3GPP TSG-SA WG3 Meeting S3#33
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CR-Form-v7

CHANGE REQUEST

⌘ **33.220 CR CRNum ⌘rev - ⌘** Current version: **6.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ □ ME □ Radio Access Network □ Core Network □

Title: ⌘	Private identity for GBA procedure		
Source: ⌘	Nokia, Motorola, Gemplus, Alcatel		
Work item code: ⌘	GBA and SSC	***Date:*** ⌘	12/04/2004
Category: ⌘	**F**	***Release:*** ⌘	Rel-6
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction 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.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *Rel-4 (Release 4)* *Rel-5 (Release 5)* *Rel-6 (Release 6)*

Reason for change: ⌘ TS 23.003 describes how to generate a user's private identity when ISIM is not present:

"13.3 Private user identity

The private user identity shall take the form of an NAI, and shall have the form username@realm as specified in clause 3 of RFC 2486 [25].

NOTE: It is possible for a representation of the IMSI to be contained within the NAI for the private identity.

If there is no ISIM application, the private user identity is not known. If the private user identity is not known, the private user identity shall be derived from the IMSI. The following steps show how to build the private user identity out of the IMSI:

1. use the whole string of digits as the username part of the private user identity;
2. convert the leading digits of the IMSI, i.e. MNC and MCC, into a domain name, as described in subclause 13.2.

The result will be a private user identity of the form "<IMSI>@ims.mnc<MNC>.mcc<MCC>.3gppnetwork.org". For example: If the IMSI is 234150999999999 (MCC = 234, MNC = 15), the private user identity then takes the form 234150999999999@ims.mnc015.mcc234.3gppnetwork.org"

Since the GBA procedure is a Rel-6 feature, and it is based on the private identity of the UE, the conversion described in TS 23.003 should be applied in the specification in question.

The second reason is that it should be possible to do the bootstrapping

		procedure with a ISIM. 3GPP TS 22.228, clause 5 states: *“In R5 the ISIM application shall require the presence of a USIM application on the same UICC. This shall not preclude the possibility in later releases of having an ISIM in a UICC that does not contain a USIM.”* Hence, the current specification TS 33.220 Rel-6 should not exclude the possibility that the UICC contains an ISIM but not a USIM. SA1 should be able to make their decision whether it should be possible to use an ISIM without a USIM in GAA. For a service that utilizes the GBA, e.g., Presence, it should be possible to access the server with an ISIM, since the presence account based on an ISIM maybe different than that in the USIM which are received from a BSF, e.g., an IMPI value, and IMPUs added to enable new services.
Summary of change:	⌘	Support for an ISIM in GAA is added.
Consequences if not approved:	⌘	Service may have conflicts when handling the UE’s identities.

Clauses affected:	⌘	2, 4, 4.3.2, 4.4.1				
		Y	**N**			
Other specs affected:	⌘		**X**	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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 TS 31.102: "3rd Generation Partnership Project; Technical Specification Group Terminals; Characteristics of the USIM application".

[2] 3GPP TS 33.102: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; 3G Security; Security architecture".

[3] Franks J., et al,: "HTTP Authentication: Basic and Digest Access Authentication", RFC 2617, June 1999.

[4] A. Niemi, et al,: "Hypertext Transfer Protocol (HTTP) Digest Authentication Using Authentication and Key Agreement (AKA)", RFC 3310, September 2002.

[10] 3GPP TS23.003: “3rd Generation Partnership Project; Technical Specification Group Core Network; Numbering, addressing and identification (Release 6)

[5] 3GPP TS 33.221: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Generic Authentication Architecture (GAA); Support for Subscriber Certificates".

[6] T. Dierks, et al,: "The TLS Protocol Version 1.0", RFC 2246, January 1999.

[7] OMA: “Provisioning Content Version 1.1”, Version 13-Aug-2003. Open Mobile Alliance.

