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TECHNICAL SPECIFICATION

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Generic Authentication Architecture (GAA);
Zh and Zn Interfaces based on the Diameter protocol;
Stage 3
(3GPP TS 29.109 version 9.7.0 Release 9)**

A GLOBAL INITIATIVE

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Contents

Foreword

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1 Scope

The present stage 3 specification defines the Diameter based implementation for bootstrapping Zh interface (BSF-HSS) and Dz interface (BSF-SLF) for HSS resolution for the BSF, the MAP based implementation for bootstrapping Zh' interface (BSF-HLR) and GAA Application Zn interface (BSF-NAF) in Generic Authentication Architecture (GAA). This specification also defines the Web Services based implementation for GAA Application Zn reference point (BSF-NAF). The definition contains procedures, message contents and coding. The procedures for bootstrapping and usage of bootstrapped security association are defined in 3GPP TS 33.220 [5].

The present document also specifies the Diameter and Web Services based implementation for the GAA Application Push Function Zpn reference point (BSF-NAF). The procedures for bootstrapping are defined in 3GPP TS 33.223 [23].

This specification is a part of the Generic Authentication Architecture (GAA) specification series.

The diameter based implementation for the Zh interface is based on re-usage of Cx interface Multimedia-Auth-Request/Answer messages originally between CSCF and HSS. These messages are defined in 3GPP TS 29.229 [3]. The 3GPP IMS mobility management uses the same definitions between CSCF and HSS. The present document defines how the defined messages are used with the bootstrapping and GAA application procedures (e.g. subscriber certificates) and the application logic that is needed in GAA network elements (BSF, HSS, and NAF).

Figure 1.1 depicts the relationships of these specifications to the other specifications for the Diameter based implementations.

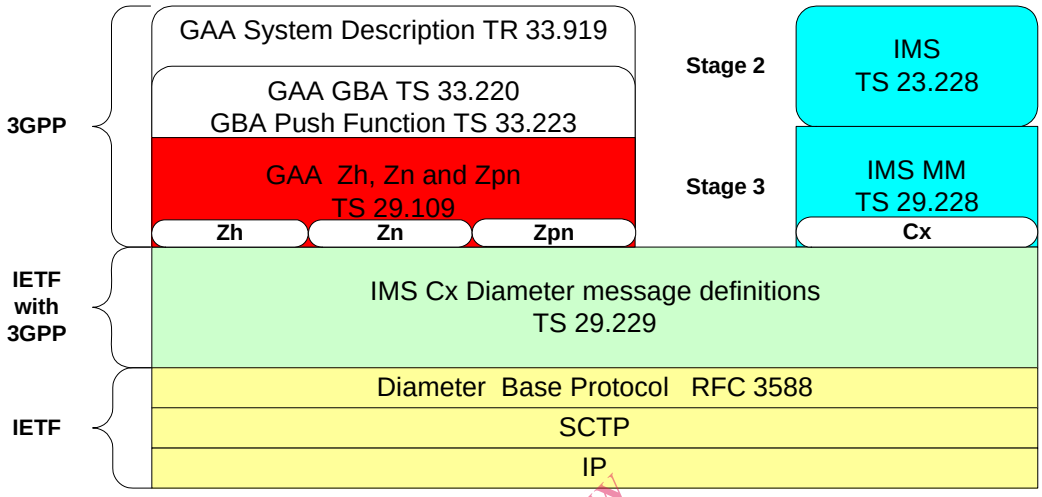


Figure 1.1: Relationships to other specifications

Figure 1.2 provides an informal overall quick introduction to the whole signalling procedures in GAA system. The important identifiers are marked bold and optional data items are italicised. The Ub and Ua interfaces, not defined in this TS, are simplified.

NOTE: The Zh' interface (BSF-HLR) is not represented in this figure.

