

Agenda Item: 16.5

Source: Nokia

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

Document for: Discussion and Decision

1 Introduction

In WG3 meeting #3 in Kawasaki, it was decided to use ASN.1 as the abstract syntax for the NBAP protocol [1] (as well as for RNSAP and RANAP). This document proposes the basic structure for NBAP 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 NBAP message, and is therefore limited to the generic ASN.1 structure only (applicable to all NBAP messages).

2 Basic NBAP 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 NBAP:

1. PDU definitions for NBAP. This module defines what messages (here called PDUs) are included in NBAP, 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. NBAP Information Elements. This module defines the information elements (IEs) that are used in the PDUs (NBAP messages) at a detailed level. Note that a given IE may be used by several PDUs
3. Constant definitions for NBAP. The definition of constants that are used by the NBAP 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.

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 NBAP procedures belong to two groups:

1. Common NBAP. This is a group of procedures that are not in relation to an existing UE context.
2. Dedicated NBAP. These procedures are applied to control an existing UE context.

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 NBAP ASN.1 structure with modules and generic PDU description

```
-- *****
--
-- PDU definitions for NBAP.
--
-- *****

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

BEGIN

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

IMPORTS

-- *** TO BE DEFINED ***
FROM NBAP-IEs

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

-- *****
--
-- NBAP-PDU-DESCR associates a NBAP PDU structure with a PDU
```

```

-- identifier.
--
-- *****
NBAP-PDU-DESCR ::= CLASS {
    &PDUType,
    &versionID                               VersionID UNIQUE,
    &compabilityInformation                   CompabilityInformation,
    &LogicalProcedure                         LogicalProcedure
}
WITH SYNTAX {
    PDU TYPE                                 &PDUType
    VERSION NUMBER AND ID                    &versionID
    COMPABILITY INFORMATION                  &compabilityInformation
    LOGICAL PROCEDURE                       &LogicalProcedure
}

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

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

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

LogicalProcedure ::= ENUMERATED { common, dedicated }

-- *****
--
-- NBAP PDU descriptions
--
-- *****

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

Dedicated-NBAP-PDUs NBAP-PDU-DESCR ::= {
-- *** TO BE DEFINED ***
-- This is the list of Dedicated NBAP messages
    ...
}

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

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

NBAP-PDU ::= SEQUENCE {

```

```

vid    NBAP-PDU-DESCR.&versionID ({NBAP-PDUs}),
indication NBAP-PDU-DESCR.&compabilityInformation ({NBAP-PDUs}@vid}),
value NBAP-PDU-DESCR.&PDUType ({NBAP-PDUs}@vid)
}

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

-- *** TO BE DEFINED ***

END

```

```

-- *****
--
-- NBAP Information Elements
--
-- *****

NBAP-IEs DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

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

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

END

```

```

-- *****
--
-- Constant definitions for NBAP
--
-- *****

NBAP-Constants DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- Definitions of NBAP 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 NBAP 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)422, UMTS 25.433 UTRAN Iub Interface NBAP Signalling (v1.0.1)