





































































































































































































**Table 6.2.3.21.3.1-3: Data structures supported by the GET Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
ImeiSvInformation	M	1	200 OK	A response body containing the IMEI(SV) information for the user shall be returned.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - USER_NOT_FOUND - DATA_NOT_FOUND
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate the following application error: - OPERATION_NOT_ALLOWED

## 6.2.3.22 Resource: IP Address Information

### 6.2.3.22.1 Description

This resource represents the IP Address Information. It is queried by the service consumer (e.g. SCC-AS) to retrieve the IP Address Information for the user.

### 6.2.3.22.2 Resource Definition

Resource URI: {apiRoot}/nhss-ims-sdm/{apiVersion}/{imsUeid}/access-data/ps-domain/ip-address

This resource shall support the resource URI variables defined in table 6.2.3.22.2-1.

**Table 6.2.3.22.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.2.1
apiVersion	See clause 6.2.1
imsUeid	Represents the IMS Public Identity (i.e. non-shared IMS Public User identity) or the IMS Private Identity.  pattern: "^((impu-sip):([a-zA-Z0-9_\.!~*()&=+\$.;?V])\@[([A-Za-z0-9]+([-A-Za-z0-9]+)\.))+[a-z]{2,} impu-tel:[0-9]{5,15} impi-.[+.]\$"

### 6.2.3.22.3 Resource Standard Methods

#### 6.2.3.22.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.22.3.1-1.

**Table 6.2.3.22.3.1-1: URI query parameters supported by the GET method on this resource**

Name	Data type	P	Cardinality	Description	Applicability
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [4] clause 6.6	

This method shall support the request data structures specified in table 6.2.3.22.3.1-2 and the response data structures and response codes specified in table 6.2.3.22.3.1-3.

**Table 6.2.3.22.3.1-2: Data structures supported by the GET Request Body on this resource**

Data type	P	Cardinality	Description
n/a			

**Table 6.2.3.22.3.1-3: Data structures supported by the GET Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
IpAddress	M	1	200 OK	A response body containing the IP address (IPv4, Ipv6, Ipv6 prefix and/or IPv6 interface identifier) for the user shall be returned.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - USER_NOT_FOUND - DATA_NOT_FOUND  DATA_NOT_FOUND indicates that no IP Address is currently allocated for the user.
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate the following application error: - OPERATION_NOT_ALLOWED

### 6.2.3.23 Resource: T-ADS Information

#### 6.2.3.23.1 Description

This resource represents the T-ADS Information. It is queried by the service consumer (e.g. SCC-AS) to retrieve the T-ADS Information for the user.

#### 6.2.3.23.2 Resource Definition

Resource URI: {apiRoot}/nhss-ims-sdm/{apiVersion}/{imsUeId}/access-data/ps-domain/tads-info

This resource shall support the resource URI variables defined in table 6.2.3.23.2-1.

**Table 6.2.3.23.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.2.1
apiVersion	See clause 6.2.1
imsUeId	Represents the IMS Public Identity (i.e. non-shared IMS Public User identity) or the IMS Private Identity.  pattern: " <code>^(impu-sip):([a-zA-Z0-9_\.!~*]&amp;=+\$.;?V+)\)@([A-Za-z0-9]+([-A-Za-z0-9]+)\.)+[a-z]{2,} impu-tel:[0-9]{5,15} impi-[a-z]{2,}\$</code> "

### 6.2.3.23.3 Resource Standard Methods

#### 6.2.3.23.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.23.3.1-1.

**Table 6.2.3.23.3.1-1: URI query parameters supported by the GET method on this resource**

Name	Data type	P	Cardinality	Description	Applicability
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [4] clause 6.6	

This method shall support the request data structures specified in table 6.2.3.23.3.1-2 and the response data structures and response codes specified in table 6.2.3.23.3.1-3.



**Table 6.2.3.24.3.1-2: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
UeReachabilitySubscription	M	1	The subscription to UE reachability for IP that is to be created.

**Table 6.2.3.24.3.1-3: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
UeReachabilitySubscription	M	1	201 Created	Upon success, a response body containing a representation of the created Individual subscription resource shall be returned.  The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource.
ProblemDetails	M	1	404 Not Found	The "cause" attribute shall be set to the following application error: - USER_NOT_FOUND

6.2.3.25 Resource: Individual subscription

6.2.3.25.1 Description

This resource is used to represent an individual subscription to notification of UE reachability for IP.

6.2.3.25.2 Resource Definition

Resource URI: {apiRoot}/nhss-ims-sdm/{apiVersion}/{imsUeId}/access-data/ps-domain/ue-reach-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.2.3.25.2-1.

**Table 6.2.3.25.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.2.1
apiVersion	See clause 6.2.1
imsUeId	Represents the IMS Public Identity (i.e. IMS Public User identity or Public Service Identity)  pattern: "^([sip]:([a-zA-Z0-9_\.!~*()&=+\$.;?V]+)\@([A-Za-z0-9]+([-A-Za-z0-9]+)\.)+[a-z]{2,}) tel:[+0-9]{5,15})\$"
subscriptionId	The subscriptionId identifies an individual subscription to notification of UE reachability for IP.

6.2.3.25.3 Resource Standard Methods

6.2.3.25.3.1 DELETE

This method shall support the URI query parameters specified in table 6.2.3.25.3.1-1.