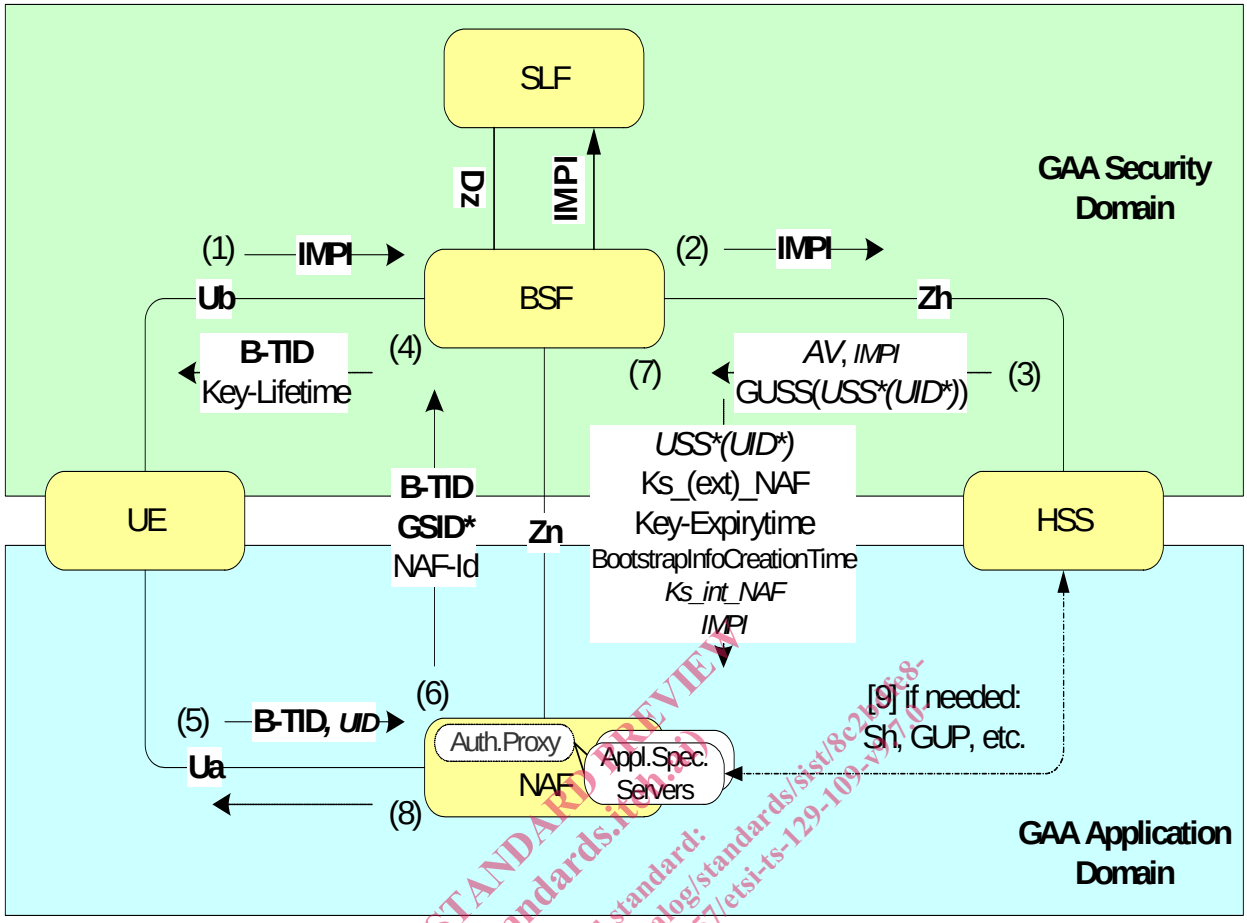
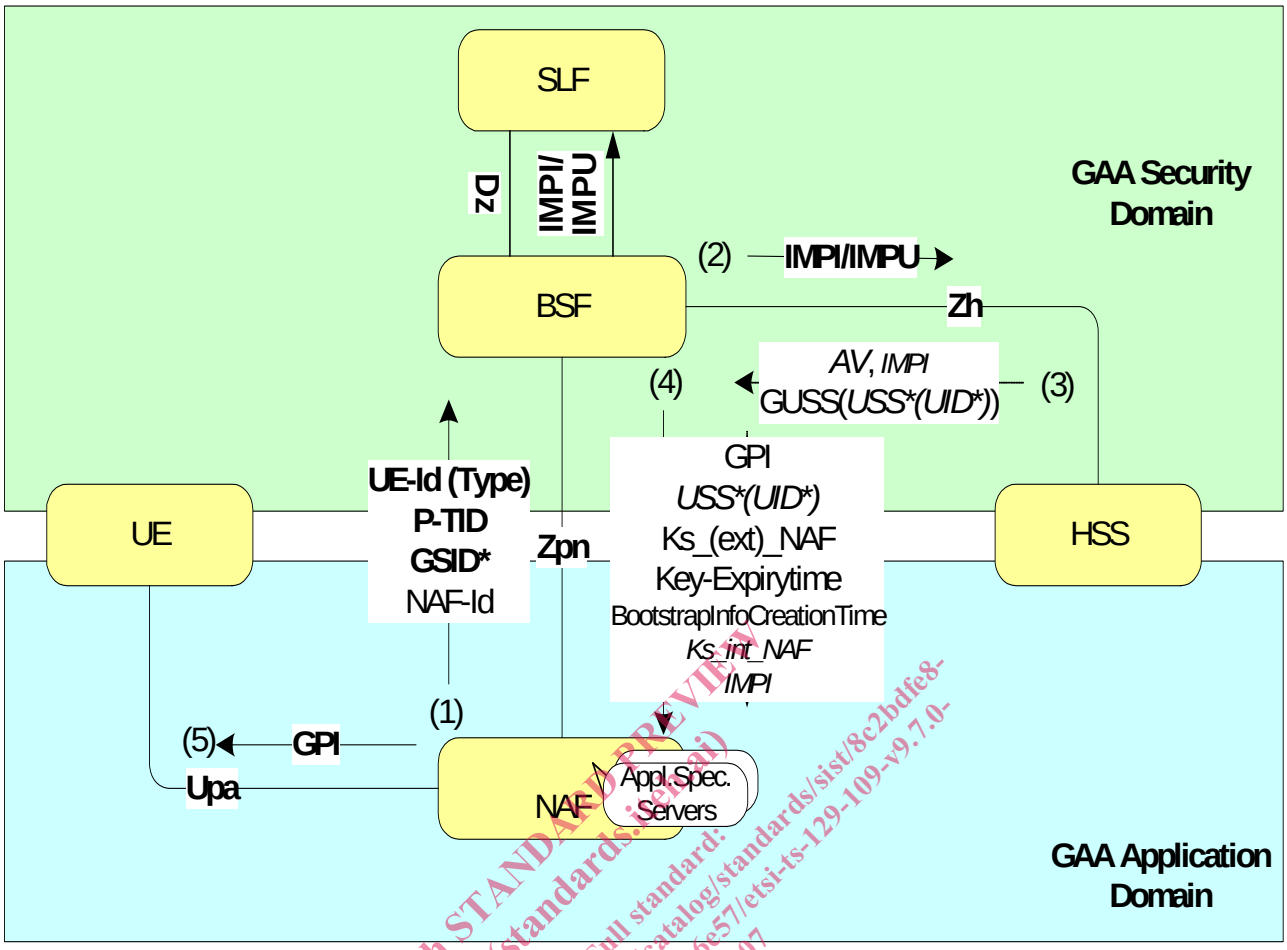


