**3GPP TSG-CT WG4 Meeting #106-eC4-215xyz**

**E-Meeting, 11th – 15th October 2021 (was C4-215227)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.562** | **CR** | **0090** | **rev** | **1** | **Current version:** | **17.2.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | HSS GBA SBI Services Definition | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | GBA\_5G | | | | |  | ***Date:*** | | | 2021-09-20 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | A new HSS service needs to be defined, as agreed in stage-2, to allow the GBA BSF to interact with HSS via SBI. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Define a new HSS service for GBA. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage-2 requirements are not met. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 1, 2, 4.1, 5.1, 5.x (new), 5.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:*** | | This CR does not impact any OpenAPI specification files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

# 1 Scope

The present document specifies the stage 3 protocol, including message flows and API specification details, for the Nhss services, as part of the 5G Service-Based Architecture, offered by the HSS.

The HSS services specified in the present document include:

- Services for interworking with the IP Multimedia Subsystem (IMS)

- Services for interworking with the Generic Bootstrapping Architecture (GBA)

NOTE: The HSS services for Interworking with the Unified Data Management (UDM) Network Function are specified in 3GPP TS 29.563 [39].

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].

The IP Multimedia Subsystem (IMS) stage 2 architecture and procedures are specified in 3GPP TS 23.228 [6].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

The stage 2 architecture and procedures of SBA-enabled GBA is specified in 3GPP TS 33.220 [xx] and 3GPP TS 33.223 [yy].

\* \* \* Next Change \* \* \* \*

# 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] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[7] 3GPP TS 29.335: "User Data Repository Access Protocol over the Ud interface; Stage 3".

[8] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[9] OpenAPI Initiative, "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[10] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[11] IETF RFC 7807: "Problem Details for HTTP APIs".

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

[13] 3GPP TS 23.003: "Numbering, addressing and identification".

[14] 3GPP TS 33.203: "Access security for IP-based services".

[15] 3GPP TS 29.503: "Unified Data Management Services; Stage 3".

[16] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[17] IETF RFC 4740: "Diameter Session Initiation Protocol (SIP) Application".

[18] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[19] IETF RFC 4412: "Communications Resource Priority for the Session Initiation Protocol".

[20] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx interfaces;Signalling flows and message contents".

[21] 3GPP TS 29.218: "IP Multimedia (IM) session handling; IM call model; Stage 2".

[22] IETF RFC 3261: "SIP: Session Initiation Protocol".

[23] IETF RFC 8497: "Marking SIP messages to be logged".

[24] 3GPP TS 24.323: "3GPP IP Multimedia Subsystem (IMS) service level tracing Management Object (MO)".

[25] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[26] 3GPP TS 29.273: "Evolved Packet System (EPS); 3GPP EPS AAA interfaces".

[27] IETF RFC 4776: "Dynamic Host Configuration Protocol (DHCPv4 and DHCPv6) Option for Civic Addresses Configuration Information".

[28] IETF RFC 2045: "Multipurpose Internet Mail Extensions(MIME) Part One: Format of Internet Message Bodies".

[29] ETSI ES 283 034: "Network Attachment Sub-System (NASS); e4 interface based on the DIAMETER protocol".

[30] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[31] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".

[32] 3GPP TS 29.272: "Evolved Packet System; MME and SGSN Related Interfaces Based on Diameter Protocol".

[33] 3GPP TS 29.518: 5G System; Access and Mobility Management Services; Stage 3".

[34] 3GPP TR 21.900: "Technical Specification Group working methods".

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

[36] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[37] 3GPP TS 23.380: "IP Multimedia Subsystem (IMS); IMS Restoration Procedures".

[38] 3GPP TS 29.328: "IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents".

[39] 3GPP TS 29.563: "Home Subscriber Server (HSS) services for interworking with Unified Data Management (UDM); Stage 3".

[xx] 3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA)".

[yy] 3GPP TS 33.223: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA) Push function".

\* \* \* Next Change \* \* \* \*

## 4.1 Introduction

Within the 5GC, the HSS offers services to the S-CSCF, I-CSCF, IMS-AS (on the IP Multimedia Subsystem) and GBA BSF via the Nhss service-based interface (see 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]).

Figure 4.1-1 provides the reference model in service-based interface representation with focus on the HSS.