**Table 6.2.3.25.3.1-1: URI query parameters supported by the DELETE method on this resource**

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.3.7.3.1-2 and the response data structures and response codes specified in table 6.2.3.7.3.1-3.



### 6.2.3.26 Resource: PS User State Information

#### 6.2.3.26.1 Description

This resource represents the User State information in PS domain. It is queried by the service consumer (e.g. AS) to retrieve the User State information in PS domain as retrieved from the serving node(s). The service consumer may indicate the requested nodes for which the request is applicable (e.g. AMF only)

#### 6.2.3.26.2 Resource Definition

Resource URI: {apiRoot}/nhss-ims-sdm/{apiVersion}/{imsUeId}/access-data/ps-domain/user-state

This resource shall support the resource URI variables defined in table 6.2.3.26.2-1.

**Table 6.2.3.15.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.2.1
apiVersion	See clause 6.2.1
imsUeId	Represents the IMS Public Identity (i.e. non-shared IMS Public User identity or Public Service Identity) or the IMS private Identity. pattern: "^(impu-sip:([a-zA-Z0-9_-.!*()&=+\$.;,?V]+)@[A-Za-z0-9]+([-A-Za-z0-9]+).)+[a-z]{2,} impu-tel:\+[0-9]{5,15} impi-+.[+])\$"

#### 6.2.3.26.3 Resource Standard Methods

##### 6.2.3.26.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.26.3.1-1.

**Table 6.2.3.26.3.1-1: URI query parameters supported by the GET method on this resource**

Name	Data type	P	Cardinality	Description
requested-nodes	array(RequestedNode)	O	0..N	Indicates the serving node(s) for which the request is applicable.
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [4] clause 6.6

If "requested-nodes" is not included, HSS shall return the user state as retrieved from all the nodes (AMF, MME and SGSN)

This method shall support the request data structures specified in table 6.2.3.26.3.1-2 and the response data structures and response codes specified in table 6.2.3.26.3.1-3.

**Table 6.2.3.26.3.1-2: Data structures supported by the GET Request Body on this resource**

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.26.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
PsUserState	M	1	200 OK	A response body containing the PS user state information as requested shall be returned.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - USER_NOT_FOUND - DATA_NOT_FOUND  DATA_NOT_FOUND indicates that the user state information is unknown or unavailable.
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate the following application error: - OPERATION_NOT_ALLOWED

### 6.2.3.27 Resource: CS User State Information

#### 6.2.3.27.1 Description

This resource represents the User State information in CS domain. It is queried by the service consumer (e.g. AS) to retrieve the User State information in CS domain as retrieved from the MSC/VLR.

#### 6.2.3.27.2 Resource Definition

Resource URI: {apiRoot}/nhss-ims-sdm/{apiVersion}/{imsUeId}/access-data/cs-domain/user-state

This resource shall support the resource URI variables defined in table 6.2.3.27.2-1.

Table 6.2.3.15.2-1: Resource URI variables for this resource

Name	Definition
apiRoot	See clause 6.2.1
apiVersion	See clause 6.2.1
imsUeId	Represents the IMS Public Identity (i.e. non-shared IMS Public User identity or Public Service Identity) or the IMS private Identity.  pattern: "^([impu-sip]:([a-zA-Z0-9_!\~*]*)&=+\${,;?V}+)@([A-Za-z0-9]+([-A-Za-z0-9]+)\.)+[a-z]{2,} [impu-tel]:\+[0-9]{5,15} [impi-.+.]+\$"

#### 6.2.3.27.3 Resource Standard Methods

##### 6.2.3.27.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.27.3.1-1.

Table 6.2.3.27.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [4] clause 6.6

This method shall support the request data structures specified in table 6.2.3.27.3.1-2 and the response data structures and response codes specified in table 6.2.3.27.3.1-3.







































## 6.2.6.2.40 Type: CsUserState

**Table 6.2.6.2.40-1: Definition of type PsUserState**

Attribute name	Data type	P	Cardinality	Description
mscVlrUserState	UserStateCs	M	1	User state as retrieved from MSC/VLR

## 6.2.6.2.41 Type: Csrn

**Table 6.2.6.2.41-1: Definition of type CsrnInformation**

Attribute name	Data type	P	Cardinality	Description
csrn	Msisdn	M	1	Contains a CS domain routeing number as retrieved from MSC/VLR

## 6.2.6.2.42 Type: ReferenceLocationInformation

**Table 6.2.6.2.42-1: Definition of type ReferenceLocationInformation**

Attribute name	Data type	P	Cardinality	Description
accessType	string	C	1	Indicates the type of access for which the reference location of the user is defined (e.g. ADSL).
accessInfo	string	C	1	Indicates the type of the access information defined for the reference location of the user (e.g. dsl-location).
accessValue	string	C	1	It contains the location information (e.g. line identifier in fixed access networks) as configured by the operator.
NOTE 1: At least one of accessType or accessInfo or accessValue shall be present.				
NOTE 2: The syntax of accessType, accessInfo and accessValue is as described in 3GPP TS 24.229 [18] for P-Access-Network-Info header fields: accessType corresponds to the "access-type" field whereas accessInfo and accessValue correspond to the type and associated value defined for the "access-info" field.				

