

5G NSA RAN architecture

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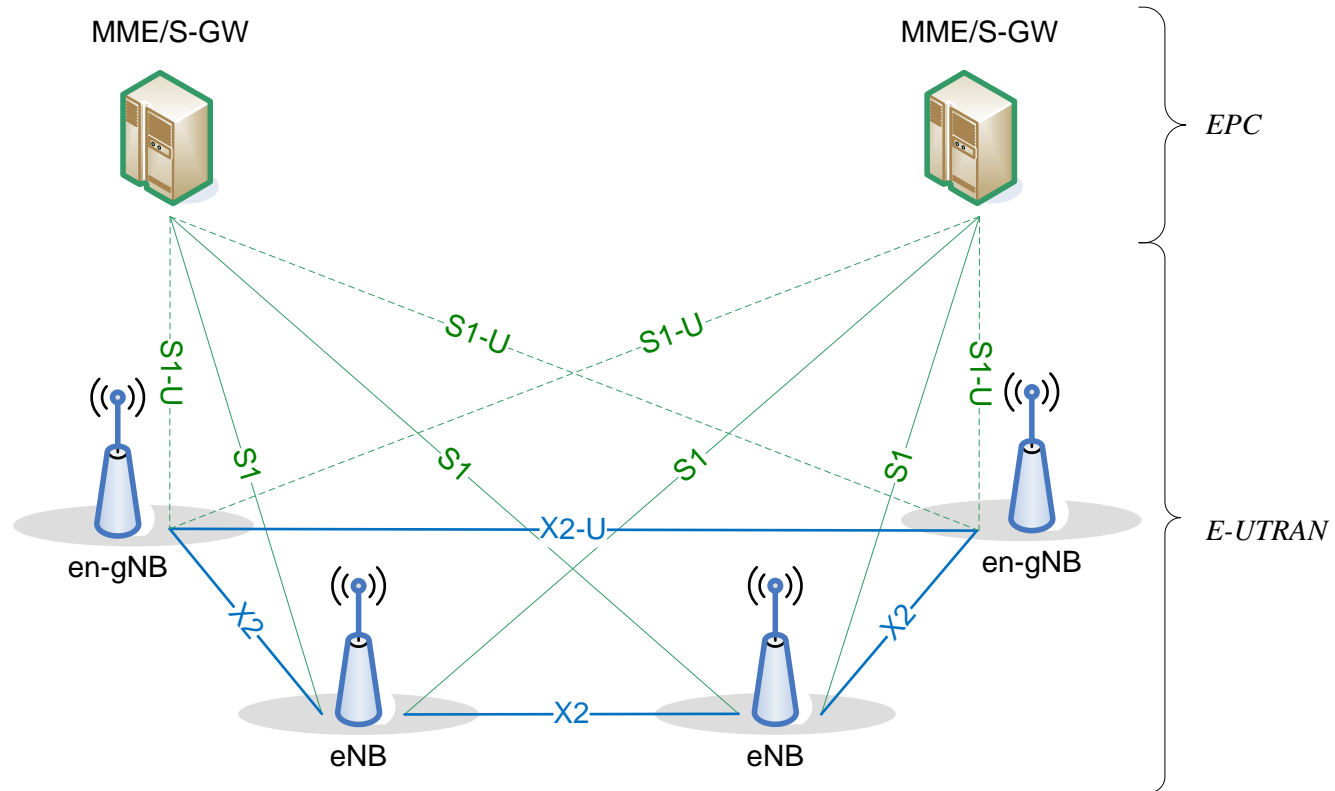
1. Introduction

Multi-RAT DC (MR-DC) types

- MR-DC with the EPC
 - **E-UTRA-NR DC (EN-DC)**
- MR-DC with the 5GC
 - NG-RAN EN-DC (NGEN-DC)
 - NR-E-UTRA NR DC (NE-DC)

