

Agenda Item: 16.2
Source: Nokia
Title: **Modifications to the RNSAP Relocation Commit procedure**
Document for: Decision

1 Introduction

In previous R3 meeting a study item for the interactions between RNSAP and RANAP procedures in case of Relocation of SRNS was initiated. This contribution proposes additions required for RNSAP Relocation Commit procedure for proper handling of downlink Direct Transfer during relocation of SRNS. An other contribution for additions required for the RANAP is made for Iu SWG.

In the 'Relocation and Handover workshop' held in Sophia Antipolis (23.8.1999) it was agreed that the lossless relocation shall be possible to be supported in release 99 UTRAN. This paper introduces also the changes for RNSAP required to fulfill this requirement.

2 Discussion

Interaction of RANAP and RNSAP:

In the previous R3 mtg, regarding the interaction with relocation, it was proposed that unfinished RANAP Direct Transfer messages and received RANAP Pagings would be moved over Iur by RELOCATION COMMIT message.

Moving of CN PAGING over Iur is not however feasible since the target RNC might be connected to different CN nodes than the source RNC. If this is the case then the paging identity (e.g. TMSI) is not valid at target RNC and the Paging Response would as a consequence go to wrong CN node.

The transmission of Direct Transfer PDUs via Iur on the other hand is feasible and hides the relocation in this respect from CN.

1) Following changes to the SRNS Relocation Commit procedure are therefore proposed:

- 1) RNSAP Relocation Commit is sent always regardless whether RRC Handover Command will be sent to UE or not (i.e. regardless whether it is a Relocation or Hard Handover)
- 2) If a DL air interface transfer of a NAS-PDU, received in RANAP DIRECT TRANSFER message, is not completed when RELOCATION COMMIT is to be sent, the uncompleted RANAP DIRECT TRANSFER message is forwarded to target RNC in a transparent field of RELOCATION COMMIT.

Requirements for the Lossless Relocation:

Due to the lossless Relocation support following additions are proposed:

Source RNC shall be able to add following information for specific RABs (originating from PS domain) to the Relocation Commit message:

- the sequence number for the next downlink GTP-PDU to be sent to the UE
- the sequence number for the next uplink GTP-PDU to be tunnelled to the SGSN.
- for each RLC protocol in use, the sequence number of the UL RLC-PDU which carried the last segment of the last GTP-PDU forwarded to SGSN.

Chapter 3 includes the detailed changes to the RNSAP specifications according to the above proposals.

3 Additions to RNSAP Specifications

3.1 SRNS Relocation Commit procedure

SRNS Relocation Commit

The ~~SRNS~~ RELOCATION COMMIT procedure is an elementary procedure used to realise the relocation of SRNS functionality part of the SRNS Relocation procedure described in [4].

The source RNC ~~shall~~ send the ~~SRNS~~ RELOCATION COMMIT message to the target RNC when it has completed necessary lu procedures and has decided received an indication that it can to proceed with the ~~SRNS~~ Relocation of SRNS procedure from all the involved CN nodes [4]. When the UE is utilising one or more radio links in the DRNC the message will be sent using the connection oriented service of the signalling bearer and no further identification of the UE context in the DRNC is required. If on the other hand, the UE is not utilising any radio link and thus uses common transport channel resources the message will be sent using the connectionless service of the signalling bearer and the D-RNTI is included in the message to identify the UE context in the DRNC.

When the RELOCATION COMMIT message is to be transmitted, Source RNC shall stop the air interface transmission of the user plane data for the RABs which utilise reliable L2 link over the air interface.

For each RAB originating from PS domain and for which N-PDU forwarding is used over Iu interface, source RNC shall include following information to the RELOCATION COMMIT:

- the sequence number for the next downlink N-PDU to be sent to the UE
- the sequence number for the next uplink N-PDU to be tunnelled to the SGSN.
- the sequence number of the UL RLC-PDU which carried the last segment of the last GTP-PDU forwarded to SGSN.

In case the downlink air interface transmission of a transparent NAS-PDUs received from CN by RANAP DIRECT TRANSFER is not completed, source RNC shall include these uncompleted RANAP DIRECT TRANSFER PDUs to the RELOCATION COMMIT message.

At reception of the ~~SRNS~~ RELOCATION COMMIT message from the source RNC the target RNC executes the DL and UL switch for all RABs belonging to the UE at the earliest suitable time instance. Prior to reception of the ~~SRNS~~ RELOCATION COMMIT message the target RNC has received a request to perform SRNS Relocation from all the involved CN nodes and responded to the CN nodes with a proceeding indication. The Iu transport bearers for each radio access bearer have also been established between the target RNC and all CN nodes.



Fig. 9-14: ~~SRNS~~ Relocation Commit

4 Proposal

It is proposed that the Non Italic modifications described in chapter 3 which are required to handle the interaction of RANAP and RNSAP procedures are included into the TS 25.423.

It is proposed that the modifications in Italic font described in chapter 3 which are required to handle the lossless relocation are included into the TS 25.423.

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Consequences of the additions in chapter 3 for Relocation Commit message contents:

Information Element	Reference	Type
Message Type		M
Transaction ID		M
D-RNTI		O
<u>RAB Contexts xn</u>		<u>O</u>
<u> RAB ID</u>		<u>M</u>
<u> DL GTP-PDU Sequence Number</u>		<u>M</u>
<u> UL GTP-PDU Sequence Number</u>		<u>M</u>
<u> UL RLC-PDU sequence Number</u>		<u>M</u>
<u>Forwarded DL NAS Information xn</u>		<u>O</u>
<u> RANAP PDU</u>		<u>M</u>

Definitions for the new Information elements:

DL GTP-PDU Sequence Number

This IE indicates the sequence number of the GTP-PDU which is the next to be sent to the UE.

UL GTP-PDU Sequence Number

This IE indicates the sequence number of the GTP-PDU which is the next to be sent to the SGSN.

UL RLC-PDU Sequence Number

This IE indicates the sequence number of the UL RLC-PDU which carried the last segment of the last GTP-PDU forwarded to SGSN

RANAP PDU

This information element is a RANAP DIRECT TRANSFER PDU produced according to the RANAP specifications.