TSGS#19(03)0122

Technical Specification Group Services and System Aspects Meeting #19, Birmingham, U.K., 17~20 March 2003

Source: TSG SA WG2 Title: CRs on 23.895

Agenda Item: 7.2.3

The following Change Requests (CRs) have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #19.

Note: the source of all these CRs is now S2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

Tdoc#	Title	Spec	CR#	cat	Versi	REL	WI	S2
					on in			meeting
<u>S2-030419</u>	Clarification to the TR on Early UE	23.895	2r1	F	6.0.0	6	Late_UE	S2-29
<u>\$2-030420</u>	Decision on method for handling Inter-RNC/BSC and Inter-MSC Handover/Relocation	23.895	1r1	F	6.0.0	6	Late_UE	S2-29
S2-031011	(After SA plenary #18) Updated scope of the TR ue.8de: " Provision of UE Capability Information to Network Entities"	23.895	3r3	F	6.0.0	6	Late_UE	S2-30

	CHANGE REQUEST									
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Reason	Reason for change: \$\mathbb{X}\$ 1) Update section 5.1 in order for it to apply also to architecture 2 for the sections said to be common between both architectures 2) When Gs applies, current VLR do not request Gs interface MS Information Request message to the SGSN as part of the Gs interface's association establishment procedures and hence do not get UESBI									
Summar	Summary of change: # 1) Generalize IMEISV into UESBI when needed 2) As an optimization, Gs BSSAP+-LOCATION-UPDATE-REQUEST message may be upgraded to carry the IMEISV (+BMUEF if architecture 2 applies) from SGSN to VLR, avoiding VLR to have to request Gs interface MS Information Request message to the SGSN as part of the Gs interface's association establishment procedures.								ecture 2 nterface	
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- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5 Architectures

To ease maintenance of this document, this section uses the term "UE Specific Behaviour Information" (abbreviated to UESBI) to mean either IMEISV or, the Bit Map of UE Faults (BMUEF), or in some cases of architecture 3, the "Bit Map of UE Verified Behaviour" (BUEVB).

There are 2 main architectural choices:

- Does the UE send its UESBI directly to the RAN or does the UE send them to the CN for it to store and supply to the RAN when needed?
 Architecture 1 and 2 in the sections below deal with UESBI transfer via CN whereas architecture 3 considers direct UESBI transfer from UE to RAN.
- Are these capabilities expressed in terms of IMEISV or in terms of a standardized bitmap of correctable issues?
 In Architecture 1, the capabilities are expressed in terms of IMEISV while Architecture 2 uses a standardised bitmap. Architecture 3 could use either IMEISV or bitmap and is mainly studied by RAN.

These architectures are not necessarily mutually exclusive. Combinations of these architectures should be bourn in mind when reading section 5.

5.1 Architecture 1: full IMEISV distribution

This architecture has much in common with Architecture 2 "Iu interface bitmap derived from IMEISV". As it is required for the CN to obtain and store the IMEISV and to transfer the UESBI between the CN elements for both Architectures 1 and 2, all text in 5.1 applies therefore to 5.2 except where explicitly stated in Architecture 2.

Note: Section 5.1.2, 5.1.3, 5.1.4, 5.1.7, 5.1.8.1 and 5.1.10 discuss implications of UESBI retrieval by MSC (to be able to transfer it to RAN) even though MSC itself may not need this information.

5.1.1 General description

When the mobile Attaches to the MSC/VLR or performs a Normal Location Update to the MSC/VLR (see note 1 below) or Attaches to the SGSN, the IMEISV is retrieved using the MM or GMM Identity Request message. The VLR and the database in the SGSN are used to store the IMEISV.

At subsequent Iu interface connection establishments (both 'initial' and for 'handover'), the MSC/SGSN sends the UESBI to the SRNC as soon as the Iu signaling link between MSC/SGSN and SRNC has been established. The UESBI can be carried e.g in the same message that currently carries the IMSI. This is summarised in Figure 1.

Note 1: It should be an operator choice as to whether to request IMEISV from the mobile at every intra-MSC Normal Location Update. This allows the operator to balance the increase in signaling load against the likelihood of an "inter-location area change and SIM swap". It should be further noted that if any mismatches between the UE's IMEISV and the IMEISV stored in the VLR lead to the user having problems, then the problems may be cleared by the user switching the UE off and back on, forcing a CS domain Attach to occur.