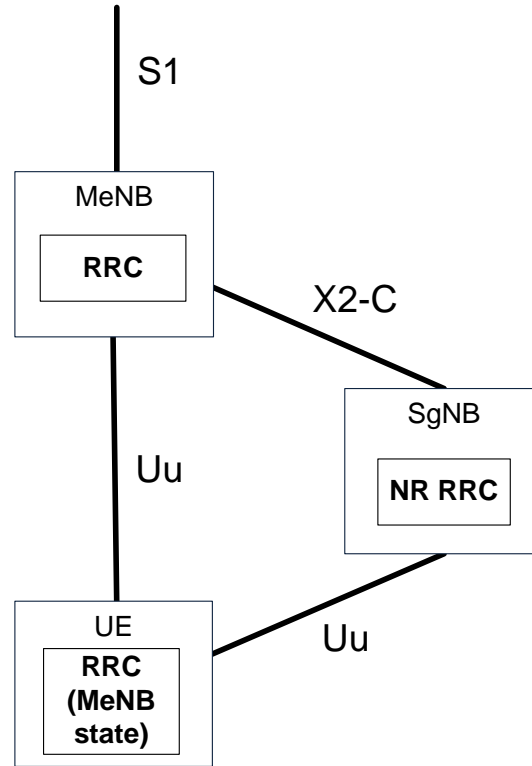
2. Architecture

Overall architecture



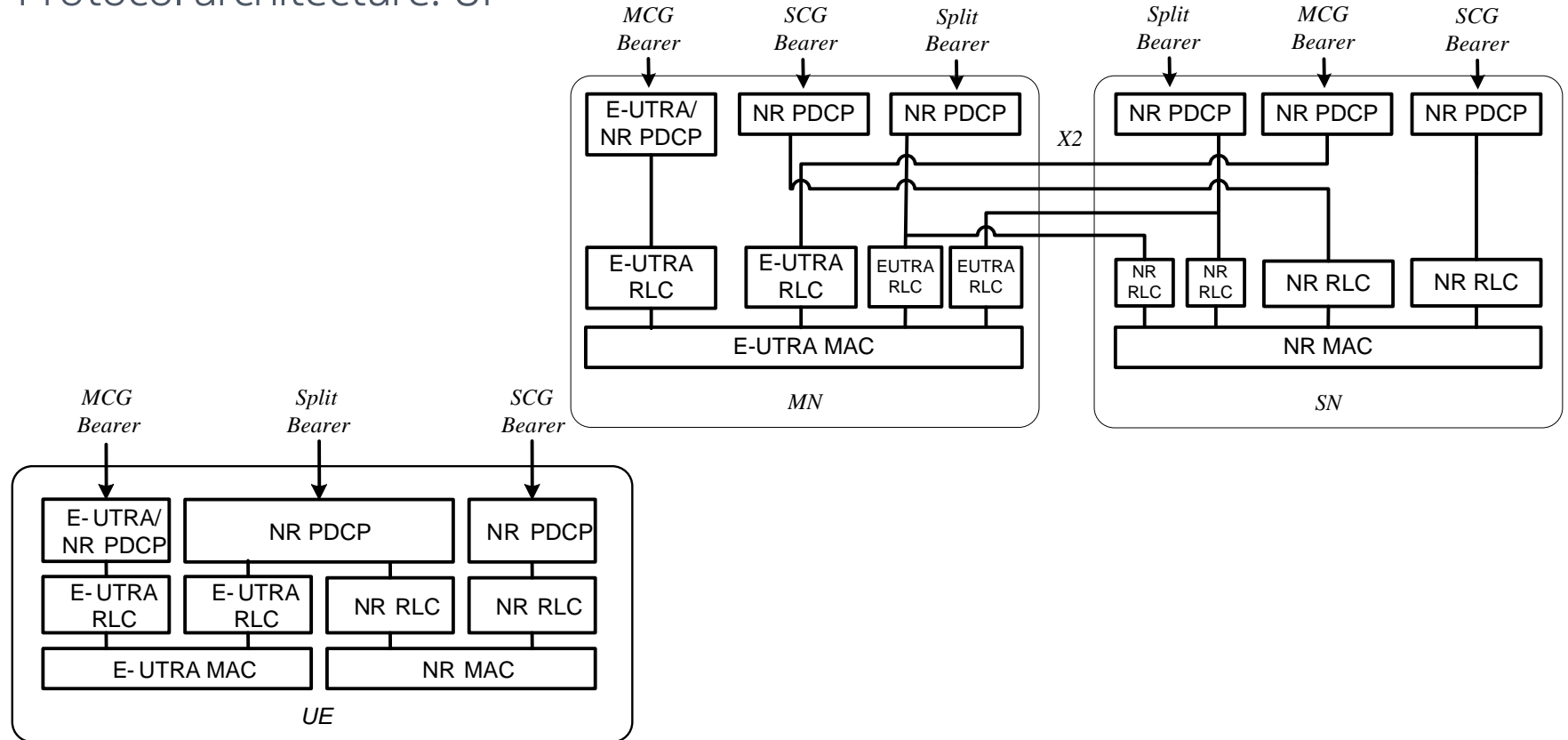
2. Architecture

Protocol architecture: CP



2. Architecture

Protocol architecture: UP



3. Bearer handling

QoS aspects

- The MN decides the split of DL UE-AMBR limits and UL UE-AMBR limits among the MN and the SN respectively, and indicates DL UE-AMBR limits and UL UE-AMBR limits to be respected by the SN.
- The node that hosts the PDCP entity enforces the respective DL UE-AMBR limits.
- Each node enforces the respective UL UE-
- AMBR limits. For SN terminated bearers, if the node is not configured to serve the uplink, it ignores the indicated UL UE-AMBR.

