
# Inter-RAT handover (E-UTRAN to UTRAN)

Computer Networks module - LTE assignment

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| **Assessment Feedback** | | | | | |
|---|---|---|---|---|---|
| Aspect (& weighting) | Excellent | Very Good | Satisfactory | Needs some more work | Needs much more work |
| Content | | | | | |
| Critical Analysis | | | | | |
| Structure | | | | | |
| Referencing | | | | | |
| Presentation + Discussion | | | | | |
| Specific aspects of the assignment that the marker likes: | | Specific aspects of the assignment that need more work: | | | |
| Tutor's Signature: | | Date: | | Grade | |

# 1 Introduction

The intra-RAT handover from E-UTRAN to UTRAN is composed of two phases: the preparation phase and the execution phase. Both the phases involve either LTE nodes and UMTS node. In particular, the LTE nodes involved are the eNodeB, E-UTRAN, and the MME, the S-GW and the P-GW. The first cited node belongs to the E-UTRAN while the others belong to the core network. The UMTS nodes are instead the RNC, the SGSN,

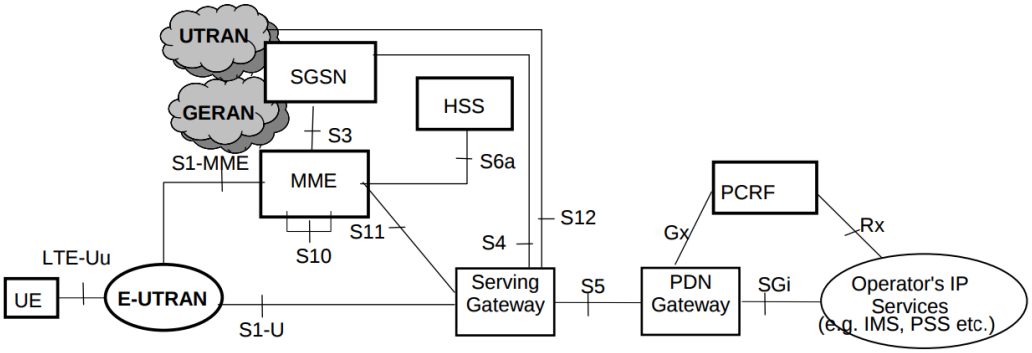


Figure 1: Architecture referece model (non-roaming architecture for 3GPP accesses)

# 2 Preparation phase

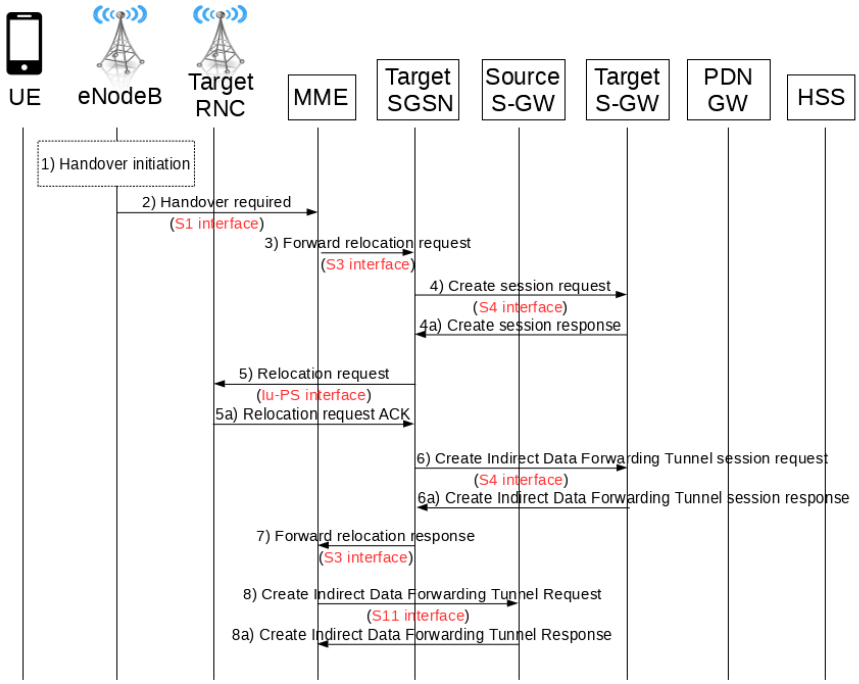


Figure 2: the flow of the messages and the nodes involved in the handover preparation phase

1) The source eNodeB decides to initiate an Inter-RAT handover to the target access network

2) The source eNodeB sends a `Handover Required` message to the source MME, requesting the CN to establish resources in the target RNC, target SGSN and the Serving GW. The message is sent through the S1 interface and it contains the following parameters:

   - S1AP Cause: it specifies the reason of the message
   - Target RNC Identifier: it identifies the target RNC
   - CSG access mode: included only if the target cell is a hybrid cell
   - CSG ID: included only if the target cell is a CSG[1] or hybrid cell, it identifies the cell

[1]CSG = closed subscriber group of a home eNodeB

3) The source MME determines from the "Target RNC Identifier" field that the type of handover is intra-RAT Handover to UTRAN Iu mode, then it initiates the Handover resource allocation procedure by sending a `Forward Relocation Request` message to the target SGSN. Some of the parameters included in this message are:

   - user IMSI
   - ISR Supported: it indicates if the source MME and the source S-GW are able to activate ISR[2]
   - PDN connections: it indicates the active PDN connections
   - RAN cause: it's the S1AP cause received from the eNodeB

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[2]ISR = "idle mode signalling reduction". When this mode is active the network can simultaneously register the UE in a routing area that is served by an SGSN and in one or more tracking areas that are served by an MME.

# References