[8] 3GPP TS 23.228: “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; IP Multimedia Subsystem (IMS); Stage 2 (Release 6) ”.

[9] 3GPP TS 31.103: "3rd Generation Partnership Project; Technical Specification Group Terminals; Characteristics of the IP Multimedia Services Identity Module (ISIM) application ".

***NEXT CHANGE ***

4 Generic Bootstrapping Architecture

The 3GPP authentication infrastructure, including the 3GPP Authentication Centre (AuC), the USIM/ISIM, and the 3GPP AKA protocol run between them, is a very valuable asset of 3GPP operators. It has been recognised that this infrastructure could be leveraged to enable application functions in the network and on the user side to establish shared keys. Therefore, 3GPP can provide the "bootstrapping of application security" to authenticate the subscriber by defining a Generic Bootstrapping Architecture (GBA) based on AKA protocol.

NOTE: The possibily of using an ISIM without a USIM is specified in TS 22.228, clause 5.

***NEXT CHANGE ***

4.4 Bootstrapping architecture and reference points

4.4.1 Ub interface

The reference point Ub is between the UE and the BSF. Reference point Ub provides mutual authentication between the UE and the BSF. It allows the UE to bootstrap the session keys based on 3GPP AKA infrastructure.

The HTTP Digest AKA protocol, which is specified in RFC 3310 [4], is used on the Ub interface. It is based on the 3GPP AKA TS 33.102 [2] protocol. The interface to the USIM is as specified in TS 31.102 [1] and to the ISIM is as specified in TS 31.103 [9].

***NEXT CHANGE ***

4.5.2 Bootstrapping procedures

When a UE wants to interact with a NAF, and it knows that the bootstrapping procedure is needed, it shall first perform a bootstrapping authentication (see figure 3). Otherwise, the UE shall perform a bootstrapping authentication only when it has received bootstrapping initiation required message or a key update indication from the NAF, or when the lifetime of the key in UE has expired (cf. subclause 4.5.3).

NOTE: The main steps from the specifications of the AKA protocol in TS 33.102 [2] and the HTTP digest AKA protocol in RFC 3310 [4] are repeated in figure 3 for the convenience of the reader. In case of any potential conflict, the specifications in TS 33.102 [2] and RFC 3310 [4] take precedence.

