**3GPP TSG-SA WG2 Meeting #143E S2-210XXXX**

**24 Feb - 03 March 2021, Electronic (revision of S2-210XXX)**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.228** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **16.6.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network | **x** |

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| ***Title:*** | IMS signalling optimization with HSS GID | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Nokia, Nokia Shanghai-Bell | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TE17\_IMSGID | | | | |  | ***Date:*** | | | 2020-12-14 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***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:*** | | Optimize IMS procedures for SBI enabled IMS nodes to avoid overloading the databases during NRF discovery procedures and to minimize overall procedure delay and execution times. | | | | | | | | |
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| ***Summary of change:*** | | Include the HSS Group ID in IMS signalling by all IMS nodes supporting an IMS procedure related to initial IMS registration, IMS terminating and IMS originating session. | | | | | | | | |
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| ***Consequences if not approved:*** | | Over loading of database due to unessary multilpe queries, and longer executuion times for IMS prcoedures. | | | | | | | | |
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| ***Clauses affected:*** | | AA.3.3.2, new section AA.3.3.X | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR … CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* First changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### AA.3.3.2 HSS Discovery

The call flow in Figure AA.3.3.2-1 illustrates the steps to locate the HSS instance for an IMS public identity.



Figure AA.3.3.2-1: HSS discovery and selection

Steps 1 - 2 may be performed, any time after power up, e.g. in the scenario where only a single HSS instance or HSS group is deployed, and in the scenario where an operator has IMPI/IMPU ranges that are registered in NRF as described in clause AA.3.2. In this case there is no need for any IMPU to perform the 2 steps.

1. An SBI capable IMS entity may discover the SBI capable HSS instances available in the PLMN via Nnrf\_NFDiscovery\_Request.

2. The NRF provides the SBI capable IMS entity with the HSS instances and/or any HSS Group IDs registered in the PLMN. If no SBI capable HSS instance and/or any HSS Group ID is available in the PLMN, then the NRF will reply to the SBI capable IMS entity with no information about available SBI capable HSS instances.

3. The SBI capable IMS entity receives an IMS procedure related to a given IMS user (IMPI or IMPU depending on the procedure).

Steps 4 - 6 may be performed, e.g. if the SBI capable IMS entity did not retrieve and store information about HSS instances and/or HSS Group IDs registered in the PLMN at an earlier stage (performed steps 1-2).

4. An SBI capable IMS entity may discover the SBI capable HSS instances available in the PLMN via Nnrf\_NFDiscovery\_Request.

5. The NRF provides the SBI capable IMS entity with the HSS instances and/or any HSS Group IDs registered in the PLMN. If no SBI capable HSS instance and/or any HSS Group ID is available in the PLMN, then the NRF will reply to the SBI capable IMS entity with no information about available SBI capable HSS instances.

6. The SBI capable IMS entity stores the result of the NRF discovery, if any is received. The IMS capable entity may store the received response for future use, otherwise the IMS entity must perform the query in response to each IMS request it receives.

If the SBI capable IMS entity received no results at all, the procedure is exited, and the SBI capable IMS entity may use Diameter interfaces to interact with an HSS.

NOTE 1: The SBI capable IMS entity can request the NRF to be notified of updates in the SBI capable HSS instances/ HSS Group IDs registered in NRF by using a Nnrf\_NFManagement\_NFStatusSubscribe service operation.

Steps 7 - 10 are performed only if the SBI capable IMS entity cannot locate an HSS instance corresponding to the IMS public identity based on stored information.

7. The SBI capable IMS entity sends to NRF an Nnrf\_NFDiscovery\_Request with the IMS public identity received in step 3.

8. NRF may query the UDR, via the Nudr\_GroupIDmap service, for the HSS Group ID corresponding to the IMS public identity.

9. If requested the UDR returns the HSS-IMS Group ID to NRF.

10. NRF locates HSS instance(s) corresponding to the HSS Group ID. NRF returns to the SBI capable IMS entity the HSS instance (s) profile which includes the HSS Group ID.

NOTE:     In indirect communication with delegated discovery as specified in TS 23.501 [93] , the SBI capable IMS entity does not interact directly with the NRF. In this case, the SBI capable IMS entity is not informed about the HSS Group ID the IMS identity belongs to.  11. The SBI capable IMS entity selects the HSS instance.

12. The SBI capable IMS entity can then start interaction with the selected HSS instance.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Next change \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### AA.3.3.X Handling of HSS Group ID in IMS Procedures

The HSS group ID may be transported in SIP signalling related to the following procedures:

* Initial IMS Registration procedure.
* IMS Terminating session establishment procedure.
* IMS Originating session establishment procedure.

An SBI enabled I-CSCF receiving an HSS Group ID during the NRF-based HSS discovery procedure should include it for transportation to the next hop in subsequent SIP signalling related to the above procedures.

In addition, every IMS node receiving an HSS Group ID in SIP signalling (e.g. S-CSCF and IMS AS) should store it as part of the UE information, and should use the received HSS Group ID to select an SBI capable HSS. Additionally, an IMS node receiving an HSS Group ID in SIP signalling should include it in subsequent SIP signalling related to the above procedures.

The HSS Group ID in SIP signalling shall not be sent outside the HPLMN.

~~NOTE:     The transportation of the HSS Group ID in SIP signalling only takes place between SBI enabled IMS nodes within the HPLMN.~~

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*