Figure 1.2: The whole signalling procedure in GAA system

Figure 1.3 provides an informal overall quick introduction to the whole signalling procedures in GAA Push Function. The important identifiers are marked bold and optional data items are italicised. The Ua and Upa interfaces, not defined in this TS, are simplified.



Bold=Important Identity. *Italic*=optional items. Ub and Ua interfaces are simplified.

Figure 1.3: Signalling procedure in GAA Bootstrapping Push Function

2 References

The following documents contain provisions that, 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] IETF RFC 3588, "Diameter Base Protocol".

[2] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents".

[3] 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol".

[4] 3GPP TR 33.919 "Generic Authentication Architecture (GAA); System Description".

[5] 3GPP TS 33.220 "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture".

[6] 3GPP TS 33.221 "Generic Authentication Architecture (GAA); Support for Subscriber Certificates".

[7] 3GPP TS 24.109: "Bootstrapping interface (Ub) and Network application function interface (Ua);Protocol details".

[8] 3GPP TS 29.230: "Diameter applications; 3GPP specific codes and identifiers"

[9] IETF RFC 3589: "Diameter Command Codes for Third Generation Partnership Project (3GPP)".

[10] 3GPP TS 23.008: "Organisation of subscriber data"

[11] 3GPP TS 33.222: "Generic Authentication Architecture (GAA); Access to network application functions using secure hypertext transfer protocol (HTTPS)".

[12] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2"

[13] W3C: "Web Services Activity", http://www.w3.org/2002/ws/.

[14] W3C: "Web Services Description Language (WSDL) Version 2.0 Part 0: Primer", http://www.w3.org/TR/2005/WD-wsdl20-primer-20050803/.

