1.2.2.1 Description

The UE Configurations resource allows a SCM-C to retrieve all the UE configurations of a VAL service domain (e.g. based on device type, device vendor, device number, etc) for a specific VAL UE that are available at a given SCM-S.

##### C.X.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/su-uc/<apiVersion>/val-services/{valServiceId}/ue-configurations**

This resource shall support the resource URI variables defined in the table C.X.1.2.2.2-1.

Table C.X.1.2.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data Type | Definition |
| apiRoot | string | See clause C.1.1 |
| apiVersion | string | See clause C3.1.1 |
| valServiceId | string | Identifier of a VAL service. |

##### C.X.1.2.2.3 Resource Standard Methods

###### C.X.1.2.2.3.1 GET

This operation retrieves UE configurations satisfying the query criteria.

This method shall support the URI query parameters specified in table C.X.1.2.2.3.1-1.

Table C.X.1.2.2.3.1-1: URI query parameters supported by the GET Request on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| ue-vendor | string | O | 0..1 | Identity of the UE vendor. |
| ue-type | TypeAllocationCode | O | 0..1 | Type of the UE. |
| ue-snr | SerialNumber | O | 0..1 | Serial number of the UE. |
| ue-uri | Uri | O | 0..1 | URI of the UE. |

This method shall support the response data structures and response codes specified in table C.X.1.2.2.3.1-2.

Table C.X.1.2.2.3.1-2: Data structures supported by the GET Response payload on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| array(UeConfigDoc) | M | 1..N | 2.05 Content | List of UE configuration documents matching the query parameters provided in the request.  |
| NOTE: The mandatory CoAP error status codes for the GET Request listed in table C.1.3-1 shall also apply. |

###### C.X.1.2.2.3.2 POST

This operation creates a UE configuration at the SCM-S for a given VAL service.

This method shall support the request data structures specified in table C.X.1.2.2.3.2-1, the response data structures and response codes specified in table C.X.1.2.2.3.2-2, and the response options specified in table C.X.1.2.2.3.2-3.

Table C.2.1.2.2.3.2-1: Data structures supported by the POST Request payload on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| UeConfigDoc | M | 1 | The UE configuration to be created. |

Table C.2.1.2.2.3.2-2: Data structures supported by the POST Response payload on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| UeConfigDoc | O | 0..1 | 2.01 Created | The UE configuration was created successfully.The "ueConfigDocId" of the created resource shall be returned in the "Location-Path" option. |
| NOTE: The mandatory CoAP error status codes for the POST method listed in table C.1.3-1 shall also apply. |

Table C.2.1.2.2.3.2-3: Options supported by the 2.01 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location-Path | string | M | 1 | Contains the location path of the newly created resource relative to the request URI. It contains the ueConfigDocId segment of the complete resource URI according to the structure: {apiRoot}/su-uc/<apiVersion>/val-services/{valServiceId}/ue-configurations/{ueConfigDocId} |

#### C.X.1.2.3 Resource: Individual UE Configuration

##### C.X.1.2.3.1 Description

The Individual UE Configuration resource represents an individual UE configuration stored at the SCM-S for a given VAL service. This resource is observable.

##### C.X.1.2.3.2 Resource Definition

Resource URI: **{apiRoot}/su-uc/<apiVersion>/val-services/{valServiceId}/ue-configurations/{ueConfigDocId}**

This resource shall support the resource URI variables defined in the table C.X.1.2.3.2-1.

Table C.X.1.2.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data Type | Definition |
| apiRoot | string | See clause C.1.1 |
| apiVersion | string | See clause C.2.1.1 |
| valServiceId | string | Identifier of a VAL service. |
| ueConfigDocId | string | Represents an individual UE configuration resource. |

##### C.X.1.2.3.3 Resource Standard Methods

###### C.X.1.2.3.3.1 GET

This operation retrieves the UE configuration document.

This method shall support the request options specified in table C.X.1.2.3.3.1-1, the response data structures and response codes specified in table C.X.1.2.3.3.1-2, and the response options specified in table C.X.1.2.3.3.1-3.

Table C.X.1.2.3.3.1-1: Options supported by the GET Request on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Observe | uint | O | 0..1 | When set to 0 (Register) it extends the GET request to subscribe to the changes of this resource.When set to 1 (Deregister) it cancels the subscription. |
| NOTE: Other request options also apply in accordance with normal CoAP procedures. |

Table C.X.1.2.3.3.1-2: Data structures supported by the GET Response payload on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| UeConfigDoc | M | 1 | 2.05 Content | The UE configuration based on the request from the SCM-C. |
| NOTE: The mandatory CoAP error status codes for the GET Request listed in table C.1.3-1 shall also apply. |

Table C.X.1.2.3.3.1-3: Options supported by the 2.05 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Observe | uint | O | 0..1 | Sequence number of the notification. |
| NOTE: Other response options also apply in accordance with normal CoAP procedures. |

###### C.X.1.2.3.3.2 PUT

This operation updates the UE configuration document.