## 6.2.6.2.43 Type: SmsRegistrationInfo

**Table 6.2.6.2.43-1: Definition of type SmsRegistrationInfo**

Attribute name	Data type	P	Cardinality	Description
ipSmGwNumber	Msisdn	M	1	IP-SM-GW number
scAddress	Msisdn	O	0..1	Short Message Service Centre Address

## 6.2.6.2.44 Type: IpSmGwAddress

**Table 6.2.6.2.44-1: Definition of type IpSmGwAddress**

Attribute name	Data type	P	Cardinality	Description
ipSmGwNumber	Msisdn	M	1	IP-SM-GW number
ipSmGwDiaUri	DiameterIdentity	O	0..1	IP-SM-GW Diameter Uri. It shall be present if s6c is supported.
ipSmGwDiaRealm	DiameterIdentity	O	0..1	IP-SM-GW Diameter Realm. It shall be present if s6c is supported.



















**Table 6.3.3.1-1: Resources and methods overview**

Resource name (Archetype)	Resource URI	HTTP method or custom operation	Description
SecurityInformation (Custom operation)	/[{impi}]/security-information/generate-sip-auth-data	generate-sip-auth-data (POST)	The HSS takes the variable {impi} and, if applicable, fetches the corresponding SUPI. The HSS calculates a fresh authentication vector based on the received information and the stored security information, if IMS-AKA is selected. Otherwise, the HSS provides the corresponding authentication information.

### 6.3.3.2 Resource: SecurityInformation

#### 6.3.3.2.1 Description

This resource represents the information that is needed together with the SIP authentication scheme to calculate a fresh authentication vector.

#### 6.3.3.2.2 Resource Definition

Resource URI: {apiRoot}/nhss-ims-ueau/v1/{impi}/security-information

This resource shall support the resource URI variables defined in table 6.3.3.2.2-1.

**Table 6.3.3.2.2-1: Resource URI variables for this resource**

Name	Definition
apiRoot	See clause 6.3.1
impi	Represents the IMS Private Identity (see 3GPP TS 23.003 [13] clause 13.3. Pattern: "^([impi-.+ .+]\$"

#### 6.3.3.2.3 Resource Standard Methods

No Standard Methods are supported for this resource.

#### 6.3.3.2.4 Resource Custom Operations

##### 6.3.3.2.4.1 Overview

**Table 6.3.3.2.4.1-1: Custom operations**

Custom operation URI	Mapped HTTP method	Description
/generate-sip-auth-data	POST	Select the authentication method and calculate a fresh AV if IMS-AKA is selected or provides corresponding authentication information.

#### 6.3.3.2.4.2 Operation: generate-sip-auth-data

##### 6.3.3.2.4.2.1 Description

This custom operation is used by the NF service consumer (S-CSCF) to request authentication information data for the IMPI from the HSS. The HSS calculates an authentication vector taking into account the information received from the NF service consumer (S-CSCF) and the current representation of this resource if IMS AKA is selected. For details see 3GPP TS 33.203 [14].

##### 6.3.3.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.3.3.2.4.2.2-1 and the response data structure and response codes specified in table 6.3.3.2.4.2.2-2.

**Table 6.3.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource**

Data type	P	Cardinality	Description
SipAuthenticationInfoRequest	M	1	Contains the SIP Authentication Scheme, the number of authentication items and Resynchronization Information

**Table 6.3.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource**

Data type	P	Cardinality	Response codes	Description
SipAuthenticationInfoResult	M	1	200 OK	Upon success, a response body containing the selected authentication method and an authentication vector if IMS AKA has been selected shall be returned.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate the following application error: - USER_NOT_FOUND
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - AUTHENTICATION_REJECTED - UNSUPPORTED_SIP_AUTH_SCHEME

## 6.3.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nhss\_imsUEAuthentication Service.

## 6.3.5 Notifications

In this release of this specification, no notifications are defined for the Nhss\_imsUEAuthentication Service.

## 6.3.6 Data Model

### 6.3.6.1 General

This clause specifies the application data model supported by the API.

Table 6.3.6.1-1 specifies the structured data types defined for the Nhss\_imsUEAU service API.



## 6.3.6.2.3 Type: SipAuthenticationInfoResult

**Table 6.3.6.2.3-1: Definition of type AuthenticationInfoResult**

Attribute name	Data type	P	Cardinality	Description
sipAuthenticationScheme	SipAuthenticationScheme	M	1	SIP Authentication Scheme used by service producer (HSS)
3gAkaAvs	array(3GAkaAv)	O	1..N	If IMS AKA is requested, it shall be present and will contain Authentication Vectors.
digestAuth	DigestAuthentication	O	0..1	If SIP Digest is used, it shall be present and shall contain the digest realm, algorithm, QoP and HA1.
lineIdentifierList	array(LineIdentifier)	O	0..N	If NBA is used, it shall be present and shall contain a list of fixed broadband access line identifiers associated to the user.
ipAddress	IpAddress	O	0..1	If GIBA is used, it shall be present and shall contain an IP address (IPv4, or IPv6, or IPv6 prefix)

## 6.3.6.2.4 Type: ResynchronizationInfo

**Table 6.3.6.2.4-1: Definition of type ResynchronizationInfo**

Attribute name	Data type	P	Cardinality	Description
rand	Rand	M	1	
auts	Auts	M	1	

## 6.3.6.2.5 Type: 3GAkaAv

**Table 6.3.6.2.5-1: Definition of type 3gAkaAv**

Attribute name	Data type	P	Cardinality	Description
rand	Rand	M	1	
xres	Xres	M	1	
autn	Autn	M	1	
ck	Ck	M	1	
ik	Ik	M	1	

## 6.3.6.2.6 Type: DigestAuthentication

**Table 6.3.6.2.6-1: Definition of type DigestAuthentication**

Attribute name	Data type	P	Cardinality	Description
digestRealm	string	M	1	Digest realm. See IETF RFC 4740 [17].
digestAlgorithm	SipDigestAlgorithm	M	1	Digest Algorithm. See IETF RFC 4740 [17].
digestQop	SipDigestQop	M	1	Quality of Protection. See IETF RFC 4740 [17].
ha1	string	M	1	Hash H(A1). See IETF RFC 4740 [17].

