3GPP Joint Meeting on GSM-UTRAN handover and SRNS relocation
Sophia Antipolis, France
23 August 1999

Agenda Item:	6.2
Source:	Nokia
Title:	UE vs. Network Initiated Routing Area Update in SGSN Handover
Document for:	Decision

1   Introduction

The SRNC relocation described in the section 4.3.12.2.3 of 23.121 [1] introduces a new procedure, i.e. the network initiated Routing Area Update (RAU). However, this new procedure is not needed if a normal RAU procedure intiated by the UE is applied. In fact, it is shown in this paper that the normal RAU procedure intiated by the UE is the only feasible solution for the SGSN handover.

This paper proposes to use a normal RAU procedure initiated by the UE instead of the network initiated RAU in case of the SRNS relocation together with SGSN handover.

2   Discussion

The SRNC relocation together with SGSN handover is described in 23.121 in the section 4.3.12.2.3. In the current version of the procedure, after the SGSN change and the location update to HLR are performed, the new location is updated to the UE by sending a network initiated RAU update message from the new SGSN.

An alternative approach is that the UE initiates a normal RAU procedure right after it receives the new location information given to the UE by UTRAN in RNTI Reallocation message. If the indicated RAI is different compared to the previous RAI then a normal RAU is triggered. The RAU request triggers in SGSN a normal update to HLR.

In the following chapters benefits of the UE initiated RAU are illustrated. It is shown that the normal RAU procedure simplifies the UE and SGSN behavior and it is even required for certain cases.

2.1   Normal Routing Area Update

A normal Routing Area Update (RAU) procedure initiated by the MS/UE is well-defined procedure in GPRS and in UMTS. Reusing an already defined procedure has several benefits:

1. Error handling has to be considered only once. The handling of errors in network procedures affecting UEs location information and which are triggered by UE is completely different than in a procedure at which the UE is only afterwards informed the new location information. Sticking to only one procedure this means faster standardisation and implementation.

2. The UE has already the functionality to perform both LAU and RAU (cf. SRNC relocation when UE connected to 3G_MSC/VLR) after reception of the explicit "New MM System info" message. Therefore, performing a normal RAU keeps the UE behaviour more uniform.

3. The SGSN could be implemented to perform SGSN change only one way. For example, the natural trigger for a location update to HLR in SGSN is the RAU request sent by a UE. Therefore, performing a normal RAU keeps the SGSN behaviour more uniform.

4. Introduces a cleaner separation between the SRNC relocation procedure and the inter-SGSN Routing area update procedure.

5. Avoids an extra procedure (Network initiated Routing Area Update) and new messages.

2.2 Maintenance of the Gs association

The SRNC relocation together with SGSN change described in 23.121 does not consider at all the case, in which the Gs interface is used in the core network. The UE initiated RAU significantly simplifies the maintenance of the Gs association.

In the MM Idle state (PS and CS), the natural trigger for the Gs association updating is a combined RAU initiated by the UE. The Gs association is not maintained if the UE is CS connected. However, after the CS connection is released the Gs association must be updated and this is realised by sending the UE initiated combined RAU to the SGSN. Therefore, SGSN must already implement the mechanism to receive a combined RAU also in the PS connected state.

In SGSN handover the same principle for maintaining the Gs could be applied in case the UE is only PS connected. This would allow to reuse already defined procedures for e.g. the Gs maintenance and unify the UE behavior in different network scenarios.

Additionally the UE initiated RAU would simplify some troublesome situations that can be generated in case the network initiated RAU approach is accepted:

1. The Gs association is maintained only if the UE attached to both CS and PS domain. Therefore, the new SGSN would need to know whether the UE is attached to CS services or not. However, this information may not be available in all cases, e.g. considering a UE coming from an area, in which there is no Gs.

2. The Gs association is not maintained if the UE is CS connected. In GPRS, the information regarding to the state of the UE is provided by the MS in the RAU message. For UMTS, if in the network initiated RAU applied some alternative mechanism would need to be developed..

3. In the chapter 4.3.1 of 23.121 contains a requirement that the size of the location area and the routing area can be independent from each other. Considering a case in which SGSN handover is performed and also MSC changes while the UE being CS IDLE, the new MSC has to retrieve authentication data from the old MSC, i.e. the old MSC has to be found. Due to the area requirement, this may not be possible, because the new MSC does not receive the old LA identity from the UE.

3 Conclusion

In this paper it is showed that the network initiated RAU procedure which is defined in 23.121 is not a feasible solution for SGSN handovers. Therefore, it is proposed to use a normal RAU procedure initiated by the UE instead of the network initiated RAU in case of the SGSN handover.

It is proposed that the CR on 23.121 in Tdoc WHS-99018 (SRNC relocation in relation with SGSN change) should be accepted.

4 References

[1] UMTS 23.121 v. 3.0.0, "Architectural Requirements for Release 1999", source: TSG SA WG2.