**3GPP TSG-SA5 Meeting #142-e *S5-222055***

**e-meeting, 4 - 12 April 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **32.158** | **CR** | **draftCR** | **rev** | - | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | TS32.158 Enhance OpenAPI to support access control | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MSAC | | | | |  | ***Date:*** | | | 2022-01-07 |
|  |  | | | |  | |  | | |  |
| ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | According to conclusion of TR 28.817 and discussion paper agreed in last meeting, the generic management service of OpenAPI should be updated to support authentication and authorization. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Enhance OpenAPI to support authentication and authorization capability | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No standardized way to support acess control for OpenAPI. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, Annex X(new), Annex Y(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:*** | | Resubmission of S5-221365 | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **Start of 1st modification** |

# 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] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[3] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[4] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[5] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

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

[7] draft-wright-json-schema-01 (October 2017): "JSON Schema: A Media Type for Describing JSON Documents".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[8] draft-wright-json-schema-validation-01 (October 2017: "JSON Schema Validation: A Vocabulary for Structural Validation of JSON".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[9] draft-wright-json-schema-hyperschema-01 (October 2017): "JSON Hyper-Schema: A Vocabulary for Hypermedia Annotation of JSON.

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[10] OpenAPI Specification (<https://github.com/OAI/OpenAPI-Specification>)

[11] IETF RFC 5789: "PATCH Method for HTTP".

[12] IETF RFC 7396: "JSON Merge Patch".

[13] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[14] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

[15] XML Path Language (XPath) Version 1.0, W3C Recommendation 16 November 1999 (<https://www.w3.org/TR/xpath-10/>)

[16] 3GPP TR 32.160: "Management and orchestration; Management service template".

[x] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[y] OpenID: OpenID connect protocol:

<https://openid.net/specs/openid-connect-core-1_0.html>

[z] IETF RFC 7519: "JSON Web Token (JWT)".

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| **Start of 2nd modification** |

##### Annex X (Normative): Authentication and Authorization:

# X.1 Operations Mapping

The IS operations are mapped to SS equivalents according to table X.1-1.

Table X.1-1: Implement access control services in OpenAPI SS

|  |  |  |  |
| --- | --- | --- | --- |
| Access control service | HTTP Method | Resource URI | S |
| authentication | GET | /oauth2/authorize | M |
| authorization | POST | /oauth2/token | M |

# X.2 Authentication

Map NRM to OpenAPI parameters according to table X.2-1 and table X.2-2.

Table X.2-1: Mapping NRM to OpenAPI input parameters (HTTP GET)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SS parameter location | SS parameter name | NRM attribute | S | Remark |
| query | consumer\_id | Identity4AC.identifier | M | A unique identifier of a MnS consumer.  For machine MnS consumer, it could be DN, FQDN, etc. It is included in authentication request.  For human MnS consumer, it could be user name, email address, phone number, etc. It is included in both of authentication request from the client (acting on behalf of human MnS consumer) to authentication service producer and login request from user agent to authentication service producer. |
| query | credential\_type | Identity4AC.credentialType | CM | Different credential types will be used according to authentication policy of the MnS consumer, e.g. it could be secret (e.g. password) or certificate based assertion (e.g. jwt-bear, see RFC 7519 [z])  For human MnS consumer, it is included in login request from user agent to authentication service producer.  For machine MnS consumer, it is in authentication request. |
| query | credential | Identity4AC.credential | CM | It is secret or certificate based assertion.  For human MnS consumer, it is included in login request from user agent to authentication service producer.  For machine MnS consumer, it is in authentication request. |
| query | client\_id | Identity4AC.authSession.assocClient | CM | It is used only for human MnS consumer scenario. It is part of associated client acting on behalf of the human consumer. It is an unique id, e.g. DN, FQDN, assigned to the client. |
| query | redirect\_uri | Identity4AC.authSession.assocClient | CM | It is used only for human MnS consumer scenario. It is part of associated client acting on behalf of the human consumer. It is redirection URI to which the authentication response from authentication service producer will be sent. |
| query | response\_type | NA | CM | It is oauth2 (see RFC 6749 [x]) and OpenID connect (see [y]) specific parameter.  It presents and its value is "code" in the authentication request from the client (acting on behalf of human MnS consumer) to authentication service producer for human MnS consumer authentication. It is empty in the authentication request from authorization service producer (acting on behalf of machine MnS consumer) to authentication service producer for machine MnS consumer authentication |
|  |  |  |  |  |

Table X.2-2: Mapping NRM to OpenAPI output parameters (HTTP GET))

