Agenda Item:

Source: Editor (BT)

Title: SCCP Modifications

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4.5.1 Use of SCCP

4.5.1.1 General

The SCCP is used to support signalling messages between the CNs and the RNSRNC. One user function of the SCCP, called Radio Access Network Application Part (RANAP), is defined. The RANAP uses one signalling connection per active UE and CN domain for the transfer of layer 3 messages.

Both connectionless and connection-oriented procedures are used to support the RANAP. TS 25.413 explains whether connection oriented or connectionless services should be used for each layer 3 procedure.

RANAP may use SSN, SPC, and/or GT and any combination of them as addressing schemes for the SCCP. Which of the available addressing scheme to use for the SCCP is an operator matter.

Which out of the possible GT formats to be used is FFS. One option is to use the same format as for the MAP specification, i.e. GT format 4.

The following sections describe the use of SCCP connections for RANAP transactions. Section 4.5.1.2 describes the connection establishment procedures. Section 4.5.1.3 describes the connection release procedures. Section 4.5.1.4 describes abnormal conditions.

4.5.1.2 SCCP connection establishment

A new SCCP connection is established when information related to the communication between a UE and the network has to be exchanged between RNSRNC and CN, and no SCCP connection exists between the CN and the RNSRNC involved, for the concerned UE.

Various SCCP connection establishment cases have to be distinguished:

i)   RNSRNC Initiated SCCP Signalling Connection

ii)   CN Initiated SCCP Signalling Connection

The above cases are the only cases currently identified for SCCP connection establishment. Others may emerge in the future.

4.5.1.2.1 Establishment procedure in case i

The SCCP signalling connection establishment is initiated, by the RNSRNC, at the reception of the first layer 3 non access stratum message from the UE.

Initiation

The ~~RNS~~RNC sends ~~INITIAL_UE~~SCCP connection request message to the Core Network. ~~The~~ A ~~INITIAL_UE~~RANAP message ~~is~~ shall always be included in the user data field of ~~an~~ the SCCP connection request message.

Termination

- successful outcome

- The SCCP connection confirm message, which may optionally contain a connection oriented RANAP message in the user data field, is returned to the ~~RNS~~RNC

- unsuccessful outcome

- If the SCCP signalling connection establishment fails, an SCCP connection refusal message will be sent back to the ~~RNS~~RNC. This message may contain a transparent message to be sent to the UE.

For more information on how the RANAP procedure Initial UE message is handled, please see the elementary procedure Initial UE message in TS 25.413.
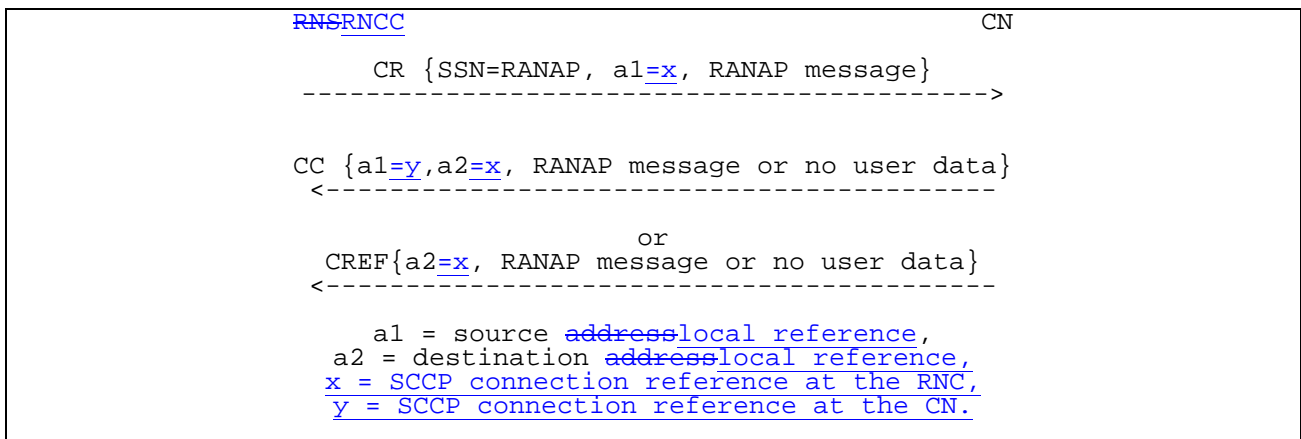
```
    ~~RNS~~RNCC                                                    CN

        CR {SSN=RANAP, a1=x, RANAP message}
      ------------------------------------------->


    CC {a1=y,a2=x, RANAP message or no user data}
     <-------------------------------------------

                        or
     CREF{a2=x, RANAP message or no user data}
      <-------------------------------------------

       a1 = source ~~address~~local reference,
      a2 = destination ~~address~~local reference,
      x = SCCP connection reference at the RNC,
      y = SCCP connection reference at the CN.
```

Figure 1: Setting-up of ~~RNS~~RNC Initiated SCCP Signalling Connection

Note: Which addressing scheme for SCCP to be used over Iu isTBD.