## 6.3.6.2.7 Type: IpAddress

The type IpAddress represents the IP address for GIBA scheme. It shall comply with the provisions defined in table 6.3.6.2.7-1.

**Table 6.3.6.2.7-1: Definition of type IpAddress**

Attribute name	Data type	P	Cardinality	Description
ipv4Addr	Ipv4Addr	C	0..1	
ipv6Addr	Ipv6Addr	C	0..1	
ipv6Prefix	Ipv6Prefix	C	0..1	
NOTE: Either ipv4Addr, or ipv6Addr, or ipv6Prefix shall be present.				









```

parameters:
  - name: imsUeId
    in: path
    description: IMS Identity
    required: true
    schema:
      $ref: '#/components/schemas/ImsUeId'
requestBody:
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/ScscfRegistration'
  required: true
responses:
  '201':
    description: Created
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ScscfRegistration'
  '200':
    description: Expected response to a valid request
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ScscfRegistration'
  '204':
    description: No content
  '403':
    description: Forbidden
    content:
      application/problem+json:
        schema:
          $ref: '#/components/schemas/ExtendedProblemDetails'
  '404':
    description: Not found
    content:
      application/problem+json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
  default:
    description: Unexpected error

/{impu}/scscf-registration/scscf-restoration-info:
  put:
    summary: Update the S-CSCF restoration information of the UE
    operationId: UpdateScscfRestorationInfo
    tags:
      - Update the S-CSCF restoration information of the UE
    security:
      - {}
      - oAuth2ClientCredentials:
        - nhss-ims-uecm
      - oAuth2ClientCredentials:
        - nhss-ims-uecm
        - nhss-ims-uecm:restoration:modify
    parameters:
      - name: impu
        in: path
        description: Public identity of the user.
        required: true
        schema:
          $ref: '#/components/schemas/Impu'
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ScscfRestorationInfoRequest'
      required: true
    responses:
      '201':
        description: Created
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ScscfRestorationInfoResponse'
    headers:
      Location:

```

```

        description: 'Contains the URI of the newly created resource, according to the
structure: {apiRoot}/nhss_imsUECM/v1/{impu}/scscf-registration/scscf-restoration-info'
        required: true
        schema:
            type: string
    '200':
        description: OK
        content:
            application/json:
                schema:
                    $ref: '#/components/schemas/ScscfRestorationInfoResponse'
    '204':
        description: No content
    '403':
        $ref: 'TS29571_CommonData.yaml#/components/responses/403'
```

```

get:
    summary: Retrieve the S-CSCF restoration
    operationId: GetScscfRestorationInfo
    tags:
        - S-CSCF Restoration Info Retrieval
    security:
        - {}
        - OAuth2ClientCredentials:
            - nhss-ims-uecm
        - OAuth2ClientCredentials:
            - nhss-ims-uecm
            - nhss-ims-uecm:restoration:read
    parameters:
        - name: impu
          in: path
          description: Public identity of the user.
          required: true
          schema:
            $ref: '#/components/schemas/Impu'
    responses:
        '200':
            description: Expected response to a valid request
            content:
                application/json:
                    schema:
                        $ref: '#/components/schemas/ScscfRestorationInfoResponse'
        '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'
```

```

delete:
    summary: Delete the S-CSCF restoration
    operationId: DeleteScscfRestorationInfo
    tags:
        - S-CSCF Restoration Info Delete
    security:
        - {}
        - OAuth2ClientCredentials:
            - nhss-ims-uecm
        - OAuth2ClientCredentials:
            - nhss-ims-uecm
            - nhss-ims-uecm:restoration:modify
    parameters:
        - name: impu
          in: path
          description: Public identity of the user.
          required: true
          schema:
            $ref: '#/components/schemas/Impu'
    responses:
        '204':
            description: No content
        '403':
            $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'
```