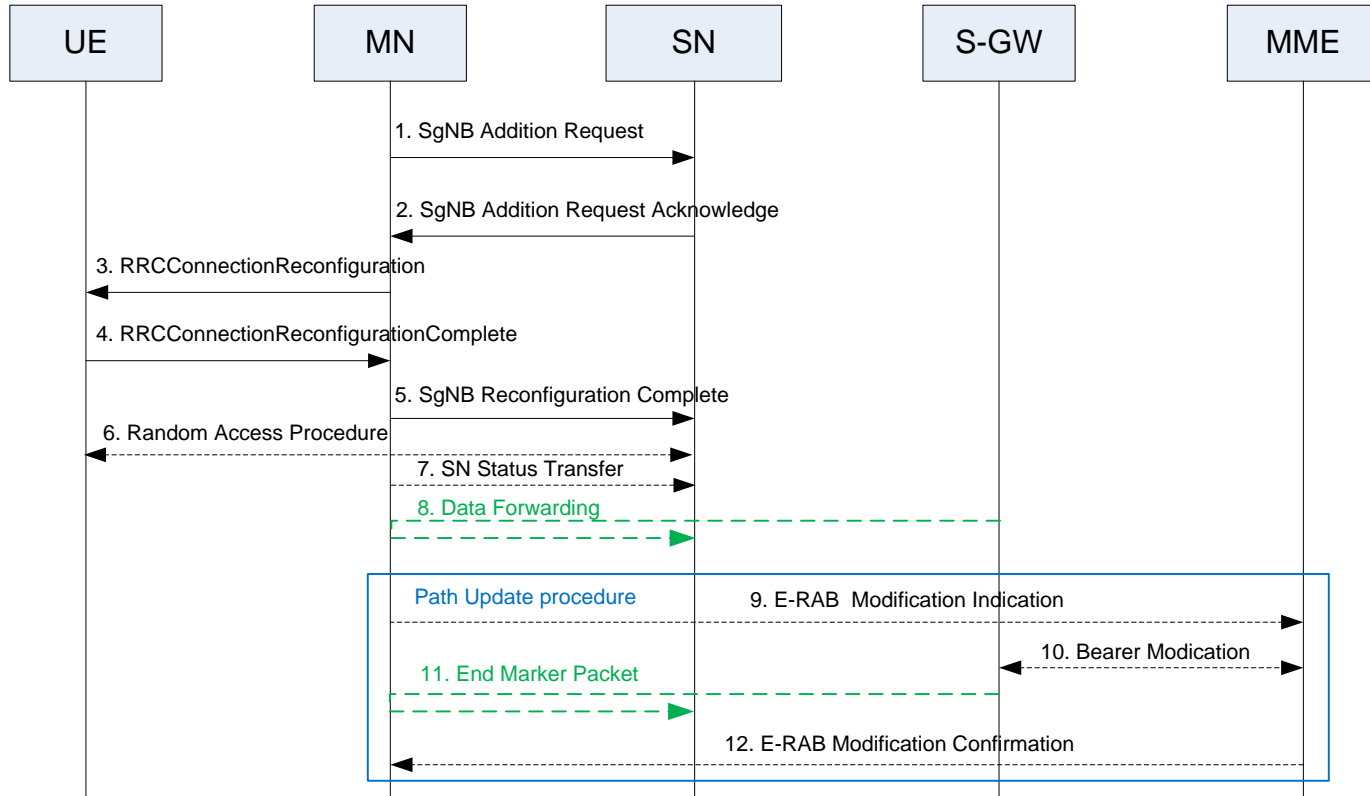
3. Bearer handling

Bearer type selection

- Decisions made by the MN
 - The location of the PDCP entity
 - In which cell group(s) radio resources are to be configured
- Fall back to MCG bearer
 - Once SN-terminated split bearer is established, the SN may remove and later on add SCG resources for the respective E-RAB, as long as the QoS for the respective E-RAB is guaranteed.