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SS parameter location | SS parameter name | NRM attribute | S | Remark |
| response status codes/body | status | NA | M | It is response status code, and optional error description in response body for error response. |
| response body | consumer\_id | Identity4AC.identifier | M | same to identifier in the request |
| response body | session\_id | Identity4AC.authSession.sessionId | O | It could be used to uniquely identify a successful authentication for a MnS consumer in different entities included in authentication workflow. |
| response body | code | Identity4AC.authSession.assertion | CM | It is oauth2 (see RFC 6749 [x]) and OpenID connect (see [y]) specific parameter.  It presents and its value is set to authorization code generated by the authentication service producer. It's only applicable to human management service consumer. |

# X.3 Authorization

Map NRM to OpenAPI parameters according to table X.3-1 and table X.3-2.

Table X.3-1: Mapping NRM to OpenAPI input parameters (HTTP POST)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SS parameter location | SS parameter name | NRM attribute | S | Remark |
| query | grant\_type | NA | M | It is oauth2 specific parameter used to designate how to authenticate a client. It's set to "authorization\_code" for authorization of human management service consumer, and "client\_credentials" for authorization of machine management service consumer |
| query | code | Identity4AC.authSession.assertion | CM | It is oauth2 (see RFC 6749 [x]) and OpenID connect (see [y]) specific parameter.  It presents and its value is set to authorization code generated by the authentication service producer. It's only applicable to human management service consumer. |
| query | client\_id | Identity4AC.authSession.assocClient | CM | It is used only for human MnS consumer scenario. It is part of associated client acting on behalf of the human consumer. It is unique id, e.g. DN, FQDN, assigned to the client. |
| query | redirect\_uri | Identity4AC.authSession.assocClient | CM | It is used only for human MnS consumer scenario. It is part of associated client acting on behalf of the human consumer. It is redirection URI to which the authentication response from authentication service producer will be sent. |
| query | scope | AccessRight | O | The scope of access request |

Table X.3-2: Mapping NRM to OpenAPI output parameters (HTTP POST)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SS parameter location | SS parameter name | NRM attribute | S | Remark |
| response status codes/body | status | NA | M | It is response status code, and optional error description in response body for error response. |
| response body | access\_token | Identity4AC.authSession.accessToken | CM | It is the access token issued by the authorization server |

**Then access\_token will be put into http "authorization" header when access management services with access control. e.g. Authorization: Basic SlAV32hkKG**

##### Annex Y (informative) : Informative example for authentication and authorization

# Y.1 Informative example: human MnS consumer authentication and authorization :

Authentication request from clien on behalf of human MnS consumer to authentication service producer:

GET /oauth2/authorize?

consumer\_id=consumer1@example.com

&client\_id=client.example.com

&redirect\_uri=https%3A%2F%2Fclient.example.com%2Fac

&response\_type=code

Host: authenticationserver.example.com

Login request from user agent to authentication service producer:

GET /oauth2/authorize?

consumer\_id=consumer1@example.com

&credential\_type=secret

&credential=SHJKUJUYKKLH

Host: authenticationserver.example.com

Authentication response:

HTTP/2 302 Found

Location: https://client.example.org/ac?

consumer\_id=consumer1@example.com

&code=SplxlOBeZQQYbYS6WxSbIA

Authorization request with granted code

POST /oauth2/token?

grant\_type=authorization\_code

&code=SplxlOBeZQQYbYS6WxSbIA

&client\_id=client.example.com

&redirect\_uri=https%3A%2F%2Fclient.example.com%2Fac

Host: authorizationserver.example.com

Authorization response

HTTP/1.1 200 OK

Content-Type: application/json

Cache-Control: no-store

Pragma: no-cache

{

"access\_token": "SlAV32hkKG",

"token\_type": "Bearer",

"context": "expire in 60m"

}

# Y.2 Informative example: machine MnS consumer authentication and authorization:

Authentication and authorization request:

POST /oauth2/token?

grant\_type=client\_credentials

&consumer\_id=consumer1.example.com

&credential\_type=jwt

&credential=eyJhbGciOiJSUzI1NiIsIng1dCI6Imd4OHRHeXN5amNScUtq

Host: authorizationserver.example.com

Authentication and authorization response:

HTTP/1.1 200 OK

Content-Type: application/json

Cache-Control: no-store

Pragma: no-cache

{

"access\_token": "SlAV32hkKG",

"token\_type": "Bearer",

"context": "expire in 60m"

}

|  |
| --- |
| **End of modification** |