TSG-RAN Meeting #19 ***RP-030188***

Birmingham, United Kingdom, 11 - 14 March 2003

Agenda Item: **9.10**

Source: **Nokia, Lucent, Siemens**

Title: **Scope of Rel-6 WI on Trace enhancement**

Document for: **Approval**

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1 Introduction

During the joint meeting between RAN WG2/WG3 and SA5 SWGD about the Rel-6 Trace enhancement, Nokia presented its view in [R3-030215/R2-030181], but all contributions for the joint meeting were noted without decision on the way forward for Trace enhancement in RAN.

Therefore this contribution briefly discusses the related standardization story in SA5 SWGD of the two trace activation methods namely the signalling based activation from CN and the management based activation directly from Network Management System. We also shortly describe the main pros and cons of both methods and propose to restrict the scope and extend the schedule of the potential RAN3 Rel-6 Trace Work Item, compared to Nortel proposal in [RP-030166].

2 Discussion

2.1 Relation of RAN to work performed in SA5 SWD:

SA5 agreed on the two activation methods on SA5#24bis in January 2002. At that meeting it was also agreed as stated in the official report [S5B010771] "*the subscriber trace activation is always based on the subscriber identification (IMSI, Public ID in IMS) and the equipment trace activation on the equipment identification (IMEI). Therefore trace can be activated in an NE only if that NE knows the corresponding identifier*".

Based on that requirement or burden for the concern NE, Nokia explained and proposed in [S5B020057] at SA5#25bis the following: "*SA5 should specify the trace activation to use management interfaces only in the case of MSC server, SGSN, HSS and P-CSCF. It cannot be assumed that other 3GPP groups could enhance interfaces and procedures under their control to enable management activation, whereas needed signalling mechanisms already exist in RANAP, GTP and BSSAP for trace activation from core network. It should also carefully be considered whether the management activation to MGW, GGSN, RNC and BSC should totally be rejected due it's technical problems, low benefits and required work in various 3GPP groups compared to existing solutions*"

The official report [S5B020062r1] of that meeting states the following related to that contribution and proposal:

"*The RG decided not to change the current working assumption to keep both CN activation and management activation until the use cases are concluded. Consequently, the proposal was rejected, but the informative content was noted as possibly being useful in a later phase.*"

In the contribution [SP-020755], that contains the presentation of Technical Specification TS34.421 to TSG-SA, it is said that: "In case the concerned 3GPP WGs cannot provide a solution meeting the detailed requirements within Release 6 timeframe, this TS would then be changed accordingly and those requirements would be postponed to a later release. This is also applicable in case the required solution would mean changes to a non-3GPP specification that could not be updated within the Release 6 timeframe."

⇒ This statement confirms that the involved WGs are still allowed to evaluate the issues by themselves as well. We believe it is now the responsibility of RAN3 to consider from RAN's perspective the implications and feasibility of both activation methods.

2.2 Trace Session activation to SRNC:

2.2.1 Current status on UTRAN interfaces

signalling based trace activation

In signalling based activation the CN sends the trace activation message to activate UTRAN trace for one specific UE in RNC, in Rel-99 RANAP: INVOKE TRACE message is already specified. This message can be sent from the CN after IMSI authentication (or IMEI verification in IMEI based trace activation), for the signalling connection that is to be traced.

⇒ So in this approach, for normal operation no new information is needed from the CN side, and only for those users for which Tracing activation is requested, extra parameters can be provided if necessary.

For deactivation of UTRAN trace of the specific UE, the CN can use specific signalling, in Rel-99 RANAP: DEACTIVATE TRACE message is already specified as well, or UTRAN trace can be released when the signalling connection is released with RANAP: IU RELEASE procedure.

management based trace activation

In the management based trace activation the IMSI and IMEI(SV) shall be made available in the RNC for all signalling connections. The only technically reasonable solution could be that the IMSI or IMEI(SV) is provided to the RNC utilising the Iu signalling connection after IMSI authentication and IMEI verification.

⇒ Thus the management based trace activation cannot trigger trace to be activated in RNC any earlier phase of RRC connection than the signalling based activation. As a result the signalling based activation gives the same results in every trace use case.

It should be noted that the data amount which trace will generate from one traced UE connection (referred to detailed trace data concept) is huge and therefore the number of simultaneously traced UEs is only a few compared to all signalling connections supported by RNC, e.g. during the busy hour. Thus, providing the IMSI and IMEI(SV) of each signalling connection established in RNC, in order to support Tracing for few UEs in case of network management based activation, is considered an overkill from the system viewpoint. It also implies a waste of resources over Iu and in RNC, as it will have to handle big IMSI/IMEI database for that purpose only.

In case of management based activation to UTRAN, the trace activation command for the traced subscriber must come from NE Management Interface before the subscriber's signalling connection establishment procedure takes place. This is due to the fact that NMS cannot know when a certain subscriber is having an ongoing call in a predefined RNC. In addition to that, NMS does not have any certainty of the subscribers location, meaning that the trace activation procedure may have to be done to several RNCs to find traced subscriber and ensure the continuation of the trace in inter-RNC HO and SRNC relocations as well as for Iur mobility if this was required by SA5.