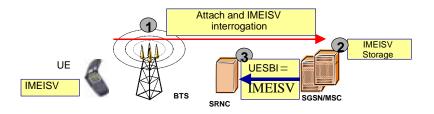


Figure 1: Architecture 1

If the UE state is changed from MM/PMM Connected to MM/PMM Idle, all information derived from the received IMEISV_UESBI is released in the RNS. Thus if the UE state is changed afterwards back to MM/PMM Connected the delivery of the IMEISV-UESBI from MSC/SGSN to SRNC must be repeated.

The SRNC then uses the UESBI to derive the capabilities of the UE.

The following subsections deal with specific points.

5.1.2 Gs interface/Network Mode of Operation = 1

When using NMO=1, current MSCs are unlikely to request the IMEISV from the SGSN during the establishment of the Gs interface association. Hence MSC software would need to be upgraded to send the Gs interface MS Information Request message to the SGSN as part of the Gs interface's association establishment procedures.

As an optimization, Gs BSSAP+-LOCATION-UPDATE-REQUEST message may be upgraded to carry the IMEISV (+BMUEF if architecture 2 applies) from SGSN to VLR, avoiding VLR to have to request Gs interface MS Information Request message to the SGSN as part of the Gs interface's association establishment procedures.

5.1.3 Emergency Call Handling

5.1.3.1 Attached Mobile with (U)SIM

This poses no problems provided that the IMEISV is stored in the VLR.

5.1.3.2 (U)SIMless mobile

In this case the mobile puts the IMEI into the CM Service Request. This is not the IMEISV, so the MSC could be mandated to assume that the mobile is at revision level zero, and signal this to the RNC. However, a mobile at Software Version = 1 might have different faults to those of a SV=0 mobile. This means that

- For architecture 1: the MSC should send the IMEI (and not the IMEISV) to the RNC, and the RNC uses the IMEI to derive the union of the sets of faults for each SV of that TAC.
- (For architecture 2: the MSC would use the IMEI to obtain the BMUEF corresponding to the union of the sets of faults for each SV of that TAC.)

A simpler alternative is that the MSC could request the full IMEISV from the mobile. Typically this would add a couple of hundred ms of delay.

5.1.3.3 Non-attached Mobile with (U)SIM

The MSC interrogates the mobile for the IMEISV. Such a pair of messages (Identity Request, Identity Response) is anticipated to take about 200ms.

Alternatively, information on the superset of all faults for all mobiles could be sent to the RNC.

5.1.4 Inter-MSC Location Updates

These do not occur during a CS call. Hence they are not generally time critical as they are rarely linked to a "follow on call".

When a (U)SIM is removed from a mobile in one LA and then reinserted into a mobile which is powered up in a different MSC's LA, the mobile performs a circuit switched "normal location update" rather than an "attach". If the new MSC used upgraded MAP signalling to retrieve the IMEISV from the old MSC, then the IMEISV information would be incorrect.

Hence it seems necessary to use a 24.008 Identity Request message/Gs MS Information Request message to get the IMEISV from the UE at inter-MSC location updates.

5.1.5 Inter-SGSN Routeing Area Update and Relocation

Routing Area update:

This is the case of RA update and NOT GPRS attach.

Intra-3G in PMM connected mode, the RA Update follows an SRNS relocation, then the RNC will already have the UESBI. In PMM idle mode, the RA Update is not associated with an SRNS relocation, then in UMTS there is little reason for it to be a prelude to data transfer.

There are however a couple of cases where the RAU can happen during an active data transfer session such as an inter-system RAU from 2G to 3G and in the case of handover between RNCs not connected by an Iur interface. In these cases, obtaining the IMEISV over the radio interface using GMM Identity Request procedure will result in additional delay.

GSM RA Updates may also be time critical.

SRNS Relocation:

The UESBI must be transferred between the RNCs during the relocation procedure. This could either be carried in the UTRAN container carried in the GTP Forward Relocation Request, or, the GTP Forward Relocation Request message could be updated to include the IMEISV.

Note that this decision should be aligned with the decision for Inter-MSC Relocation.

Transfer of UESBI to the new SGSN and Target RNC:

Could either use existing GMM Identity Request mechanisms to get the IMEISV from the UE, or, could be carried in the container for relocation, or, GTP could be upgraded.

To cater for 2G-SGSNs using GTPv0, a solution solely based on Gn interface (SGSN-SGSN) signalling would necessitate upgrades to both GTPv0 and GTPv1 signalling.