This method shall support the request data structures specified in table C.X.1.2.3.3.2-1 and the response data structures and response codes specified in table C.X.1.2.3.3.2-2.

Table C.X.1.2.3.3.2-1: Data structures supported by the PUT Request payload on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| UeConfigDoc | M | 1 | Updated details of the UE configuration document. |

Table C.X.1.2.3.3.2-2: Data structures supported by the PUT Response payload on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| UeConfigDoc | O | 1 | 2.04 Changed | The UE configuration document updated successfully and the updated UE configuration document may be returned in the response.  |
| NOTE: The mandatory CoAP error status codes for the PUT method listed in table C.1.3-1 shall also apply. |

###### C.X.1.2.3.3.3 DELETE

This operation deletes the UE configuration document.

This method shall support the response data structures and response codes specified in table C.X.1.2.3.3.3-1.

Table C.X.1.2.3.3.3-1: Data structures supported by the DELETE Response payload on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| n/a |  |  | 2.02 Deleted | The individual UE configuration document matching the ueConfigDocId is deleted. |
| NOTE: The mandatory CoAP error status codes for the DELETE method listed in table C.1.3-1 shall also apply. |

### C.X.1.3 Data Model

#### C.X.1.3.1 General

Table C.X.1.3.1-1 specifies the data types defined specifically for the SU\_UeConfig resource representation.

Table C.X.1.3.1-1: SU\_UeConfig API specific data types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| UeConfigDoc | C.X.1.4.2.1 | UE configuration document. |  |
| UeConfig | C.X.1.4.2.2 | UE configuration including configuration data. |  |
| ValUeIds | C.X.1.4.2.3 | VAL UE identifiers. |  |
| ImeiRange | C.X.1.3.2.4 | Range of IMEIs. |  |
| SnrRange | C.X.1.3.2.5 | Range of UE serial numbers. |  |
| SerialNumber | C.X.1.3.3.1 | Serial number of a UE. |  |
| TypeAllocationCode | C.X.1.3.3.1 | Type allocation code. |  |

Table C.X.1.3.1-2 specifies data types re-used by the SS\_Events API service:

Table C.X.1.3.1-2: Reused data types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| ConfigType | C.2.1.4.3.1 | Configuration type. |  |
| Uri | C.1.X.3 | Unified resource identifier. |  |

#### C.X.1.3.2 Structured data types

##### C.X.1.3.2.1 Type: UeConfigDoc

Table C.X.1.3.2.1-1: Definition of type UeConfigDoc

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ueConfigDocId | string | O | 0..1 | Contains the ueConfigDocId of the complete resource URI of this UE configuration document according to the structure: {apiRoot}/su-uc/<apiVersion>/val-services/{valServiceId}/ue-configurations/{ueConfigDocId}This attribute shall be provided by the SCM-S in CoAP responses. |  |
| configName | string | O | 0..1 | Displayable name of the UE configuration document. |  |
| valServiceDomain | string | M | 1 | Domain name of the VAL service for which the configuration document is applicable. |  |
| valServiceId | string | O | 0..1 | VAL service idenity for which the configuration document is applicable. |  |
| valUeIds | ValUeIds | O | 0..1 | Defines a set of VAL UE IDs for which the configuration document is applicable. |  |
| ueConfigs | array(UeConfig) | O | 0..N | List of UE configurations of different configuration types, i.e. there shall not be 2 configuration with the same value of configType. |  |

##### C.X.1.3.2.2 Type: UeConfig

Table C.X.1.3.2.2-1: Definition of type UeConfig

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| configType | ConfigType (NOTE) | M | 1 | Indicates the type of the UE configuration. |  |
| configData | string | M | 1 | Actual UE configuration data. |  |
| NOTE: Only the values COMMON and ON\_NETWORK are applicable in the present specification. |

##### C.X.1.3.2.3 Type: ValUeIds

Table C.X.1.3.2.3-1: Definition of type ValUeIds

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| uris | array(Uri) | O | 0..N | List of VAL UE identities, each identity defined by a URI. |  |
| imeiRanges | array(ImeiRange) | O | 0..N | List of IMEI ranges. |  |

##### C.X.1.3.2.4 Type: ImeiRange

Table C.X.1.3.2.4-1: Definition of type ImeiRange

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tac | TypeAllocationCode | M | 1 | Type allocation code of the UEs. |  |
| snrs | array(SerialNumber) | O | 0..N | List of UE serial numbers. |  |
| snrRange | SnrRange | O | 0..1 | Range of UE serial numbers. |  |