components:

```

securitySchemes:
    OAuth2ClientCredentials:
        type: oauth2
        flows:
```

```

    clientCredentials:
      tokenUrl: '{nrfApiRoot}/oauth2/token'
      scopes:
        nhss-ims-uecm: Access to the Nhss IMS UE Context Management API
        nhss-ims-uecm:authorize:invoke: Access to invoke the Authorize custom operation
        nhss-ims-uecm:registration:create: Access to create S-CSCF Registration resources
        nhss-ims-uecm:restoration:read: Access to read the S-CSCF Restoration resource
        nhss-ims-uecm:restoration:modify: Access to create/update/delete the S-CSCF Restoration
resource

    schemas:

# COMPLEX TYPES:

AuthorizationRequest:
  description: Ims authorization request data
  type: object
  required:
    - authorizationType
  properties:
    impi:
      $ref: '#/components/schemas/Impi'
    authorizationType:
      description: authorization type
      $ref: '#/components/schemas/AuthorizationType'
    visitedNetworkIdentifier:
      type: string
    emergencyIndicator:
      type: boolean
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

AuthorizationResponse:
  description: Ims Registration authorization information result
  type: object
  properties:
    authorizationResult:
      $ref: '#/components/schemas/AuthorizationResult'
    cscfServerName:
      type: string

ScscfRegistration:
  description: Scscf Registration
  type: object
  required:
    - imsRegistrationType
    - cscfServerName
  properties:
    impi:
      $ref: '#/components/schemas/Impi'
    imsRegistrationType:
      description: Ims registration type
      $ref: '#/components/schemas/ImsRegistrationType'
    cscfServerName:
      type: string
    scscfInstanceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    deregCallbackUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    associatedImpis:
      type: array
      items:
        $ref: '#/components/schemas/Impi'
    associatedRegisteredImpis:
      type: array
      items:
        $ref: '#/components/schemas/Impi'
    irsImpus:
      type: array
      items:
        $ref: '#/components/schemas/Impu'
      minItems: 1
      uniqueItems: true
    wilddcardedPui:
      $ref: '#/components/schemas/Impu'
    looseRouteIndicator:
      $ref: '#/components/schemas/LooseRouteIndication'
    wilddcardedPsi:

```

```

    $ref: '#/components/schemas/Impu'
  supportedFeatures:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  multipleRegistrationIndicator:
    type: boolean
  pcscfRestorationIndicator:
    type: boolean
    default: false

ExtendedProblemDetails:
  allOf:
  - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
  - $ref: '#/components/schemas/AdditionalInfo'

AdditionalInfo:
  type: object
  properties:
    scscfServerName:
      type: string

ScscfRestorationInfo:
  description: S-CSCF restoration information
  type: object
  properties:
    userName:
      $ref: '#/components/schemas/Impi'
    restorationInfo:
      type: array
      items:
        $ref: '#/components/schemas/RestorationInfo'
    registrationTimeout:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    sipAuthenticationScheme:
      $ref: '#/components/schemas/SipAuthenticationScheme'

ScscfRestorationInfoRequest:
  description: S-CSCF restoration information request
  type: object
  properties:
    scscfRestorationInfoRequest:
      $ref: '#/components/schemas/ScscfRestorationInfo'

ScscfRestorationInfoResponse:
  description: S-CSCF restoration information response
  type: object
  properties:
    scscfRestorationInfoResponse:
      type: array
      items:
        $ref: '#/components/schemas/ScscfRestorationInfo'

RestorationInfo:
  description: The information relevant to a specific registration required for an S-CSCF to
  handle the requests for a user
  type: object
  required:
  - path
  - contact
  properties:
    path:
      type: string
    contact:
      type: string
    initialCSeqSequenceNumber:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInt32'
    callIdSipHeader:
      type: string
    ueSubscriptionInfo:
      $ref: '#/components/schemas/UeSubscriptionInfo'
    pcscfSubscriptionInfo:
      $ref: '#/components/schemas/PcscfSubscriptionInfo'

UeSubscriptionInfo:
  type: object
  required:
  - callIdSipHeader
  - fromSipHeader
  - toSipHeader

```











```

'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
'504':
  $ref: 'TS29571_CommonData.yaml#/components/responses/504'
default:
  $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/{imsUeId}/ims-data/location-data/server-name:
  get:
    summary: Retrieve the server name for the associated user
    operationId: GetSserverName
    tags:
      - Server Name retrieval
    security:
      - {}
      - oAuth2ClientCredentials:
        - nhss-ims-sdm
      - oAuth2ClientCredentials:
        - nhss-ims-sdm
        - nhss-ims-sdm:server-name:read
    parameters:
      - name: imsUeId
        in: path
        description: IMS Identity
        required: true
        schema:
          $ref: '#/components/schemas/ImsUeId'
      - name: supported-features
        in: query
        description: Supported Features
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    responses:
      '200':
        description: Expected response to a valid request
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsLocationData'
      '404':
        $ref: 'TS29571_CommonData.yaml#/components/responses/404'
      '405':
        $ref: 'TS29571_CommonData.yaml#/components/responses/405'
      '500':
        $ref: 'TS29571_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      '504':
        $ref: 'TS29571_CommonData.yaml#/components/responses/504'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/{imsUeId}/ims-data/location-data/scscf-capabilities:
  get:
    summary: Retrieve the S-CSCF capabilities for the associated IMS subscription
    operationId: GetScscfCapabilities
    tags:
      - Retrieval of the S-CSCF capabilities for the IMS subscription
    security:
      - {}
      - oAuth2ClientCredentials:
        - nhss-ims-sdm
      - oAuth2ClientCredentials:
        - nhss-ims-sdm
        - nhss-ims-sdm:scscf-capabilities:read
    parameters:
      - name: imsUeId
        in: path
        description: IMS Identity
        required: true
        schema:
          $ref: '#/components/schemas/ImsUeId'
    responses:
      '200':
        description: Expected response to a valid request
        content:

```

































```
- nhss-ims-sdm
- oAuth2ClientCredentials:
  - nhss-ims-sdm
  - nhss-ims-sdm:wireline-domain:reference-location:read
parameters:
  - name: imsUeId
    in: path
    description: IMS Identity
    required: true
    schema:
      $ref: '#/components/schemas/ImsUeId'
  - name: supported-features
    in: query
    description: Supported Features
    schema:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
responses:
  '200':
    description: Expected response to a valid request
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ReferenceLocationInformation'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '405':
    $ref: 'TS29571_CommonData.yaml#/components/responses/405'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  '504':
    $ref: 'TS29571_CommonData.yaml#/components/responses/504'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/{imsUeId}/subscriptions:
  post:
    summary: subscribe to notifications
    operationId: ImdSdmSubscribe
    tags:
      - SDM Subscription Creation
    security:
      - {}
      - oAuth2ClientCredentials:
          - nhss-ims-sdm
      - oAuth2ClientCredentials:
          - nhss-ims-sdm
          - nhss-ims-sdm:subscriptions:create
    parameters:
      - name: imsUeId
        in: path
        description: IMS Public Identity
        required: true
        schema:
          $ref: '#/components/schemas/ImsUeId'
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImsSdmSubscription'
      required: true
    responses:
      '201':
        description: Expected response to a valid request
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsSdmSubscription'
        headers:
          Location:
            description: 'Contains the URI of the newly created resource, according to the
structure: {apiRoot}/nhss-ims-sdm/<apiVersion>/{imsUeId}/subscriptions/{subscriptionId}'
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29571_CommonData.yaml#/components/responses/400'
```



```

security:
  - {}
  - oAuth2ClientCredentials:
      - nhss-ims-sdm
  - oAuth2ClientCredentials:
      - nhss-ims-sdm
      - nhss-ims-sdm:subscription:modify
parameters:
  - name: imsUeId
    in: path
    description: IMS Public Identity
    required: true
    schema:
      $ref: '#/components/schemas/ImsUeId'
  - name: subscriptionId
    in: path
    description: Id of the Subscription
    required: true
    schema:
      type: string
requestBody:
  content:
    application/json-patch+json:
      schema:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchItem'
        minItems: 1
      required: true
responses:
  '200':
    description: Expected response to a valid request
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ImsSdmSubscription'
  '204':
    description: Successful modification
  '400':
    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
  '403':
    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
  '500':
    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  default:
    description: Unexpected error
/shared-data-subscriptions:
  post:
    summary: subscribe to notifications for shared data
    operationId: SubscribeToSharedData
    tags:
      - Subscription Creation for shared data
    security:
      - {}
      - oAuth2ClientCredentials:
          - nhss-ims-sdm
      - oAuth2ClientCredentials:
          - nhss-ims-sdm
          - nhss-ims-sdm:shared-subscriptions:create
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ImsSdmSubscription'
          required: true
    responses:
      '201':
        description: Expected response to a valid request
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsSdmSubscription'
    headers:

```



```

    - oAuth2ClientCredentials:
      - nhss-ims-sdm
      - nhss-ims-sdm:shared-subscription:modify
    parameters:
      - name: subscriptionId
        in: path
        description: Id of the SDM Subscription
        required: true
        schema:
          type: string
    requestBody:
      content:
        application/json-patch+json:
          schema:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchItem'
            minItems: 1
      required: true
    responses:
      '200':
        description: Expected response to a valid request
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ImsSdmSubscription'
      '400':
        $ref: 'TS29571_CommonData.yaml#/components/responses/400'
      '403':
        $ref: 'TS29571_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29571_CommonData.yaml#/components/responses/404'
      '500':
        $ref: 'TS29571_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        description: Unexpected error

/shared-data:
  get:
    summary: retrieve shared data
    operationId: GetSharedData
    tags:
      - Retrieval of shared data
    security:
      - {}
      - oAuth2ClientCredentials:
        - nhss-ims-sdm
      - oAuth2ClientCredentials:
        - nhss-ims-sdm
        - nhss-ims-sdm:shared-data:read
    parameters:
      - name: shared-data-ids
        in: query
        description: List of shared data ids
        required: true
        style: form
        explode: false
        schema:
          type: array
          items:
            $ref: '#/components/schemas/SharedDataId'
    responses:
      '200':
        description: Expected response to a valid request
        content:
          application/json:
            schema:
              type: array
              items:
                $ref: '#/components/schemas/SharedData'
              minItems: 1
      '400':
        $ref: 'TS29571_CommonData.yaml#/components/responses/400'
      '404':
        $ref: 'TS29571_CommonData.yaml#/components/responses/404'
      '500':