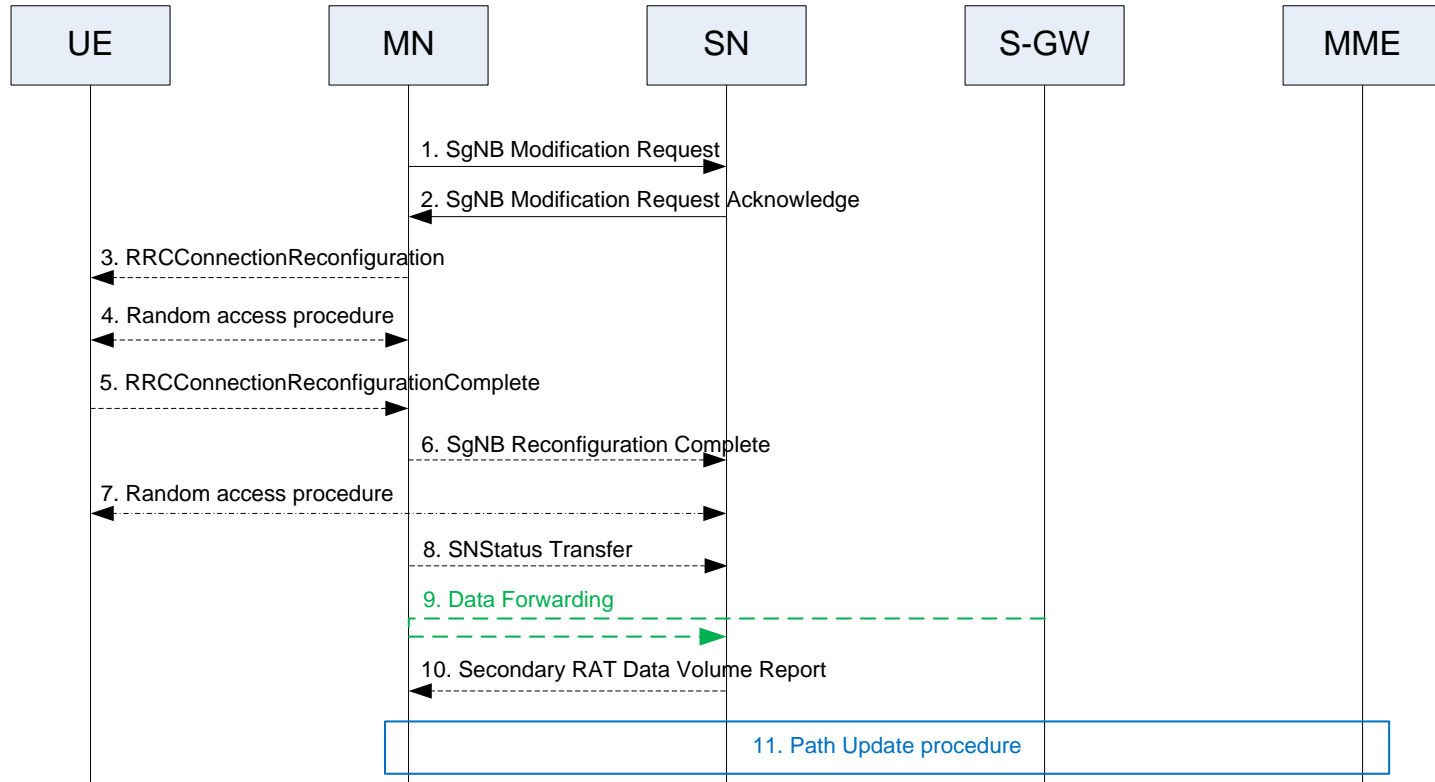
4. Procedures

Secondary Node Addition



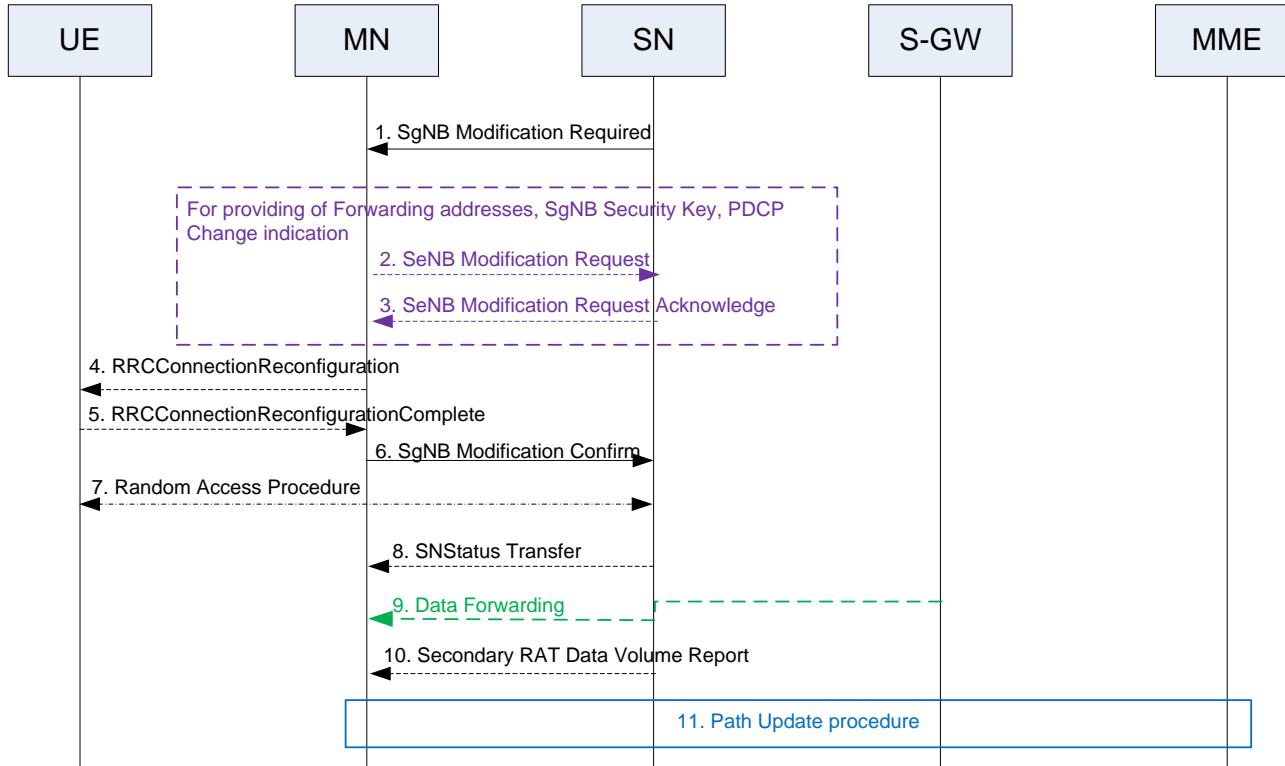
4. Procedures

Secondary Node Modification (MN/SN initiated)