##### C.X.1.3.2.5 Type: SnrRange

Table C.X.1.3.2.5-1: Definition of type SnrRange

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| low | SerialNumber | M | 1 | First UE serial number identifying the start of a UE serial number range. |  |
| high | SerialNumber | M | 1 | Last UE serial number identifying the end of a UE serial number range. |  |

#### C.X.1.3.3 Simple data types and enumerations

##### C.X.1.3.3.1 Simple data types

Table C.X.1.3.3.1-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| TypeAllocationCode | string | Type Allocation Code (TAC) of the UE, comprising the initial eight-digit portion of the 15-digit IMEI and 16-digit IMEISV codes. See clause 6.2 of 3GPP TS 23.003 [ts23003].Pattern: '^[0-9]{8}$' |
| SerialNumber | string | Serial number of the UE, comprising the six-digit portion of the 15-digit IMEI and 16-digit IMEISV codes. See clause 6.2 of 3GPP TS 23.003 [ts23003]. Leading 0s may be excluded.Pattern: '^[0-9]{1,6}$'  |

### C.X.1.4 Error Handling

General error responses are defined in clause C.1.3.

### C.X.1.5 CDDL Specification

#### C.X.1.5.1 Introduction

The data model described in clause C.X.1.3 shall be binary encoded in the CBOR format as described in IETF RFC 8949 [17].

Clause C.X.1.5.2 uses the Concise Data Definition Language described in IETF RFC 8610 [18] and provides corresponding representation of the SU\_UeConfig API data model.

#### C.X.1.5.2 CDDL document

;;; UeConfigDoc

;;+ Represents UE configuration information associated with a VAL service.

UeConfigDoc = {

 ? UeConfigDocId: text

 ? configName: text ; Name of the config

 valServiceDomain: text

 ? valServiceId: text

 ? valUeIds: ValUeIds

 ? ueConfigs: [+ UeConfig]

}

;;; UeConfig

;;+ UE configuration.

UeConfig = {

 configType: ConfigType

 configData: text ; Actual UE configuration data.

}

;;; ConfigType

;;+ Indicates the type of the UE configuration.

ConfigType = "COMMON" / "ON\_NETWORK" / text

;;; ValUeIds

;;+ VAL UE identities for which the UE configuration is applicable.

ValUeIds = {

 ? uris: [+ Uri]

 ? imeiRanges: [+ ImeiRange]

}

;;; ImeiRange

;;+ Defines a range of IMEIs.

ImeiRange = {

 tac: TypeAllocationCode

 ? snrs: [+ SerialNumber]

 ? snrRange: SnrRange

}

;;; SnrRange

;;+ Defines a range of SerialNumbers.

SnrRange = {

 low: SerialNumber

 high: SerialNumber

}

;;; TypeAllocationCode

;;+ Type Allocation Code.

TypeAllocationCode = text .regexp "[0-9]{8}"

;;; SerialNumber

;;+ Serial Number.

SerialNumber = text .regexp "[0-9]{1,6}" ;

;;; Uri

;;+ URI

Uri = text ; formatted according to RFC 3986

### C.X.1.6 Media Type

The media type for a user profile document shall be "application/vnd.3gpp.seal-ue-config-info+cbor".

Editor's Note: It is possible to specify other payload format for CoAP than CBOR, and the details about other payload format is FFS.

### C.X.1.7 Media Type registration for application/vnd.3gpp.seal-ue-config-info+cbor

Type name: application

Subtype name: vnd.3gpp.seal-ue-config-info+cbor

Required parameters: none

Optional parameters: none

Encoding considerations: Must be encoded as using IETF RFC 8949 [17]. See 3GPP TS 24.546 clause C.X.1.3 for details.

Security considerations: See Section 10 of IETF RFC 8949 [17] and Section 11 of IETF RFC 7252 [12].

Interoperability considerations: Applications must ignore any key-value pairs that they do not understand. This allows backwards-compatible extensions to this specification.

Published specification: 3GPP TS 24.546 "Configuration management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification", available via http://www.3gpp.org/specs/numbering.htm.

Applications that use this media type: Applications supporting the SEAL configuration management procedures as described in the published specification.

Fragment identifier considerations: Fragment identification is the same as specified for "application/cbor" media type in IETF RFC 8949 [17]. Note that currently that RFC does not define fragmentation identification syntax for "application/cbor".

Additional information:

Deprecated alias names for this type: N/A

Magic number(s): N/A

File extension(s): none

Macintosh file type code(s): none

Person & email address to contact for further information: <MCC name>, <MCC email address>

Intended usage: COMMON

Restrictions on usage: None

Author: 3GPP CT1 Working Group/3GPP\_TSG\_CT\_WG1@LIST.ETSI.ORG

Change controller: <MCC name>/<MCC email address>

Editor's Note: The registration for application/vnd.3gpp.seal-ue-config-info+cbor is TBD.

\* \* \* End of Changes \* \* \* \*