**3GPP TSG-SA3 Meeting #104-e *draft\_S3-212894-r1***

**e-meeting, 16 - 27 August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **33.501** | **CR** | **1188** | **rev** | **1** | **Current version:** | **17.2.1** |  |
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| *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 |  | Core Network | **x** |

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| ***Title:*** | SBA NRF roaming clarification | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_eSBA | | | | |  | ***Date:*** | | | 2021-08-27 |
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| ***Category:*** | **F** |  | | | | | ***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)* | |
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| ***Reason for change:*** | | In roaming scenario precise wording is needed for distinguishing vNRF and hNRF part in the service access authorization.  Usage of NF producer / NF consumer is not in line with 33.501, which uses capitalized NF Service Producer / NF Service Consumer.  In roaming scenario vNRF only authenticates, hNRF authorizes. Thus, precise specification text is needed.  If only NRF is used, it is unclear in roaming if vNRF or hNRF is meant. | | | | | | | | |
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| ***Summary of change:*** | | Updating to have precise wording to distinguish vNRF and hNRF part in the authorization process.  Incorrect naming is corrected. | | | | | | | | |
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| ***Consequences if not approved:*** | | Ambiguious specification. | | | | | | | | |
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| ***Clauses affected:*** | |  | | | | | | | | |
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|  | | **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:*** | | 13.4.1.2.1, 13.4.1.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | S3-212894 | | | | | | | | |

\*\*\*\*\*\*\*\*\* START OF CHANGES

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13.4.1.2 Service access authorization in roaming scenarios

13.4.1.2.1 OAuth 2.0 roles

In the roaming scenario, OAuth 2.0 roles are as follows:

a. The visiting Network Repository Function (vNRF) shall be the OAuth 2.0 Authorization server for vPLMN. vNRF that authenticates the NF Service Consumer.

b. The home Network Repository Function (hNRF) shall be OAuth 2.0 Authorization server for hPLMN that authorizes the NF Service Consumer and generates the access token.

c. The NF Service Consumer in the visiting PLMN shall be the OAuth 2.0 client.

d. The NF Service Producer in the home PLMN shall be the OAuth 2.0 resource server.

**OAuth 2.0 client (NF Service Consumer) registration with the OAuth 2.0 authorization server (vNRF)**

Same as in the non-roaming scenario in 13.4.1.1.

13.4.1.2.2 Service Request Process

The complete service request is two-step process including requesting an access token by NF Service Consumer (Step 1, i.e. 1a or 1b), and then verification of the access token by NF Service Producer (Step 2).

**Step 1:**

Pre-requisite:

- The NF Service Consumer (OAuth2.0 client) is registered with the vNRF (Authorization Server).

- The hNRF and NF Service Producer share the required credentials.

- The two NRFs have mutually authenticated each other.

- The NRF in the serving PLMN (vNRF) and NF Service Consumer have mutually authenticated each other.

**1a. Obtaining access token independently before NF Service access**

The following procedure describes how the NF Service Consumer obtains an access token for NF Service Producers of a specific NF type for use in the roaming scenario.

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**Figure 13.4.1.2-1: NF Service Consumer obtaining access token before NF Service access (roaming)**

1. The NF Service Consumer shall invoke Nnrf\_AccessToken\_Get Request (NF Instance Id of the NF Service Consumer, expected NF Service Name (s), NF Type of the expected NF Service Producer instance, NF type of the NF Service Consumer, home and serving PLMN IDs, optionally list of NSSAIs or list of NSI IDs for the expected NF Service Producer instances) from NRF in the same PLMN.

2. The NRF in serving PLMN (vNRF) shall identify the NRF in home PLMN (hNRF) based on the home PLMN ID, discover the NF/NF service and request an access token from hNRF, as described in clause 4.17.5 of TS 23.502 [8]. The vNRF shall forward the parameters it obtained from the NF Service Consumer, including NF Service Consumer type, to the hNRF.

3. The hNRF checks whether the NF Service Consumer is authorized to access the requested service(s). If the NF Service Consumer is authorized, the hNRF shall generate an access token with appropriate claims included. The hNRF shall digitally sign the generated access token based on a shared secret or private key as described in RFC 7515 [45]. If the NF Service Consumer is not authorized, the hNRF shall not issue an access token to the NF Service Consumer.

The claims in the token shall include the NF Instance Id of hNRF (issuer), NF Instance Id of the NF Service Consumer appended with its PLMN ID (subject), NF type of the NF Service Producer appended with its PLMN ID (audience), expected services name(s) (scope) and expiration time (expiration). The claims may include a list of NSSAIs or NSI IDs for the expected NF Service Producer instances.

4. If the authorization is successful, the access token shall be included in Nnrf\_AccessToken\_Get Response message to the vNRF. Otherwise it shall reply based on Oauth 2.0 error response defined in RFC 6749 [43]. The NF Service Consumer may store the received token(s). Stored tokens may be re-used for accessing service(s) from NF Service Producer NF type listed in claims (scope, audience) during their validity time. The other parameters (e.g., the expiration time, allowed scope) sent by hNRF in addition to the access token are described in TS 29.510 [68].

5. The vNRF shall forward the Nnrf\_AccessToken\_Get Response or error message to the NF Service Consumer.

**1b. Obtain access token for a specific NF Service Producer/NF Service Producer service instance**

The NF Service Consumer shall request an access token from the NRF for a specific NF Service Producer instance/Service NF Service Producer service instance. The request shall include the NF Instance Id of the requested NF Service Producer, appended with its PLMN ID, the expected NF service name and NF Instance Id of the NF Service Consumer, appended with its PLMN ID.

The NRF in the visiting PLMN (vNRF) shall forward the request to the NRF in the home PLMN (hNRF).

The NRF in the home PLMN checks whether the NF Service Consumer is authorized to use the requested NF Service Producer instance/NF Service Producer service instance, and shall then proceed to generate an access token with the appropriate claims included. If the NF Service Consumer is not authorized, the NRF in the home PLMN shall not issue an access token to the NF Service Consumer.

The claims in the token shall include the NF Instance Id of hNRF (issuer), NF Instance Id of the NF Service Consumer appended with its PLMN ID (subject), NF Instance Id of the requested NF Service Producer appended with its PLMN ID (audience), expected service name(s) (scope) and expiration time (expiration). The token shall be included in the Nnrf\_AccessToken\_Get response sent to the NRF in the visiting PLMN. The NRF in the visiting PLMN shall forward the Nnrf\_AccessToken\_Get response message to the NF Service Consumer. The NF Service Consumer may store the received token(s). Stored tokens may be re-used for accessing service(s) from NF Service Producer NF type listed in claims (scope, audience) during their validity time.

**Step 2:**

**Service access request based on token verification**

In addition to the steps described in the non-roaming scenario in 13.4.1.1, the NF Service Producer shall verify that the PLMN-ID contained in the API request is equal to the one inside the access token.

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**Figure 13.4.1.2-2: NF Service Consumer requesting service access with an access token in roaming case**

The NF Service Producer shall check that the home PLMN ID of audience claim in the access token matches its own PLMN identity.

The pSEPP shall check that the serving PLMN ID of subject claim in the access token matches the remote PLMN ID corresponding to the N32-f context Id in the N32 message.

\*\*\*\*\*\*\*\*\* END OF CHANGES