Figure 4.1-1: Reference model – HSS

\* \* \* Next Change \* \* \* \*

## 5.1 Introduction

The SBI capable HSS offers the following services via the Nhss\_ims interface:

- Nhss\_imsUEContextManagement Service

- Nhss\_imsSubscriberDataManagement Service

- Nhss\_imsUEAuthentication Service

- Nhss\_gbaSubscriberDataManagement Service

- Nhss\_gbaUEAuthentication Service

Table 5.1-1 summarizes the corresponding APIs defined for this specification.

Table 5.1-1: API Descriptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Service Name** | **Clause** | **Description** | **OpenAPI Specification File** | **apiName** | **Annex** |
| Nhss\_imsUEContextManagement | 6.1 | Nhss UE Context Management Service for IMS | TS29562\_Nhss\_imsUECM.yaml | nhss-ims-uecm | A.2 |
| Nhss\_imsSubscriberDataManagement | 6.2 | Nhss Subscriber Data Management Service for IMS | TS29562\_Nhss\_imsSDM.yaml | nhss-ims-sdm | A.3 |
| Nhss\_imsUEAuthentication | 6.3 | Nhss UE Authentication Service for IMS | TS29562\_Nhss\_imsUEAU.yaml | nhss-ims-ueau | A.4 |
| Nhss\_gbaSubscriberDataManagement | 6.x | Nhss Subscriber Data Management Service for GBA | TS29562\_Nhss\_gbaSDM.yaml | nhss-gba-sdm | A.x |
| Nhss\_gbaUEAuthentication | 6.y | Nhss UE Authentication Service for GBA | TS29562\_Nhss\_gbaUEAU.yaml | nhss-gba-ueau | A.y |

All scenarios shown in the following clauses assume that the SBI capable HSS is stateful and stores information in local memory. However, the SBI capable HSS may be stateless and store information externally in the UDR. If so, the stateless SBI capable HSS may use Ud interface as specified in 3GPP TS 29.335 [7] to retrieve required data from the UDR and store them locally before processing an incoming request. Processing the incoming request may then include updating data in the UDR. After processing the incoming request, the SBI capable HSS may delete the locally stored data. When data stored in UDR is then shared among the different SBI capable HSS instances of the same group, as identified by HSS Group ID (see 3GPP TS 23.501 [2], clause 6.2.6), bulk subscriptions, as described in clause 4.15.3.2.4 of 3GPP TS 23.502 [3], are not applicable, i.e. an NF consumer (e.g. IMS-AS) only subscribes towards one of the SBI capable HSS instances within the group.

Editor's Note: It is FFS if an informative Annex needs to be included to show how an IMS-AS/I-CSCF/S-CSCF can interact with a group of stateless SBI capable HSS instances.

\* \* \* Next Change \* \* \* \*

## 5.X Nhss\_gbaSubscriberDataManagement Service

### 5.X.1 Service Description

See 3GPP TS 33.220 [6], clause X.2.1.2.

### 5.X.2 Service Operations

#### 5.X.2.1 Introduction

For the Nhss\_gbaSubscriberDataManagement service the following service operations are defined:

- Get

- Subscribe

- Unsubscribe

- Notification

The Nhss\_gbaSubscriberDataManagement Service is used by Consumer NFs (GBA BSF) to:

- fetch the GBA subscriber data for the UE

- subscribe/unsubscribe, and to be notified, when data previously requested have changed

#### 5.X.2.2 Get

##### 5.X.2.2.1 General

The following procedures using the Get service operation are supported:

- Retrieval of GBA subscriber data

##### 5.X.2.2.2 Retrieval of GBA subscriber data

Figure 5.X.2.2.2-1 shows a scenario where the GBA BSF sends a request to the HSS to retrieve the GBA subscriber data. The request contains the UE's identity (/{ueId}) which shall be one of IMSI, MSISDN, IMPI, IMPU.



Figure 5.X.2.2.2-1: Retrieval of GBA subscriber data

1. The GBA BSF sends a GET request to the resource representing the UE's GBA subscriber data.

2a. Upon success, the HSS responds with "200 OK" with the GBA subscriber data (containing, e.g. the GBA User Security Settings, GUSS) in the response body, and HSS supported features.

2b. If the operation is not authorized due to, e.g. received UE identity not being allowed for GBA services, or the requesting node not being authorized to fetch the requested data, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

2c. If the UE identity is not found in HSS, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

In the case of redirection, the HSS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another HSS (service) instance.

#### 5.X.2.3 Subscribe

##### 5.X.2.3.1 General

The following procedures using the Subscribe service operation are supported:

- Subscription to changes on the GBA subscriber data

##### 5.X.2.3.2 Subscription to changes on the GBA subscriber data

Figure 5.X.2.3.2-1 shows a scenario where the GBA BSF sends a request to the HSS to subscribe to changes on a previously retrieved GBA subscriber data. The request contains the UE's identity (/{ueId}) which shall be one of IMSI, MSISDN, IMPI, IMPU.