Therefore, the direct network management based activation to UTRAN via NE Management interface introduces an IMSI register/table. It contains those IMSI numbers, that should be traced when they appear under that RNC. This means that the majority of IMSI numbers in RNC IMSI register/table can and will be either those that are registered under different RNC, are in IDLE state or are switched off. It can be clearly seen that the size of the IMSI register/table in RNC would not be related at all to the real number of UEs that should be traced under that RNC. In addition, the trace deactivation for one subscriber requires that NMS must separately update the IMSI register/table in each RNC where trace was activated, to ensure that the subscriber trace would not start unnecessarily when subscriber is moving under different RNC area.

Due to the fact that IMSI register/table maintained by NMS, must be general in RNC and that the RANAP: COMMON ID message uses connection oriented signalling, the comparison between IMSI numbers in IMSI register/table and IMSI number in RANAP message comes cumbersome. This means that RNC must check the IMSI number received from every RANAP: COMMON ID message against all IMSI numbers in IMSI register/table, if the trace reports should be provided for NMS from that signalling connection. The checking must be done for all signalling connections even if the trace is not set to active set from NMS via NE Management Interface for that specific subscriber.

It should be noted as well that this issue must not be tight together with the Rel-5 Early UE handling issue. Indeed the choice between IMEI(SV) or BMUEF to be carried over Iu has not yet been done and should not yet be taken into account for a potential Rel-6 Trace enhancement. Vice-versa, it cannot be argued that IMEI(SV) should be chosen for the Rel-5 Early UE handling (practically speaking more like a rel-99 issue) because it eases the support for Rel-6 or later of the network management based activation

trace over Iu that may not even be feasible or beneficial. Thus it is seen reasonable to consider the two items separately.

Moreover, the configuration work of management based trace activation can become overwhelming, e.g., in case of subscriber complaint. There the operator must configure all its network elements manually, compared to the signalling based activation where the activation needs to be done only once in HSS. Thus, in these situations the signalling based activation is the only acceptable solution, especially so in larger networks. This is something SA5 already agreed upon in the use cases documented in an informative annex of TS 32.421. Both activation methods can be used for all use cases except for subscriber complaints. It is to be noted that TS 32.421 does not present any single use case, where the only feasible activation method would be the network management based activation.

Restricting the scope of the Trace WI to the signalling based trace activation would keep the trace concept similar to Subscriber trace defined for GSM in TS101 627 (GSM 12.08 version 5.1.1 Release 1996), which would be beneficial when merging usage of 2G and 3G networks.

Trace Session propagation to DRNC:

Unlike in RANAP, there is no existing means in RNSAP to support propagation of Trace over Iur. This would require some specification changes for the signalling based activation. Here it is noted that if the purpose of the Work Item is to fulfill the SA5 requirements that are documented in TS32.421, the document does not clearly state the session propagation to DRNC as a requirement. However, this was presented in the joint meeting between RAN2/3 and SA5 in the SA5 Trace presentation that was approved by SA5. For this reason the trace session propagation in signalling based activation should be considered in RAN3 as well.

2.3 WI schedule:

The Nortel WI proposal for Trace enhancement in RAN has the RAN#21 (September 2003) as target date for completion. We believe it is not a realistic schedule considering the foreseen work on trace in RAN3 and also the overall work load situation in RAN3. For most of the Rel-6 specifications from SA5, September 2003 is the deadline for sending them for approval to TSG-SA (TSG#21). For some specifications (including Trace specs 32.422 and 32.423) the deadline is December 2003 (TSG#22). The charging specifications have March 2004 as their deadline of sending for approval (TSG#23). All these dates will be presented to TSG#19 (most of them have been changed, i.e., delayed).

To be realistic, we do not think that the stage 2 for Trace enhancement TS32.422 would be approved before December 2003, even with a good cooperation and contribution from different companies involved in the SA5 work (Nokia is the rapporteur of the Trace WI in SA5, Lucent is the editor of TS32.422). At the moment the specification is empty. Only the ToC is agreed and a lot of work is needed to complete that specification. There are only 6 SA5 meetings before December, so it is seen reasonable to expect the TS32.422 to be available in December 2003.

Furthermore, the experience has shown that SA5 (as many other WGs) always has about 3 months delay to finish the content of its release. So if the current deadline for Rel-6 is December 2003 then it would be even OK for Rel6 to complete the specification in March 2004, as Rel6 could not be finished at least from SA5 point of view without charging support that has been targeted to March 2004.

Assuming that the December deadline for TS32.422 and TS32.423 is respected, RAN3 normally needs at least 3 more months (1-2 meetings) to fully complete the WI in its stage 3 specifications. This would set the target deadline for the RAN WI to TSG-RAN#23 (March 2004).

3 Summary and proposal:

Nokia, Lucent and Siemens support the creation of a WI under TSG-RAN for Subscriber & Equipment Trace enhancement with the scope to enable trace activation in UTRAN only for the signalling based activation according to the needs of SA5 SWG-D. Neither need nor benefit are seen in UTRAN for the management based activation especially so as the trace results of the two methods are going to be the same. The target date for the WI is proposed to be at TSG-RAN#22 (December 2003).

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4 References:

[SP-020755] Rel-6 TS 32.421 v2.0.0 (Subscriber and equipment trace: Trace concepts and requirements), source SA5, approved at TSGS#18.