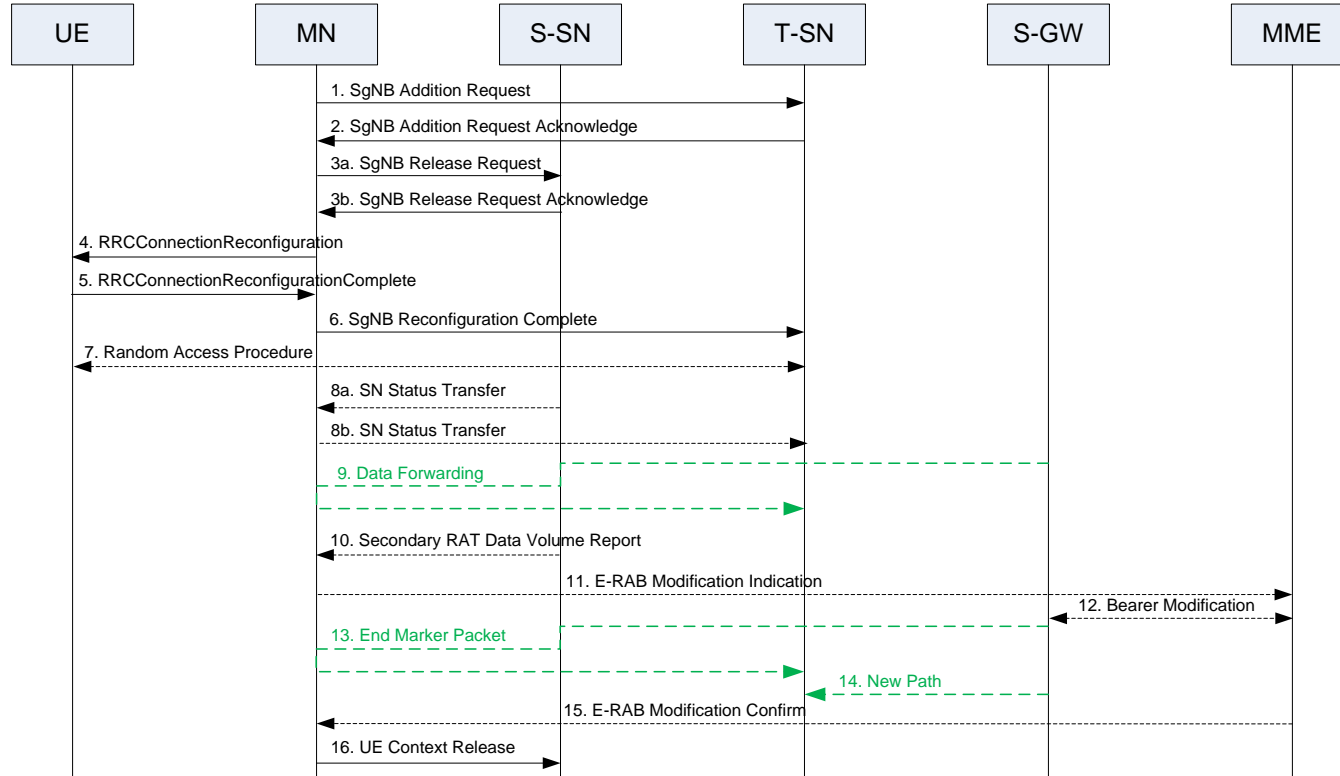
4. Procedures

Secondary Node Modification (MN/SN initiated)