However using the GMM Identity Request procedure causes additional delay for certain RAU cases, and, for reasons given in section 5.1.7 (Inter-RNC/BSC and Inter-MSC Handover/Relocation), it is proposed to update the GTP SGSN Context Response message and GTP Forward Relocation Request messages.

To avoid upgrading both GTPv0 and GTPv1 it is proposed for simplicity to upgrade only GTPv1.

5.1.6 Long Lived Iu-ps Connections

The use of "long lived Iu-ps connections" may frequently mean that the RNC has the UESBI at the very first stage of the CS domain call from the mobile. This is because the SGSN stores the same UESBI information as the MSC/VLR.

5.1.7 Inter-RNC/BSC and Inter-MSC Handover/Relocation

Should the anchor MSC send the UESBI to the target BSC/RNC, or, should the "transparent container" be used to carry the information between RAN nodes? This is analyzed below:

a) transparent container

All BSCs and RNCs have to be upgraded to support this use of the transparent container. This could involve changes in up to perhaps 4 different hardware platforms in one PLMN (2 GSM BSC vendors and 2 UMTS RNC vendors).

This method requires all the different RNCs and BSCs to copy the **IMEISV**_<u>UESBI</u> from the Common ID message into a new field within the transparent containers. This seems to require the definition of a new Field in BSSMAP (48.008) and a new parameter in RANAP (25.413). These require changes to BSCs and RNCs, These changes do not require changes to relay MSC functionality.

UESBI will need to be carried in the UTRAN container for Architecture 3. If a combination architecture is chosen (such as Architecture 3 with either 1 or 2), then it may be useful to carry all the information in the UTRAN container. Further study is needed on this issue if a combined architecture is selected.

b) UESBI buffered in relay MSC

The UESBI is sent by the anchor MSC in the Relocation Request message. The relay MSC sends it to the target RAN node and also stores it for future BSC/RNC handovers within the relay MSC's area. This method requires the relay MSC to store and handle the UESBI in a similar manner to that in which it has to store and handle the IMSI. Hence this should not severely impact the relay MSC functionality. No changes are needed to BSCs or RNCs.

The following points needs to be considered further:

- i) A interface (and some E interface) messages have a length limit of around 255 bytes. It needs to be checked that carrying the UESBI in the Handover Request message does not cause problems.
- ii) Subsequent inter MSC handover? 2G MSC to 3G MSC handover?

architecture(s) selected by the TSG plenaries.
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3GPP TSG-SA WG Meeting #29 San Francisco, USA, 20-24/1/03

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Reason for change: ** The current TR has not reached a conclusion on how to handle inter MSC handover/relocation. Without such a conclusion stage 3 work will be stalled.									
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The following points needs to be considered further:

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- ii) Subsequent inter MSC handover? 2G MSC to 3G MSC handover?

Selection of the best solution needs further study and may well be dependent upon the architecture(s) selected by the TSG plenaries.

Conclusion:

Method b, "UESBI buffered in relay MSC" only requires additions to already existing relay MSC functionality. This avoids changes to legacy BSC equipment. Hence method b is selected.

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Reason for change: **During last SA plenary, TDoc SP-020795 "WID: Early UE handling in the 3GPP system" was approved. [But it has been required that] An updated version including a change to scope to remove the ambiguity or mis-interpretation allowing untested UEs on the market [would be written by SA2]. This is the object of this CR: It shall be clearly unambiguous that the "Early UE feature" does not aim at replacing the IOT procedure and should not be taken as a way to launch untested or partially tested mobiles on the market.										
Summary of chang	ge: Remove refe	rences to unt	ested feat	ures on l	JE(s)					
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1 Scope

This TR studies different possible mechanisms to provide the 3GPP network entities with UE Specific Behavior Information (UESBI). UESBI is used by correcting mechanisms to overcome some of the issues that will be recognized by 3GPP in TR 25.994 and other such documents. The description of these correcting mechanisms is out of the scope of this TR.

The 3GPP system has many features and it is impractical to fully test all combinations of mobile features with network or test equipment. Hence when one of the un-tested features is "switched on" in a network, there is a risk that some mobiles will not work with this feature (or particular combination of features). As a consequence, it may become desirable that particular network elements adapt or constrain the features that they use with specific types of UE.

This report documents one or more possible signalling mechanisms that can be used to provide UE specific behaviour information to network entities.

A comparison of the pros and cons of the different architectures is included, however, the TR is not expected to make a decisive conclusion. Instead, the TSG plenary meetings are expected to use this TR to recommend how to proceed with further work.