

**Agenda Item:** 10.3  
**Source:** Nokia  
**Title:** **RANAP support for volume based charging**  
**Document for:** Decision

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## 1 Introduction

RANAP does not currently have any mechanisms to support data volume based charging. This paper proposes additions to the RANAP specification to support this feature.

## 2 Discussion

UTRAN is responsible for handling the reliable data transmission over the air interface while SGSN is handling the charging for the service. If some reliable estimate for the downlink data amount transmitted over the air interface is wanted to be known in SGSN, data volume reports have to be received from UTRAN.

In principle there is two options for reporting the DL data volume to SGSN:

1. SGSN calculating sent DL data and UTRAN reports SGSN about unsuccessfully sent data
2. UTRAN calculates succesfully sent DL data and reports this to SGSN

The method 2 is proposed to be used since with option 1 there are some problems during relocation procedure as described below:

At relocation of SRNS it is possible that some GTP-data is moved from source RNC to target RNC without involvement of CN. Since the target RNC is responsible for the transmission of the forwarded data over the air interface the source RNC can not know the faith of the data that was forwarded for the target RNC. Following case 1, source RNC would have to report the forwarded data being unsuccessful.

In case the target RNC successfully transmits the data over the air, then again following case 1, no report is generated for the new SGSN, resulting that the data is not charged at all. On the other hand if the data is not transmitted successfully by the target RNC the new SGSN would receive a data volume report of data that it has never sent. This may lead to some difficult error cases and misbehaviour of the charging functionality in SGSN.

## 3 Modifications to RANAP specification

For RAB assignment procedure the CN shall be able to define whether for a RAB the data volume calculation and reporting is required or not (Modification to RAB ASSIGNMENT REQUEST message).

Also the CN should be able to request at a give time the data volume information from UTRAN and UTRAN should be able to report the data volume (New RANAP procedure: Data Volume Report). Also when the RAB is released UTRAN should be able to report the data volumes (modifications to messages lu Release Complete and RAB Assignmnet response).

### 3.1 Data Volume Report Procedure

#### **Data Volume Report**

Data Volume Report procedure is used by CN to request the transmitted DL data volume for specific RABs. The procedure uses connection oriented mode of the signalling bearer.

Procedure is initiated by CN by sending DATA VOLUME REPORT REQUEST message to UTRAN. Message contains the list of RABs for which the data volume report shall be issued.

At reception of this message UTRAN shall produce the DATA VOLUME REPORT message indicating the amount of successfully transmitted downlink data for the addressed RABs since the last data volume indication to CN. UTRAN shall also reset the data volume counter for the reported RABs. UTRAN shall send the DATA VOLUME REPORT message to CN.

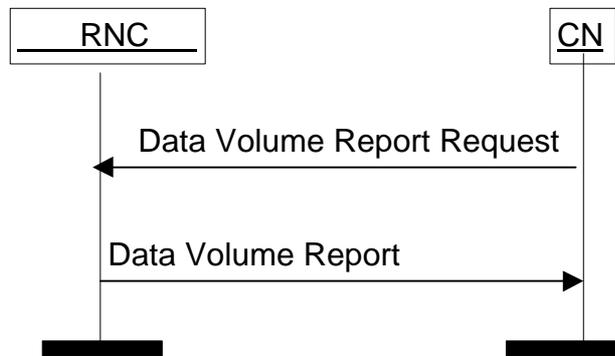


Figure 1. Data Volume Report Procedure.

### 3.13.2 Message modifications (additions)

#### RAB ASSIGNMENT REQUEST

Information element	Reference	Type
Message type		M
<b>Bearers x n to be setup or modified</b>		<b>C1</b>
RAB ID		M
NAS Binding Information		M
RAB parameters		M (1)
<a href="#">Data Volume Reporting Indication</a>		<a href="#">M</a>
User Plane mode		M
Transport Address		M
Iu transport association		M
Priority level and pre-emption indication		O (2)
Bearer linking		O
<b>Bearers x n to be released</b>		<b>C1</b>
RAB ID		M
Cause		M

#### RAB ASSIGNMENT RESPONSE

Information element	Reference	Type
Message type		M
Location Identifier		O
<b>Bearers x n established or modified</b>		<b>C1</b>
RAB ID		M

RAB parameters		O (1)
Transport address		M (2)
Iu transport association		M (2)
<b>Bearer x n released</b>		<b>C1</b>
RAB ID		M
<u>Transmitted DL data volume</u>		<u>O</u>
<b>Bearer x n queued</b>		<b>C1</b>
RAB ID		M
<b>Bearer x n failed to establish or modify</b>		<b>C1</b>
RAB ID		M
Cause		M

## IU RELEASE COMPLETE

Information element	Reference	Type
Message type		M
<u>RAB Data Volume report x n</u>		<u>O</u>
<u>RAB ID</u>		<u>M</u>
<u>Transmitted DL data volume</u>		<u>M</u>

## DATA VOLUME REPORT REQUEST

Information element	Reference	Type
Message type		M
<b>RAB Data Volume report x n</b>		<b>M</b>
RAB ID		M

## DATA VOLUME REPORT

Information element	Reference	Type
Message type		M
<b>RAB Data Volume report x n</b>		<b>M</b>
RAB ID		M
Transmitted DL data volume		M

### 3.23.3 Definitions for the new Information elements

#### Data Volume Reporting Indication

This IE indicates whether or not RNC has to calculate the successfully transmitted NAS data amount for the RAB and to report the amount of data when the RAB is released.

#### Transmitted Data Volume

This information element indicates the data volume (octets) that is successfully transmitted over the air in DL direction for the RAB.