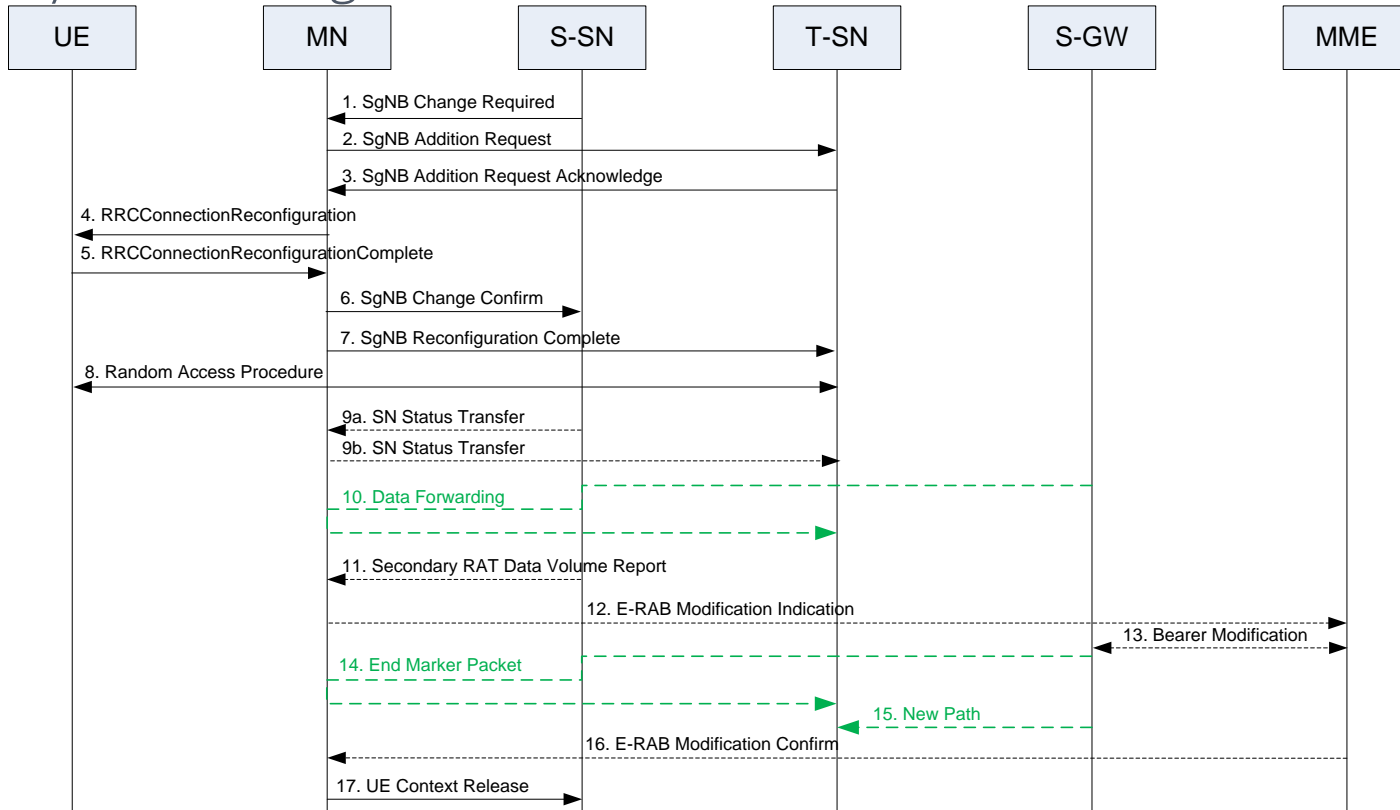
4. Procedures

Secondary Node Change (MN/SN initiated)



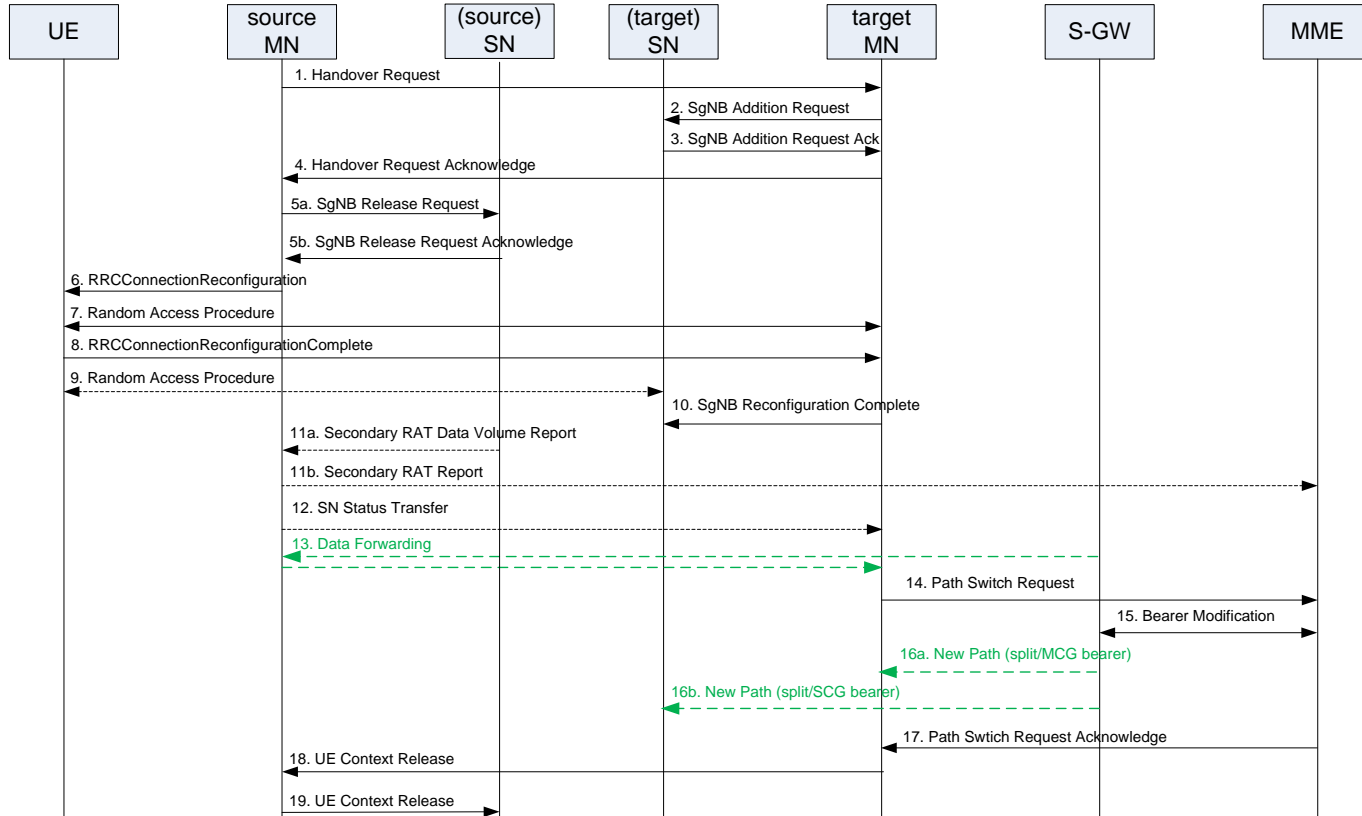
4. Procedures

Secondary Node Change (MN/SN initiated)