[15] 3GPP TR 33.980: "Liberty Alliance and 3GPP Security Interworking; Interworking of Liberty Alliance ID-FF, ID-WSF and Generic Authentication Architecture".

[16] Liberty Alliance Project: "Liberty ID-FF Authentication Context Specification".

[17] 3GPP TS 33.110: "Key establishment between a Universal Integrated Circuit Card (UICC) and a terminal"

[18] 3GPP TS 33.259: "Key establishment between a UICC Hosting Device and a Remote Device"

[19] 3GPP TS 29.002: "Mobile Application Part (MAP) Specification"

[20] 3GPP TS 33.102: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; 3G Security; Security architecture".

[21] 3GPP TS 23.003: "Numbering, addressing and identification".

[22] OASIS Standard: "Authentication Context for the OASIS Security Assertion Markup Language (SAML) V2.0 OASIS Standard, 15 March 2005, saml-authn-context-2.0-os".

[23] 3GPP TS 33.223 "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA) Push Function".

[24] 3GPP TS 33.402: "3GPP System Architecture Evolution (SAE); Security aspects of non-3GPP accesses".

[25] Void

[26] 3GPP TS 26.237: "IP Multimedia Subsystem (IMS) based Packet Switched Streaming (PSS) Multimedia Broadcast/Multicast Services (MBMS); User Service; Protocols".

[27] Void

[28] Void

[29] 3GPP TR 33.924: "Identity Management and 3GPP Security Interworking; Identity Management and Generic Authentication Architecture (GAA) Interworking".

[30] 3GPP TS 33.224: "Generic Authentication Architecture (GAA); Generic Push Layer".

[31] 3GPP TS 33.203: "Access security for IP-based services".

[32] 3GPP TS 29.329: " Sh Interface based on the Diameter protocol; Protocol details".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 23.008 [10], 3GPP TR 33.919 [4], 3GPP TS 33.220 [5] apply with following additions.

Bootstrapping information (Bootstrapped data) in a BSF consists of a bootstrapping transaction identifier (B-TID), a key material (Ks), the key lifetime (expiry time), the boostrapinfo creation time, the IMPI and the GUSS (if received from HSS) with BSF control information. Each bootstrapping procedure creates a bootstrapped data entity with B-TID as retrieval key..

GAA application is an application that uses the security association created by GBA Bootstrapping procedure.

GAA service is an operator specific end user service that uses the security association created by GAA Bootstrapping procedure. GAA services are identified by **GAA Service Identifiers**. A GAA service is implemented using some standardised or propriatary GAA application defined by GAA application type.

NAF specific Bootstrapping information transferred from a BSF to a NAF contains NAF and its service specific parts from bootstrapped data and needed key information derived from the bootstrapped data.

Service/Application. The term service is used here in its common meaning. A service is something that a MNO offers to subscribers. GAA Services are identified by GAA Service Identifier (GSID). In stage 2 documents ([4], [5], [6] and [11]) the term application is used in the same meaning i.e. MNOs offer applications to subscribers. There is a reason to avoid the usage of the term application here. The application is an already reserved term in Diameter. In Diameter applications are identified by Application Identifiers.

3.2 Symbols

For the purposes of the present document, the terms and definitions given in 3GPP TS 23.008 [10].

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AK	Anonymity Key
AKA	Authentication and Key Agreement
AUTN	Authentication token
AV	Authentication Vector. 3GPP AV=[RAND,AUTN,XRES,CK,IK].
AVP	Attribute-Value-Pair in Diameter messages.
BIA	BootstrappingInfo-Answer message
BIR	BootstrappingInfo-Request message
BS	BootStrapping Procedure
BSF	Bootstrapping server functionality BSF is hosted in a network element under the control of an MNO.
B-TID	Bootstrapping Transaction Identifier
CA	Certificate Authority
CK	Confidential Key
FQDN	Full Qualified Domain Name in URI (e.g. http://FQDN:80)
GAA	Generic Authentication Architecture
GBA	Generic Bootstrapping Architecture
GPI	GBA Push Information
GSID	GAA Service Identifier
GUSS	GBA User Security Settings
HSS	Home Subscriber System
IK	Integrity Key
IMPI	IP Multimedia Private Identity
IMPU	IP Multimedia Public Identity
Ks	Key Material
Ks_ext_NAF	MEbased key for a specific NAF