```



```
    items:
      $ref: '#/components/schemas/Capability'
    minItems: 1
    uniqueItems: true

RepositoryData:
  type: object
  required:
    - serviceData
    - sequenceNumber
  properties:
    sequenceNumber:
      $ref: '#/components/schemas/SequenceNumber'
    serviceData:
      type: string
      format: byte

MsisdnList:
  type: object
  required:
    - basicMsisdn
  properties:
    basicMsisdn:
      $ref: '#/components/schemas/Msisdn'
    additionalMsisdns:
      type: array
      minItems: 1
      items:
        $ref: '#/components/schemas/Msisdn'

PublicIdentities:
  type: object
  required:
    - publicIdentities
  properties:
    publicIdentities:
      type: array
      items:
        $ref: '#/components/schemas/PublicIdentity'
      minItems: 1
      uniqueItems: true

PublicIdentity:
  type: object
  required:
    - imsPublicId
    - identityType
  properties:
    imsPublicId:
      $ref: '#/components/schemas/ImsPublicId'
    identityType:
      $ref: '#/components/schemas/IdentityType'
    irsIsDefault:
      type: boolean
    aliasGroupId:
      type: integer

ImsAssociatedIdentities:
  type: object
  required:
    - irsState
    - publicIdentities
  properties:
    irsState:
      $ref: '#/components/schemas/ImsRegistrationState'
    publicIdentities:
      $ref: '#/components/schemas/PublicIdentities'

ImsSdmSubscription:
  type: object
  required:
    - nfInstanceId
    - callbackReference
    - monitoredResourceUri
  properties:
    nfInstanceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    callbackReference:
```



```

- sptGroup
properties:
  conditionNegated:
    type: boolean
  sptGroup:
    type: array
    items:
      $ref: '#/components/schemas/SptGroupId'
    minItems: 1
  regType:
    items:
      $ref: '#/components/schemas/RegistrationType'
    minItems: 1
    maxItems: 2
  requestUri:
    type: string
  sipMethod:
    type: string
  sipHeader:
    $ref: '#/components/schemas/HeaderSipRequest'
  sessionCase:
    $ref: '#/components/schemas/RequestDirection'
  sessionDescription:
    $ref: '#/components/schemas/SdpDescription'

HeaderSipRequest:
  type: object
  required:
  - header
  properties:
    header:
      type: string
    content:
      type: string

SdpDescription:
  type: object
  required:
  - line
  properties:
    line:
      type: string
    content:
      type: string

ApplicationServer:
  type: object
  required:
  - asUri
  properties:
    asUri:
      type: string
    sessionContinue:
      type: boolean
    serviceInfoList:
      type: array
      items:
        $ref: '#/components/schemas/ServiceInformation'
      minItems: 1

ImsLocationData:
  type: object
  required:
  - scscfName
  properties:
    scscfName:
      type: string

RequestedNodes:
  type: array
  minItems: 1
  uniqueItems: true
  properties:
    requestedNode:
      $ref: '#/components/schemas/RequestedNode'

PsLocation:
  type: object

```



```

required:
- twanSsid
- plmnId
properties:
  twanSsid:
    type: string
  plmnId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
  twanBssid:
    type: string
  civicAddress:
    type: string
    format: byte
  twanOperatorName:
    type: string
  timeZone:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
  logicalAccessId:
    type: string

CsLocation:
  type: object
  required:
  - mscNumber
  - vlrNumber
  - plmnId
  properties:
    mscNumber:
      type: string
    vlrNumber:
      type: string
    plmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
    vlrLocation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/GeraLocation'
    csgInformation:
      $ref: '#/components/schemas/CsgInformation'
    timeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'

CsgInformation:
  type: object
  required:
  - csgId
  properties:
    csgId:
      type: string
      format: byte
    accessMode:
      type: string
      format: byte
    cMi:
      type: boolean

SrvccData:
  type: object
  required:
  - stnSr
  properties:
    stnSr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/StnSr'
    ueSrvccCapabilities:
      type: array
      items:
        $ref: '#/components/schemas/SrvccCapability'
      minItems: 1
      uniqueItems: true

PsiActivationState:
  type: object
  required:
  - activationState
  properties:
    activationState:
      $ref: '#/components/schemas/ActivationState'

```



```
- ipv4Addr
- required:
- ipv6Addr
- required:
- ipv6Prefix
properties:
  ipv4Addr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
  ipv6Addr:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
  ipv6Prefix:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'

TadsInformation:
  type: object
  required:
  - voiceOverPsSessionSupport
  properties:
    voiceOverPsSessionSupport:
      $ref: '#/components/schemas/ImVoiceOverPsSessionSupport'
    accessType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    lastUeActivityTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

UeReachabilitySubscription:
  type: object
  required:
  - expiry
  properties:
    expiry:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

CreatedUeReachabilitySubscription:
  type: object
  required:
  - expiry
  properties:
    expiry:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

UpdatedUeReachabilitySubscription:
  type: object
  required:
  - expiry
  properties:
    expiry:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

UeReachabilityNotification:
  type: object
  required:
  - reachabilityIndicator
  - detectingNode
  - accessType
  properties:
    reachabilityIndicator:
      type: boolean
    detectingNode:
      $ref: '#/components/schemas/DetectingNode'
    accessType:
      $ref: '#/components/schemas/AccessType'

PsUserState:
  type: object
  oneOf:
  - required:
  - sgsnUserState
  - required:
  - mmeUserState
  - required:
  - amfUserState
  properties:
    sgsnUserState:
      $ref: '#/components/schemas/UserStatePs'
    mmeUserState:
```



```

# SIMPLE TYPES:

Capability:
  type: integer

ImsUeId:
  type: string
  pattern: '^(impu-sip\:([a-zA-Z0-9_-!~*()&=#$,;?\/]+)\@([A-Za-z0-9]+([-A-Za-z0-9]+)\.))+[a-z]{2,}|impu-tel\:\+[0-9]{5,15}|impi-.\+|.+$)'

SequenceNumber:
  type: integer
  minimum: 0

ServiceIndication:
  type: string

Msisdn:
  type: string
  pattern: '[0-9]{5,15}$'

PrivateId:
  type: string

ImsPublicId:
  type: string
  pattern: '^(sip\:([a-zA-Z0-9_-!~*()&=#$,;?\/]+)\@([A-Za-z0-9]+([-A-Za-z0-9]+)\.))+[a-z]{2,}|tel\:\+[0-9]{5,15})$'

NameSpacePriority:
  type: string
  pattern: '^([0-9a-zA-Z-\!\%\*_\+\`'\~]+).[0-9a-zA-Z-\!\%\*_\+\`'\~]+$'

CscfFilterSetId:
  type: integer
  minimum: 0

SptGroupId:
  type: integer
  minimum: 0

ServingNode:
  type: boolean

LocalTime:
  type: boolean

CurrentLocation:
  type: boolean

SharedDataId:
  type: string
  pattern: '^([0-9]{5,6})-.\+$'

Iimei:
  type: string
  pattern: '^([0-9]{15})$'

IimeiSv:
  type: string
  pattern: '^([0-9]{16})$'

PrePaging:
  type: boolean

SipServerName:
  type: string
  pattern: '^(sip\:([a-zA-Z0-9_-!~*()&=#$,;?\/]+)\@([A-Za-z0-9]+([-A-Za-z0-9]+)\.))+[a-z]{2,})$'

# ENUMS:

IdentityType:
  anyOf:
    - type: string
      enum:
        - DISTINCT_IMPU