4. Procedure

Inter-Master Node handover with/without Secondary Node change



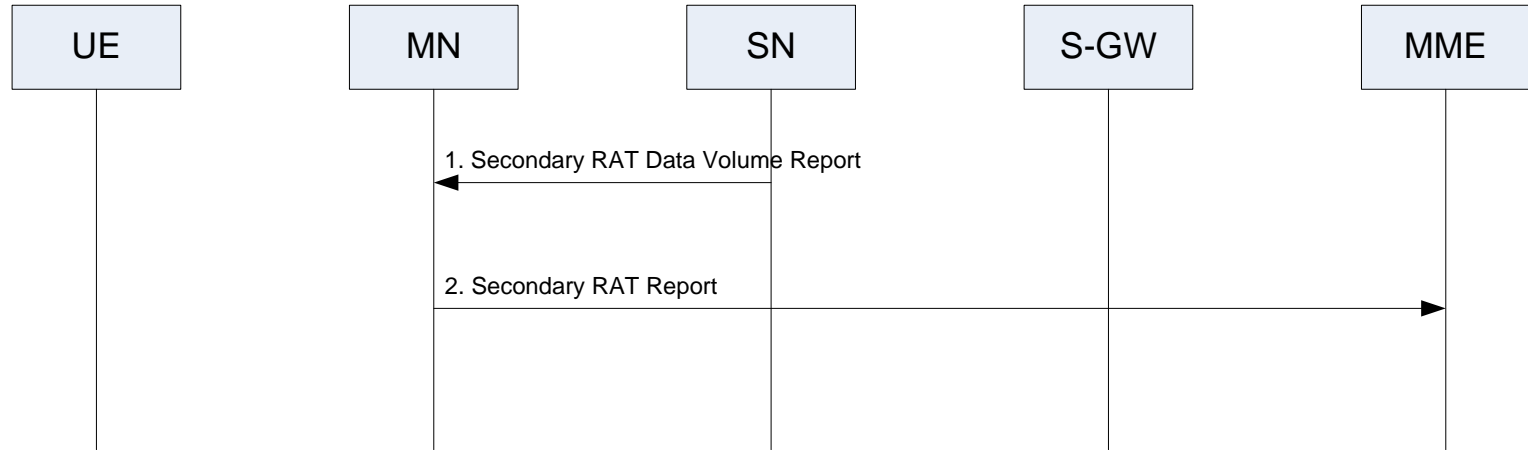
4. Procedures

Other mobility procedures

- Master Node to eNB/gNB Change
- eNB/gNB to Master Node change

4. Procedures

Secondary RAT data volume reporting



5. X2-U aspects

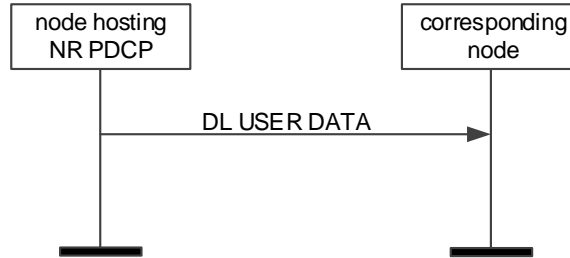
User data forwarding

- User data forwarding may be performed for E-RABs for which the bearer type change from/to MN terminated bearer to/from SN terminated bearer is performed.
- The behaviour of the node from which data is forwarded is the same as specified for the "source eNB" for handover, the behaviour of the node to which data is forwarded is the same as specified for the "target eNB" for handover.

