TSG-RAN Working Group 3, Meeting #4
Warwick, UK; 1-4 June 1999

TSGR3#4(99)522

Agenda Item: 14.4

Source: Nokia

Title: **Basic RNSAP ASN.1 structure, Modules and General PDU definition**

Document for: Discussion and Decision

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1 Introduction

In WG3 meeting #3 in Kawasaki, it was decided to use ASN.1 as the abstract syntax for the RNSAP protocol [1] (as well as for NBAP and RANAP). This document proposes the basic structure for RNSAP ASN.1 definition. It includes definition the module structure and definition of generic PDU (message) format that is applied throughout the protocol.

This contribution does not propose detailed ASN.1 definition of any specific RNSAP message, and is therefore limited to the generic ASN.1 structure only (applicable to all RNSAP messages).

2 Basic RNSAP ASN.1 Structure

2.1 ASN.1 Modules

According to "*Guidelines and Principles for protocol description and error handling*" [2], ASN.1 definitions shall be placed in ASN.1 modules in such manner that definitions in a module form a logical unit. It is proposed that the following three ASN.1 modules are used for RNSAP:

1. PDU definitions for RNSAP. This module defines what messages (here called PDUs) are included in RNSAP, what parameters (here called Information Elements) are included in the PDUs, and how PDUs are identified. In addition PDU values are encapsulated within a generic PDU structure (see following sections), which is also defined in this module.

2. RNSAP Information Elements. This module defines the information elements (IEs) that are used in the PDUs (RNSAP messages) at a detailed level. Note that a given IE may be used by several PDUs

3. Constant definitions for RNSAP. The definition of constants that are used by the RNSAP are presented in this module. The constants typically set the boundaries for IE values, e.g. max or min values, and may also include other constants that are applied throughout the protocol.

Note that this is slightly different structure compared to the one shown as an example in Nokia contribution TSGR3#3(99)348 to the previous meeting.

2.2 Generic Definitions for PDUs

To make the handling of the protocol messages as efficient as possible, it is advantageous to define a uniform appearance for them. This can be done by making the ASN.1 definitions that are described in this section.

2.2.1 Identification of PDUs and items to be sent to the peer entity

An identification for a PDU and the contents of a PDU are associated together. This is applicable for all PDUs, and at the same time all other items which are applied to all PDUs are defined (i.e. compatibility and logical grouping, see sections below). Identification consists of a version number and a PDU id. This identification is unique for the PDUs within this module.

Furthermore, the generic PDU structure is associated with a list of valid contents. The generic PDU structure defines which part of the definition is actually sent on the line to the peer protocol entity.

2.2.2 Versioning and Compatibility

It is likely that the protocols we are developing now will be developed in the future, and there is need to indicate the version number of a PDU. It is proposed that each message will have a version number. The details on the structure of a version number should be further refined.

Furthermore, in addition to version number, it is proposed to include some compatibility information in the messages indicating what kind of action the sending entity expects from the receiving entity in case of mismatch in the supported versions. The number of possible actions, and the details of these actions should be defined later.

2.2.3 Logical Procedure grouping

The RNSAP procedures belong to three groups:

1. Basic Mobility Management. This is a group of procedures that apply to basic mobility management, and do not require User Plane in the Iur interface.

2. Dedicated Channel Procedures. These procedures are applied to control DCHs in the Iur Interface.

3. Common Transport Channel Procedures. These procedures are applied to control Common Transport Channels in the Iur Interface.

The grouping is explicit from the message Id and there is no need to send it to the peer. The grouping may be helpful for implementations, and it is therefore proposed to include it.