```



```
anyOf:
- type: string
  enum:
  - IMS_VOICE_OVER_PS_NOT_SUPPORTED
  - IMS_VOICE_OVER_PS_SUPPORTED
  - IMS_VOICE_OVER_PS_SUPPORT_UNKNOWN
- type: string

DetectingNode:
anyOf:
- type: string
  enum:
  - SGSN
  - MME
  - AMF
- type: string

AccessType:
anyOf:
- type: string
  enum:
  - 3GPP_ACCESS
  - NON_3GPP_ACCESS
- type: string

UserStatePs:
anyOf:
- type: string
  enum:
  - DETACHED
  - ATTACHED_NOT_REACHABLE_FOR_PAGING
  - ATTACHED_REACHABLE_FOR_PAGING
  - CONNECTED_NOT_REACHABLE_FOR_PAGING
  - CONNECTED_REACHABLE_FOR_PAGING
  - NOT_PROVIDED_FROM_SGSN_OR_MME_OR_AMF
  - NETWORK_DETERMINED_NOT_REACHABLE
- type: string

UserStateCs:
anyOf:
- type: string
  enum:
  - CAMEL_BUSY
  - NETWORK_DETERMINED_NOT_REACHABLE
  - ASSUMED_IDLE
  - NOT_PROVIDED_FROM_VLR
- type: string
```

## A.4 Nhss\_imsUEAU API

openapi: 3.0.0

info:

```
version: '1.0.0'
title: 'Nhss_imsUEAU'
description: |
  Nhss UE Authentication Service for IMS.
  © 2020, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: 3GPP TS 29.562 HSS Services for Interworking with IMS, version 16.1.0
url: 'http://www.3gpp.org/ftp/Specs/archive/29_series/29.562/'
```

servers:

```
- url: '{apiRoot}/nhss-ims-ueau/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.
```

security:

```
- {}
- oAuth2ClientCredentials:
  - nhss-ims-ueau
```



```
securitySchemes:
  OAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{nrfApiRoot}/oauth2/token'
        scopes:
          nhss-ims-ueau: Access to the Nhss IMS UE Authentication API
          nhss-ims-ueau:generate-sip-auth-data:invoke: Access to invoke the Generate SIP Auth Data
custom operation

schemas:

# COMPLEX TYPES:

SipAuthenticationInfoRequest:
  type: object
  required:
    - sipAuthenticationScheme
  properties:
    sipAuthenticationScheme:
      $ref: '#/components/schemas/SipAuthenticationScheme'
    sipNumberAuthItems:
      $ref: '#/components/schemas/SipNumberAuthItems'
    resynchronizationInfo:
      $ref: '#/components/schemas/ResynchronizationInfo'

ResynchronizationInfo:
  type: object
  required:
    - rand
    - auts
  properties:
    rand:
      $ref: 'TS29503_Nudm_UEAU.yaml#/components/schemas/Rand'
    auts:
      $ref: 'TS29503_Nudm_UEAU.yaml#/components/schemas/Auts'

SipAuthenticationInfoResult:
  type: object
  required:
    - impi
  properties:
    impi:
      $ref: '#/components/schemas/Impi'
    3gAkaAvs:
      type: array
      items:
        $ref: '#/components/schemas/3GakaAv'
      minItems: 1
    digestAuth:
      $ref: '#/components/schemas/DigestAuthentication'
    lineIdentifierList:
      type: array
      items:
        $ref: '#/components/schemas/LineIdentifier'
      minItems: 1
    ipAddress:
      $ref: '#/components/schemas/IpAddress'

3GakaAv:
  type: object
  required:
    - rand
    - xres
    - autn
    - ck
    - ik
  properties:
    rand:
      $ref: 'TS29503_Nudm_UEAU.yaml#/components/schemas/Rand'
    xres:
      $ref: 'TS29503_Nudm_UEAU.yaml#/components/schemas/Xres'
    autn:
      $ref: 'TS29503_Nudm_UEAU.yaml#/components/schemas/Autn'
    ck:
      $ref: '#/components/schemas/Ck'
    ik:
```



```
anyOf:  
  - type: string  
    enum:  
      - AUTH  
      - AUTH_INT  
  - type: string
```

## Annex B (informative): Withdrawn API versions

### B.1 General

This Annex lists withdrawn API versions of the APIs defined in the present specification. 3GPP TS 29.501 [5] clause 4.3.1.6 describes the withdrawal of API versions.



# History

<b>Document history</b>		
V16.1.0	July 2020	Publication
V16.2.0	November 2020	Publication