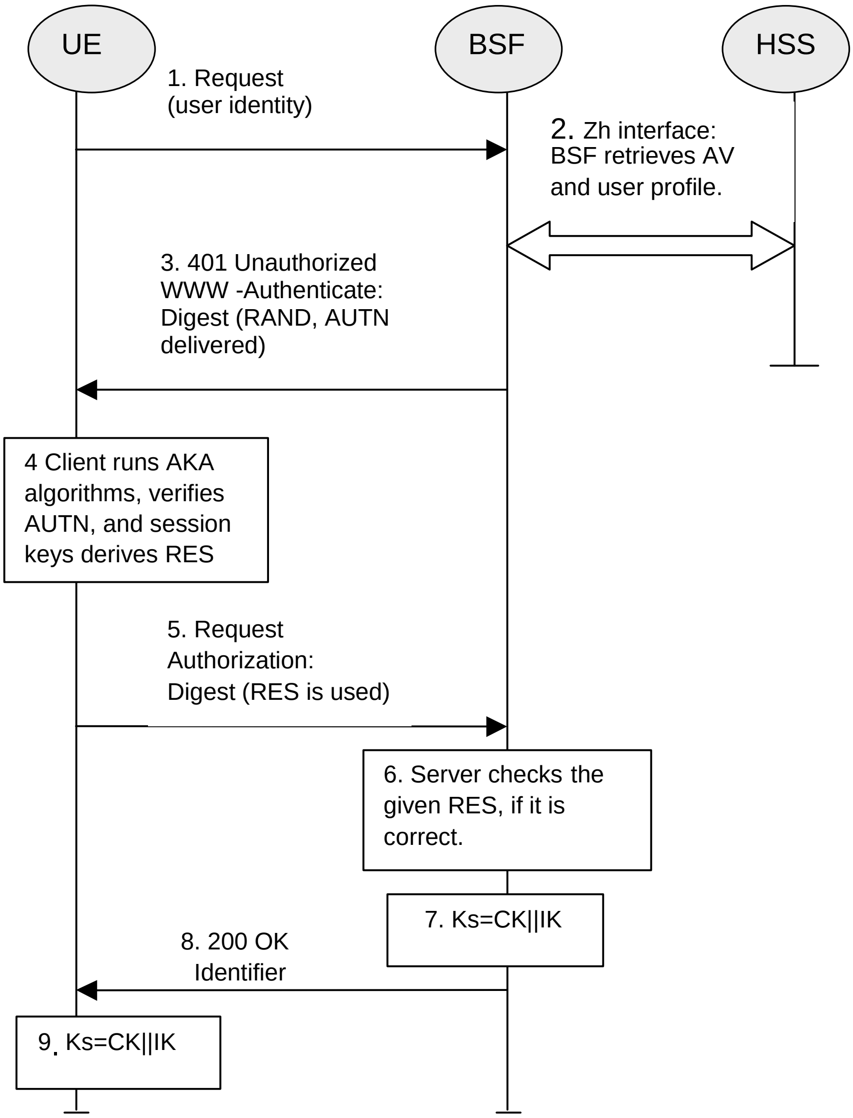

Figure 3: The bootstrapping procedure

1. The UE sends an HTTP request towards the BSF. The exact format to generate the user identity is left for the stage 3 specification.
2. BSF retrieves the user profile and one or a whole batch of Authentication Vectors (AV, AV = RAND||AUTN||XRES||CK||IK) over the Zh interface from the HSS.
3. Then BSF forwards the RAND and AUTN to the UE in the 401 message (without the CK, IK and XRES). This is to demand the UE to authenticate itself.
4. The UE checks AUTN to verify that the challenge is from an authorised network; the UE also calculates CK, IK and RES. This will result in session keys IK and CK in both BSF and UE.
5. The UE sends another HTTP request, containing the Digest AKA response (calculated using RES), to the BSF.
6. The BSF authenticates the UE by verifying the Digest AKA response.
7. The BSF generates key material Ks by concatenating CK and IK. The Transaction Identifier value shall be also generated in format of NAI by taking the RAND value from step 3, and the BSF server name, i.e. RAND@BSF_servers_domain_name.
8. The BSF shall send a 200 OK message, including a Transaction Identifier, to the UE to indicate the success of the authentication. The BSF also supplies a flag DER_FLAG to the UE, which indicates whether key derivation

shall be applied to Ks or not. If key derivation is performed it is to be applied uniformly to all keys shared between any UE and any NAF. In addition, in the 200 OK message, the BSF shall supply the lifetime of the key Ks, and an indication whether multiple key derivation shall be used. The key material Ks is generated in UE by concatenating CK and IK.

9. Both the UE and the BSF shall use the Ks to derive the key material Ks_NAF, if applicable. Ks_NAF is used for securing the Ua interface.

   Ks_NAF is computed as Ks_NAF = KDF (Ks, key derivation parameters), where KDF is a suitable key derivation function, and the key derivation parameters include the user's IMPI (derived from the IMSI, as specified in TS 23.003 [10], or taken from ISIM as specified in [9]), the NAF_Id and RAND. The NAF_Id consists of the full DNS name of the NAF. KDF shall be implemented in the ME.

Editor's note: The definition of the KDF and the possible inclusion of further key derivation parameters are left to ETSI SAGE and to be included in the Annex B of the present specification.

   If multiple key derivation is used then the UE and the BSF store the key Ks with the associated Transaction Identifier for further use, until the lifetime of Ks has expired, or until the key Ks is updated. Otherwise, the key Ks and the Transaction Identifier may be deleted in the UE and in the BSF after the key Ks_NAF has been derived.