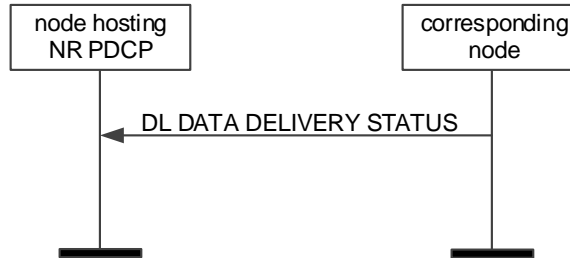
5. X2-U aspects

Elementary procedures

- Transfer of Downlink User Data



- Downlink Data Delivery Status



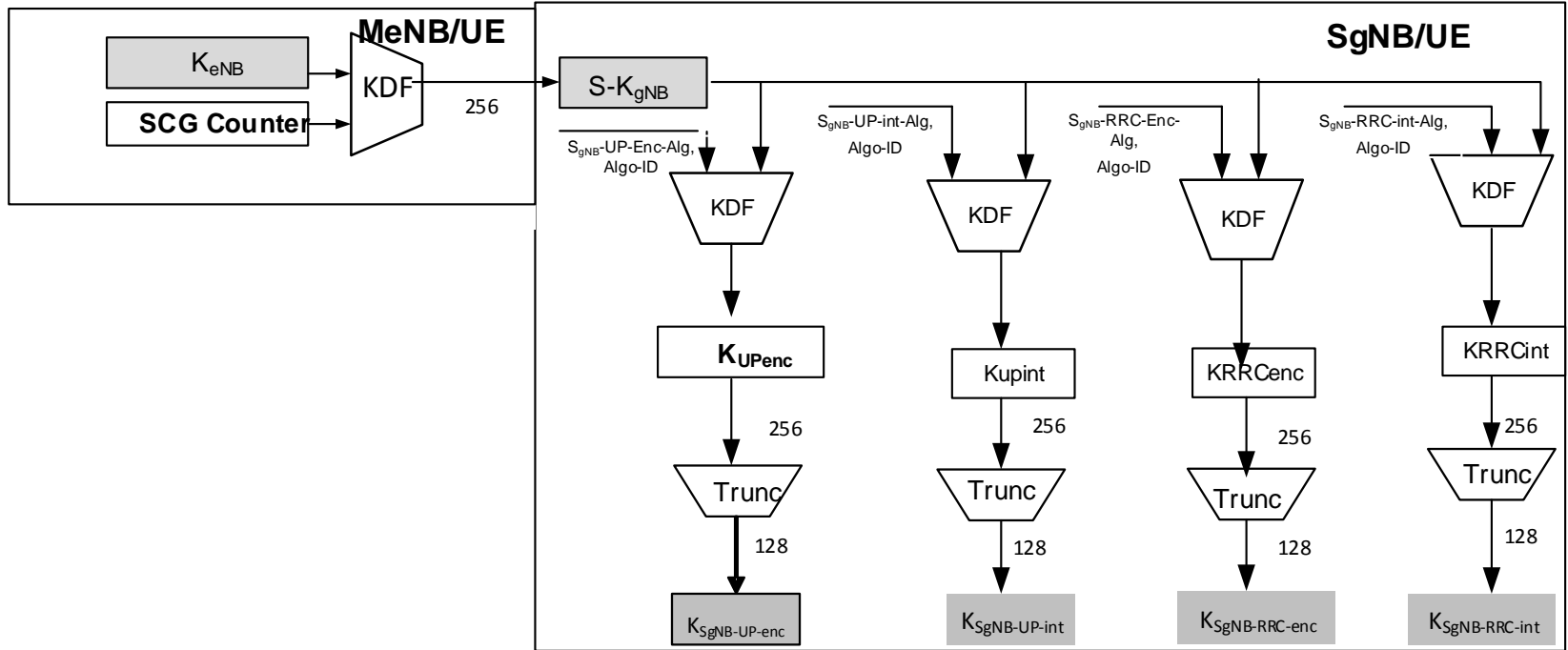
6. Security aspects

K_{eNB} and $S-K_{gNB}$

- For bearers terminated in the MN the network configures the UE with K_{eNB} ; for bearers terminated in the SN the network configures the UE with $S-K_{gNB}$.
- For mobility scenarios that involve only a change of the SCG (i.e. no Pcell handover and hence no K_{eNB} change), $S-K_{gNB}$ key refresh is not required if the PDCP termination point of the SN is not changed.

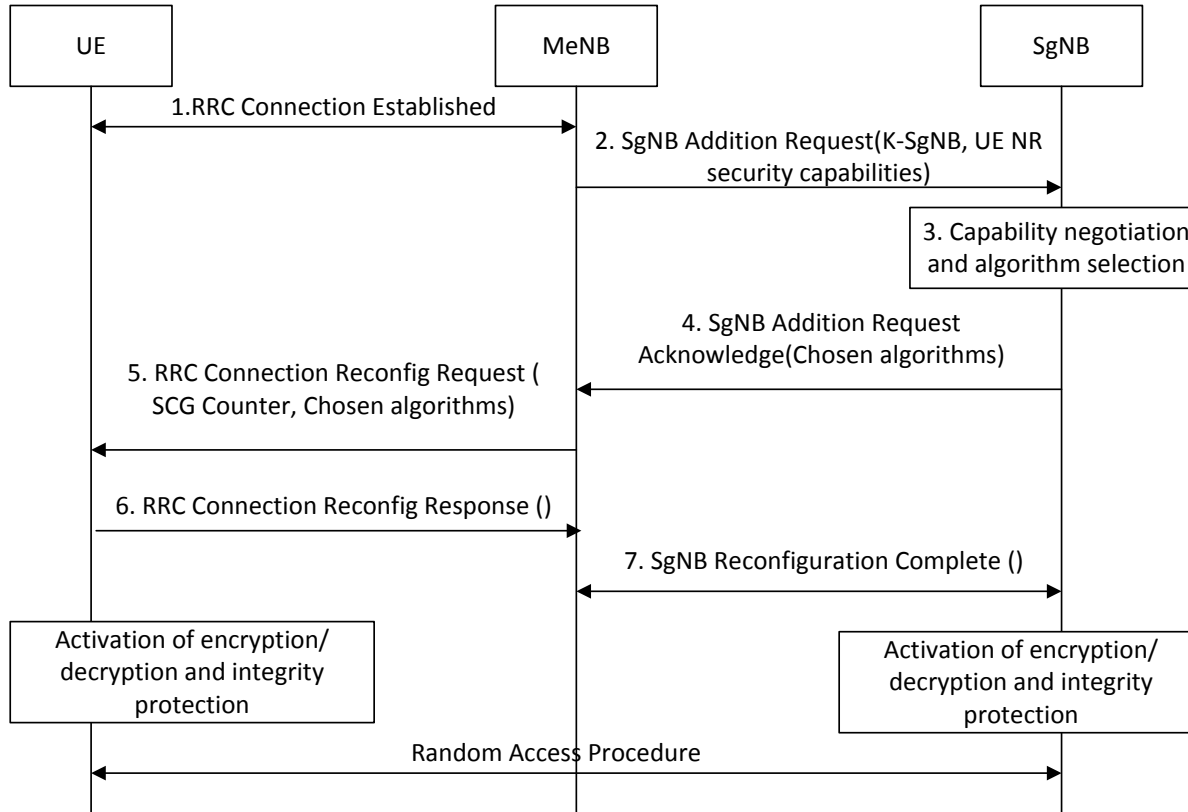
6. Security aspects

Key derivation



6. Security aspects

Security activation



NOKKIA