Figure 5.X.2.3.2-1: Subscription to changes on the GBA subscriber data

1. The GBA BSF sends a POST request to the collection resource representing the subscriptions to changes on the UE's GBA subscriber data. The request body contains a URI where subsequent notification shall be sent by HSS.

2a. Upon success, the HSS responds with "200 OK" with the subscription data in the response body, and HSS supported features.

2b. If the operation is not authorized due to, e.g. received UE identity not being allowed for GBA services, or the requesting node not being authorized to subscribe to changes on GBA subscriber data, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

2c. If the UE identity is not found in HSS, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

In the case of redirection, the HSS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another HSS (service) instance.

#### 5.X.2.4 Unsubscribe

##### 5.X.2.4.1 General

The following procedures using the Unsubscribe service operation are supported:

- Unsubscribe to changes on the GBA subscriber data

##### 5.X.2.4.2 Unsubscribe to changes on the GBA subscriber data

Figure 5.X.2.4.2-1 shows a scenario where the GBA BSF sends a request to the HSS to unsubscribe to changes on a previously retrieved GBA subscriber data. The request contains the UE's identity (/{ueId}) which shall be one of IMSI, MSISDN, IMPI, IMPU.



Figure 5.X.2.4.2-1: Deletion of a subscription to changes on the GBA subscriber data

1. The GBA BSF sends a DELETE request to the resource representing the individual subscription (subscriptionID) to changes on the UE's GBA subscriber data.

2a. Upon success, the HSS responds with "204 No Content".

2b. If the operation is not authorized due to, e.g. received UE identity not being allowed for GBA services, or the requesting node not being authorized to subscribe/unsubscribe to changes on GBA subscriber data, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

2c. If the UE identity is not found in HSS, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

In the case of redirection, the HSS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another HSS (service) instance.

#### 5.X.2.5 Notify

##### 5.X.2.5.1 General

The following procedures using the Notify service operation are supported:

- Notification of changes on the GBA subscriber data

##### 5.X.2.5.2 Notification of changes on the GBA subscriber data

Figure 5.X.2.5.2-1 shows a scenario where the HSS sends a notification to the GBA BSF to inform of changes on a previously retrieved GBA subscriber data.



Figure 5.X.2.5.2-1: Subscription to changes on of GBA User Security data

1. The GBA BSF sends a POST request to the notification URI previously provided by the GBA BSF during the subscription request (see clause 5.X.2.3.1).

2a. Upon success, the HSS responds with "204 No Content".

2b. If the UE identity contained in the NotificationData is not found in GBA BSF, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

In the case of redirection, the GBA BSF shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another GBA BSF instance capable of handling the notification request.

\* \* \* Next Change \* \* \* \*

## 5.Y Nhss\_gbaUEAuthentication Service

### 5.Y.1 Service Description

See 3GPP TS 33.220 [6], clause X.2.1.3.

### 5.Y.2 Service Operations

#### 5.Y.2.1 Introduction

For the Nhss\_gbaUEAuthentication service the following service operations are defined:

- Get

The Nhss\_gbaUEAuthentication Service is used by Consumer NFs (GBA BSF) to:

- request the authentication data of the UE

#### 5.Y.2.2 Get

##### 5.Y.2.2.1 General

The following procedures using the Get service operation are supported:

- Request UE authentication data

##### 5.Y.2.2.2 Request UE authentication data

Figure 5.Y.2.2.2-1 shows a scenario where the GBA BSF sends a request to the HSS to retrieve UE authentication data (authentication vectors) for GBA. The request contains the UE's identity (/{ueId}) which shall be one of IMSI, MSISDN, IMPI, IMPU.



Figure 5.Y.2.2.2-1: Request UE authentication data

1. The GBA BSF sends a POST request (custom method: generate-auth-data) to the HSS.

2a. Upon success, the HSS responds with "200 OK" with the Authentication Data (containing authentication vectors) in the response body, and HSS supported features.

2b. If the operation is not authorized due to, e.g. received UE identity not being allowed for GBA services, or the requesting node not being authorized to fetch the requested data, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

2c. If the UE identity is not found in HSS, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in "ProblemDetails" data structure).

In the case of redirection, the HSS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another HSS (service) instance.

\* \* \* End of Changes \* \* \* \*