4.5.1.2.2 Establishment procedure in case ii

The SCCP signalling connection establishment is initiated, by the Core Network, in connection with performing a Relocation.

Initiation

The Core Network initiates the connection establishment by sending a~~n~~ SCCP connection request ~~RELOCATION REQUEST~~ message to the RNC. Optionally, a RANAP message may be~~The RELOCATION REQUEST message is~~ included in the user data field of ~~an~~ the SCCP connection request message.

Termination

- successful outcome

- The SCCP connection confirm message, which may optionally contain a connection oriented RANAP message in the user data field, is returned to the Core Network.

- unsuccessful outcome

- If the SCCP signalling connection establishment fails, an SCCP connection refusal message will be sent back to the Core Network. This message may contain a RANAP message in the user data field.

Note: In case of an unsuccessful termination of the UE signalling connection establishment (i.e. when RELOCATION FAILURE is sent to the CN), no radio resources are assigned for the UE in the RNSRNC. If the SCCP signalling connection has been established, the CN is expected to initiate the SCCP connection release.

For more information on how the RANAP procedure for Relocation is handled, please see the elementary procedure Relocation Resource Allocation in TS 25.413.
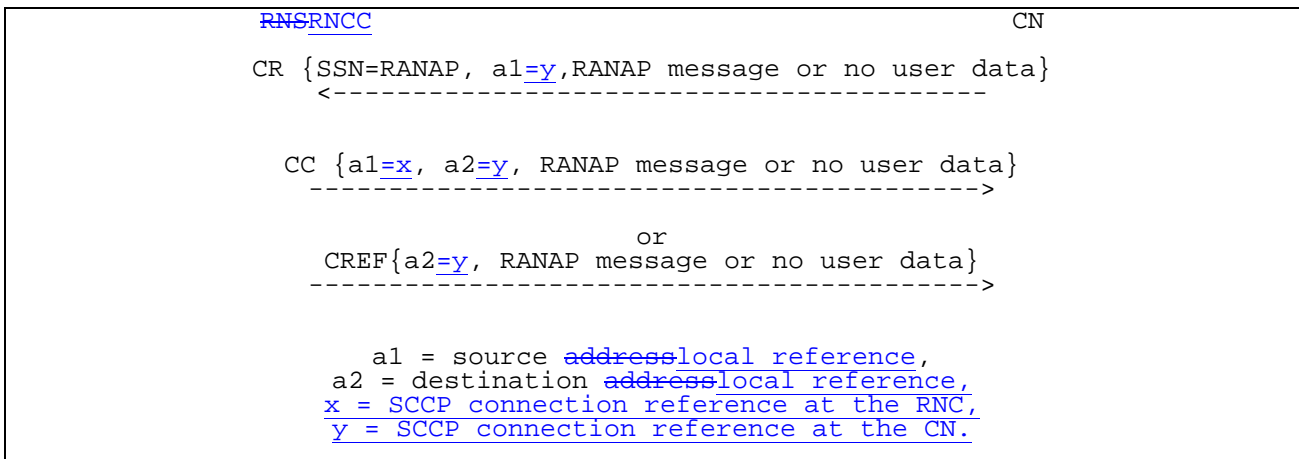
```
        RNSRNCC                                              CN

        CR {SSN=RANAP, a1=y,RANAP message or no user data}
            <-------------------------------------


        CC {a1=x, a2=y, RANAP message or no user data}
            ------------------------------------------>
                                or
        CREF{a2=y, RANAP message or no user data}
            ------------------------------------------>


            a1 = source addresslocal reference,
          a2 = destination addresslocal reference,
          x = SCCP connection reference at the RNC,
          y = SCCP connection reference at the CN.
```

Figure 2: Setting-up of CN Initiated SCCP Signalling Connection

Note: Which addressing scheme for SCCP to be used over Iu is TBD.

4.5.1.3 SCCP connection release

This procedure is always initiated at the Core Network side.

An SCCP connection is released when the CN realises that a given signalling connection is no longer required.

The CN sends a SCCP Released message.

4.5.1.4 General SCCP Abnormal Conditions

If a user-out-of-service information or signalling-point-inaccessible information is received by the RANAP, no new attempt to establish SCCP connections towards the affected point code will be started until the corresponding user-in-service information or signalling-point-accessible information is received.

When a user-out-of-service information or signalling-point-inaccessible is received by the RNSRNC, an optional timer may be started. When the timer expires, all the SCCP connections towards the affected point code will be released. When the user-in-service or signalling-point-accessible is received, the timer is stopped.

If for any reason an SCCP connection is released, the optional timer expires or a connection refusal is received while any of the RANAP procedures are being performed or while a dedicated resource is still allocated, the following actions are taken:

At RNSRNC:

- Any RNSRNC procedure relating to that connection is abandoned.

- The UTRAN resources allocated to the connection are released.

At Core Network:

- The resources associated with the SCCP connection are cleared as soon as possible.