**3GPP TSG-SA3 Meeting #104-e *draft\_S3-212885-r3***

**e-meeting, 16 - 27 August 2021** Revision of S3-21xxxx

**Source: Nokia, Nokia Shanghai Bell**

**Title: Access token request for NF Set – EN resolution**

**Document for: Approval**

**Agenda Item: 5.20**

# 1 Decision/action requested

Inclusion of update to solution #7

# 2 References

[1] 3GPP 33.875

# 3 Rationale

*Reason for change: Resolution of EN on how NRF and NFp verify the correctness of NFc Set Id.*

*Summary of changes: Adding details of the solution, in particular the need for inclusion of NFc Set Id in NF certificate and/or CCA.*

# 4 Detailed proposal

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

## 6.7 Solution #7: Access token request for NF Set

Editor’s Note: It is ffs whether using the same access token for different OAuth 2.0 clients follows the OAuth 2.0 RFC and best practices.

### 6.7.1 Introduction

This solution addresses KI#6.

3GPP introduces the concepts of NF Set and NF Service Set which allows essentially for a group of interchangeable NF instances/NF Service instances of the same type, supporting the same services and the same Network Slice(s). Rel-16 also allows re-selection of a NF instance or a NF Service instance within the Set for subsequent transaction.

5G SBA architecture design allows for the concept of stateless NFs.

The solution assumes that each NF of a set has registered at NRF also with its NF Set ID or the NF Service Set ID. Thus, verification of the correctness of a set id is implicit by authenticating the NF when registering at NRF. Thus, if NRF is then issuing an access token with a distinct set id, the NF Service Producer can trust the correctness, or do another verification, if the set id is also included in CCA or NF certificate.

A NF Service Producer can also indicate in its profile, if it is allowing the NRF to provide access tokens for NF Sets or NF Service Sets.

NOTE: Whether to have this feature allowed per operator policy configured at NRF or per NF Service Producer or NF Service Producer Set is a deployment decision.

The solutions objective is to avoid that a NF from a NF Set needs to request a new access token, when targeting a service of an existing resource requested before by another NF of the NF Set, it is proposed that any NF in a NF Set can request an access token for the NF Set. Thus, any NF Service Consumer targetting a service of an existing resource it can use the access token provided to a NF Set of NF Service Consumers.

NOTE: For any NF to make use of this solution, that NF is required to register with the NRF.

### 6.7.2 Solution details

The NF Service Consumer belonging to a NF Set, it includes its NF Set ID in the Access Token Request message to NRF and also in the CCA or the NF certificate.

When the Access Token Request is processed by the NRF and a NF Set ID is included, the NRF knows that the NF Service Consumer requests an access token to be usuable by all NF Service Consumer instances within the NF Set. If NRF authorization of the NF Service Consumer is successful, ie. the NF Service Producer has indicated that an access token for a NF Set or NF Service Set can be issued, and the NF Set ID in the CCA matches the NF Set ID in the access token or in the NF certificate, NRF includes as claim the NF Set ID of the expected NF Service Consumer instances to allow the access token generated for usage by all NF Service Consumers in the NF Set. NRF sends the access token back to the requester.



Figure 1 – Access Token Request procedure (TS 33.501 Figure 13.4.1.1.1-1) enhanced with NF Set ID in the Access Token Request message

How NFs of a NF Set or a NF Service Set manage the distribution of an access token issued for set or service set and their availability to other NFs within the NF Set, is for implementation and out of scope.

When a service is requested, the requester (NF Service Consumer or SCP) includes the NF Set ID of the NF Service Consumer in the Service API Request as well as in the CCA, if the CCA is sent, in addition to the access token obtained from the NRF. NF Set ID in CCA is only reliable if the NF Set ID is included in the certificate related to the private key that the NF Service Consumer used to sign the CCA.

The NF Service Producer checks whether the Consumer NF Set Id in the Service Request matches with the NF Set ID claim in the Access token. If CCA is sent, it also verifies, if the NF Set ID matches the NF Set ID in the CCA. If included in NF certificate, it can also match the NF Set ID with the NF Set ID in the NF certificate. If yes, it proceeds with serving the request, otherwise it rejects the request.

Editor's Note: Clause 5.21.3.2 of TS 23.501 states "Furthermore, for a given UE and PDU Session any SMF in the SMF Set should be able to control the N4 session with the UPF (however, at any given time, only one SMF in the SMF Set will control the UPF for a given UE's PDU Session)." It is ffs whether only one NF consumer in the NF set can use the same token to request service from NFp at the same time, i.e. if only one NFc can represent the NF set at any given time.

### 6.7.3 Evaluation

TBD

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