2.3 Resulting RNSAP ASN.1 structure with modules and generic PDU description

```
-- **************************************************************
--
-- PDU definitions for RNSAP.
--
-- **************************************************************

RNSAP-PDUs -- { object identifier to be allocated }--
DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
```

```
-- *** TO BE DEFINED ***
FROM RNSAP-IEs

-- *** TO BE DEFINED ***
FROM RNSAP-Constants;

-- **********************************************************************
--
-- RNSAP-PDU-DESCR associates a RNSAP PDU structure with a PDU
-- identifier.
--
-- **********************************************************************

RNSAP-PDU-DESCR ::= CLASS {
     &PDUType,
     &versionID                              VersionID UNIQUE,
     &compatibilityInformation               CompatibilityInformation,
     &LogicalProcedure                       LogicalProcedure
}
WITH SYNTAX {
     PDU TYPE                                &PDUType
     VERSION NUMBER AND ID                   &versionID
     COMPATIBILITY INFORMATION               &compatibilityInformation
     LOGICAL PROCEDURE                       &LogicalProcedure
}

-- *** TO BE DEFINED ***
VersionID ::= SEQUENCE {
     pduID                                   INTEGER (0..63),
     versionNumber                           VersionNumber
}

-- *** TO BE DEFINED ***
VersionNumber                                ::= INTEGER (1 .. 255)

-- *** TO BE DEFINED ***
CompatibilityInformation ::= ENUMERATED {
     releaseIndicator,
     sendNotify,
     discardMessages,
     ...
}

LogicalProcedure                ::= ENUMERATED { bASIC, dEDICATED, cOMMON }

-- **********************************************************
--
-- RNSAP PDU descriptions
--
-- **********************************************************

RNSAP-PDUs RNSAP-PDU-DESCR ::= {
     Basic-RNSAP-PDUs                        |
     Dedicated-RNSAP-PDUs                    |
     Common-RNSAP-PDUs                       |
     ...
}

Basic-RANP-PDUs RANAP-PDU-DESCR ::= {
-- *** TO BE DEFINED ***
-- This is the list of RANAP Basic Mobility messages
     ...
}

Dedicated-RANP-PDUs RANAP-PDU-DESCR ::= {
-- *** TO BE DEFINED ***
-- This is the list of RANAP DCH messages
```

```
    ...
}

Common-RANP-PDUs RANAP-PDU-DESCR ::= {
-- *** TO BE DEFINED ***
-- This is the list of RANAP Common Transport Channel messages
    ...
}

-- **************************************************************
--
-- Generic PDU structure. The RNSAP-PDUs table above describes valid
-- contents for the vid, indication and value fields.
--
-- **************************************************************

RNSAP-PDU ::= SEQUENCE {
    vid        RNSAP-PDU-DESCR.&versionID ({RNSAP-PDUs}),
    indication RNSAP-PDU-DESCR.&compatibilityInformation ({RNSAP-PDUs}{@vid}),
    value      RNSAP-PDU-DESCR.&PDUType ({RNSAP-PDUs}{@vid})
}

-- **************************************************************
--
-- Definition of the PDUs one by one
--
-- **************************************************************

-- *** TO BE DEFINED ***

END
```

```
-- **************************************************************
--
-- RANAP Information Elements
--
-- **************************************************************

RNSAP-IEs DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

-- *** TO BE DEFINED ***
FROM RNSAP-Constants;

-- Definitions of RANAP IEs one by one
-- *** TO BE DEFINED ***

END
```

```
-- **************************************************************
--
-- Constant definitions for RNSAP
--
-- **************************************************************

RNSAP-Constants DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- Definitions of RNSAP constants one by one
-- *** TO BE DEFINED ***
```

```
END
```

3 Proposals

It is proposed that the ASN.1 definitions shown in section 2.3 of this contribution are inserted in Section 9.3 "*Message and Information Element abstract syntax (with ASN.1)*" of RNSAP Specification [3], as the starting point and structure of further ASN.1 definitions.

4 References

[1] Draft minutes of 3GPP TSG RAN WG3 Meeting #2 – Kawasaki, Japan

[2] 3GPP TSG RAN WG2 R2.01 (v0.1.0), Guidelines and Principles for protocol description and error handling.

[3] TSGR3#4(99)421, UMTS 25.423 UTRAN Iur Interface RNSAP Signalling (v1.0.2)