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Title: **Handling abnormal conditions in UTRAN Interfaces**

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1 Introduction

This contribution discusses general principles for handling abnormal conditions in UTRAN interfaces; Iu, Iur and Iub. Elementary procedure specific error handling mechanism are not discussed and this contribution concentrates on three general issues:

- Usage of transaction ID in Application part procedure messages
- Existence of application part Error Report procedure
- Error handling principles for UTRAN interfaces in cases where procedure specific error handling does not work

It is proposed that the mechanisms described in chapters 2,3 4 are taken as a guidelines for the handling of abnormal cases.

2 USAGE OF TRANSACTION ID

In general there is no requirements to run parallel procedures in UTRAN interfaces. For easy error handling, transaction ID shall however be included in some messages belonging to application part procedures.

In some abnormal cases detected e.g. from an expiry of a timer there might be still some messages being transmitted or about to be transmitted over the interface from the other end. In order to be able to start a new similar but a possibly differently parametrised procedure, the different executions of the procedure shall be separated by transaction ID. Each time a new procedure is initiated without the previous being finalised, the count for pending transaction IDs is increased by one. For each procedure, in which transaction IDs are used there is a maximum amount of pending transaction IDs (set by the operator). When this maximum value is reached special error handling procedures shall be initialised (see chapter 4). Every time a procedure is completed the count of pending transaction IDs is reset.

If an UMTS node receives a message belonging to a new execution of a procedure while old executions of the same procedure are still in pending state, the UMTS node should abort the old procedure and continue the new execution as required by the reception of the new message.

Example:

SRNC initiates a Relocation procedure towards two CN nodes. Other CN node rejects the procedure indicating a cause value "available CN resources not available". After that, the same CN node initiates Iu release towards UTRAN. After this the Relocation is still ongoing in the other CN domain. In order to have fast execution of the Relocation for the remainining domain, the SRNC shall initiate a new Relocation procedure. In this new procedure the parameters are however different to the previous execution.

SRNC shall initiate a new RELOCATION REQUIRED message with a new transaction ID towards the remaining CN domain. Upon doing this the SRNC shall abort the old RELOCATION procedure. When Source CN node receives the new RELOCATION REQUIRED it as well aborts the old procedure and continues the new Relocation. Same is done in target CN node and in target RNC. Target RNC responds to the new Relocation, the answer being transferred back to SRNC. Upon reception of the response for the new RELOCATION the SRNC knows that all nodes have aborted the old procedure and are ready for the execution of the new Relocation.

If a message belonging to an aborted procedure is received the message shall be ignored.

3 RANAP/RNSAP/NBAP Error Report procedure

RANAP/ RNSAP/NBAP Error Report procedure is used to solve error cases that can not be solved by messages belonging to certain elementary procedures.

If an UMTS node receives a message that is not recognised then the node should initiate the XXXAP Error Report procedure, indicating cause value "Unrecognised message". This message includes in addition to the cause value, the supported protocol versions and an echo of the unrecognised message.

If an UMTS node receives a recognised message in which the parameters are not consistent with other parameters existing in the receiving node and if the procedure has a message for unsuccessful operation, then that should also be used for all error cases (either procedure or parameter level) indicating appropriate cause. If there is no suitable response message for the procedure the receiving node shall initiate the XXXAP Error Report procedure, indicating cause value "Paramater mismatch". This message includes in addition to the cause value, the supported protocol versions and an echo of the message which caused the mismatch.

4 Error handling principles for UTRAN interfaces

Elementary procedure which results repeatedly to the same abnormal condition shall be repeated at most N(ELEMENTARY PROCEDURE MAX COUNT) times. This count shall be elementary procedure specific and to be defined by the operator. If transaction ID is used for subsequent executions of the procedure, the maximum count shall be smaller than the available amount of transaction IDs.

If the abnormal condition still exist after having reached the maximum count of procedure executions, then:

Iu Interface:
If the maximum count is reached at RNC side:

The Iu release Request procedure shall be intialised. This procedure shall be repeated maximally N(IU RELEASE REQUEST) times after which RNC should release all resouces related to the UE within UTRAN including the Iu SCCP connection. The O&M function of the RNC shall be notified of the abnormal release.

If the maximum count reached at CN side:

The Iu release procedure shall be initialised. This procedure shall be repoeated maximally N(IU RELEASE) times after which CN should release all resouces related to the active connections for the UE within CN including the Iu SCCP connection. The O&M function of the CN node shall be notified of the abnormal release.

Iur Interface:

If maximum count is reached in SRNC:

The RL DELETION procedure shall be intialised addressing all radio links within DRNS. This procedure shall be repeated maximally N(RL DELETION) times after which RNC should release all resouces related to the UE and the DRNS in question within UTRAN including the Iur SCCP connection. The O&M function of the RNC shall be notified of the abnormal release.

If maximum count is reached in CRNC:

The NBAP RL DELETION procedure shall be initialised addressing all radio links within DRNS. This procedure shall be repeated maximally N(RL DELETION) times after which RNC should release all

resouces related to the UE within DRNS, including the Iur SCCP connection. The O&M function of the RNC shall be notified of the abnormal release.

Iub Interface:

If maximimum count is reached in CRNC:

RNSAP Radio Link Failure procedure shall be initialised towards SRNC. This procedure shall be repeated maximally N(RL FAILURE) times.

Maximum Count reached in Node-B:

NBAP Radio Link Failure procedure shall be initialised towards CRNC. This procedure shall be repeated maximally N(RL FAILURE) times after which all resources within Node-B related to the UE in question shall be released. The O&M function of the Node-B shall be notified of the abnormal release.