

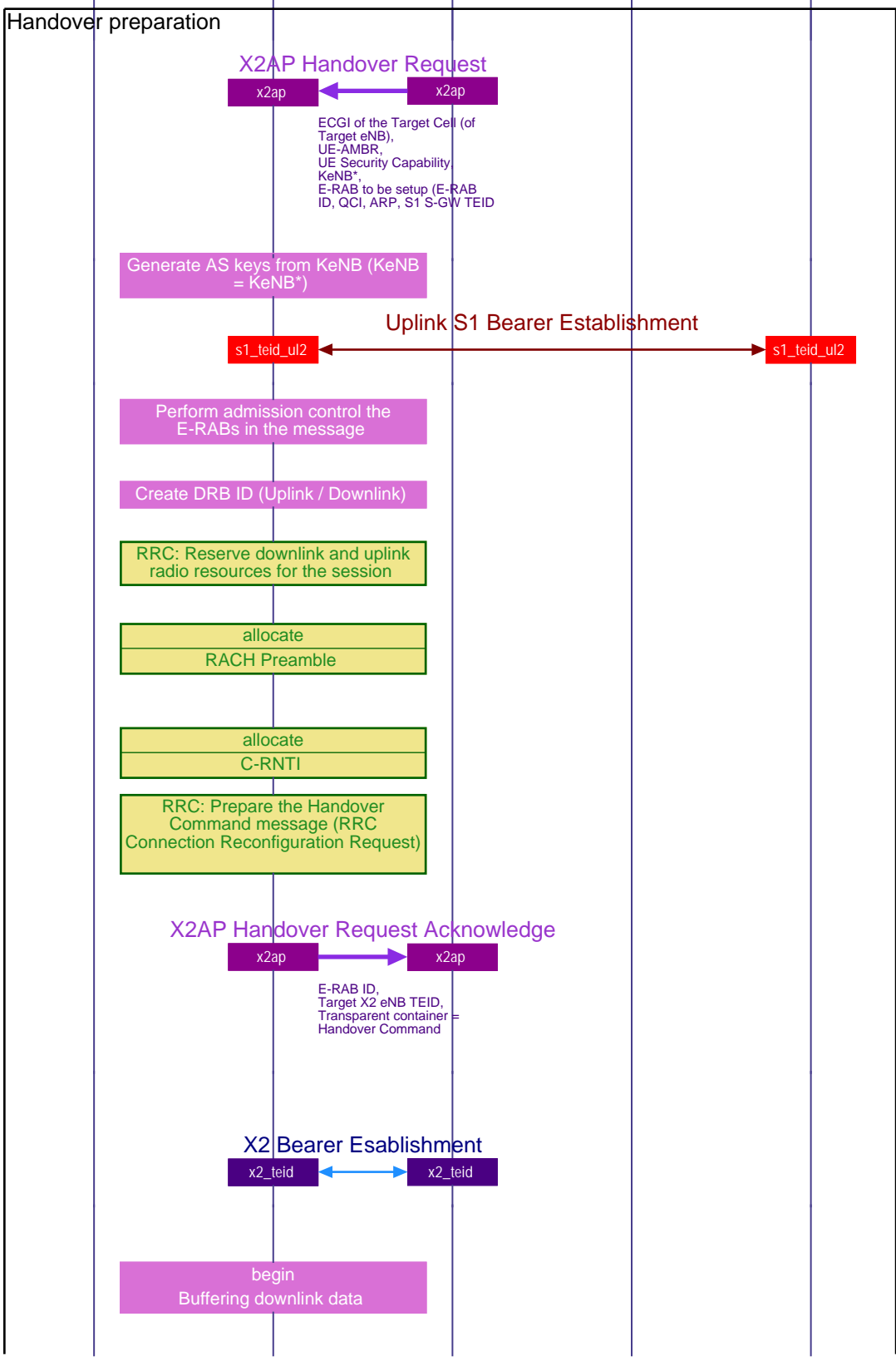
Target eNodeB Interfaces (Successful Handover)				
LTE Mobile	eNodeB Network		Core Network	
UE	Target eNodeB	Source eNodeB	MME	SGW
				EventStudio System Designer 6
				20-Apr-13 22:04 (Page 1)

This sequence diagram was generated with EventStudio System Designer - <http://www.EventHelix.com/EventStudio/>

eNodeBs in LTE are interconnected with the X2 interface. If two eNodeBs are served by the same MME, handover from the source to the target eNodeB will take place over the X2 interface.

Downlink data is flowing from the SGW to the UE via the Source eNodeB.

Uplink data is flowing from the UE to the SGW via the Source eNodeB.



The Source eNodeB initiates the handover with the Handover Request message. Information about active E-RABs, security keys is included in the message. (Click on the message name above the arrow to see message details)

GTP connect for the uplink side is established between the Target eNodeB and the serving SGW.

Check if resources are available at the target eNodeB to accept this session.

Assign Dedicated Radio Bearer ids for Uplink and Downlink.

The Target eNodeB allocates radio resources for the UE that will be handed in.

The Target eNodeB allocates a RACH preamble to the UE. The UE will use this preamble to send a contention free RACH.

A new C-RNTI is assigned to the UE.

This message includes the RACH preamble that needs to be sent to the terminal. This message includes information about the assigned radio resources.

The Target eNodeB responds back to the source eNodeB with a Handover Request Acknowledge message. This message carries the Handover Command message (RRC Connection Reconfiguration Request) in a transparent container. (Click on the message name above the arrow to see message details)

An X2 GTP connection is established between the Source and the Target eNodeBs. This channel will carry the user data during the handover.

At this point, the UE is ready to buffer downlink data that will be received during the handover.

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Handover execution

X2AP SN Transfer Status



Downlink PDCP Sequence Number, Uplink PDCP Sequence Number

The PDCP sequence numbers are sent from the source to the target eNodeB. (Click on the message name above the arrow to see message details)

Downlink data flow during handover preparation

At this point all downlink data is getting rerouted from the source eNodeB to the target eNode. The data is being buffered at the target as the UE is yet to connect to the target.

Downlink Data



Buffer the received downlink data

The uplink data is still being sent from the UE to the SGW via the Source eNodeB.

Synchronizing with target cell

RACH Preamble



Random Access Response



Timing Advance, Target C-RNTI, Uplink grant

UE uses the preamble assigned in the handover command to send a RACH to the target eNodeB.

The target eNodeB accepts the request and responds back with a timing adjustment and an uplink resource grant.

RRC Connection Reconfiguration Complete



Target C-RNTI

The UE uses the assigned resources to transmit the Handover Confirm message (RRC Connection Reconfiguration Complete).

AS layer security procedure

RRC-Connected

The UE is not connected to the Target eNodeB. Thus it transitions to the RRC-Connected state.

Transmit transmission of queued downlink data

The UE is now connected to the target eNodeB. All the queued messages are now transmitted towards the UE.

Downlink Data

Downlink Data

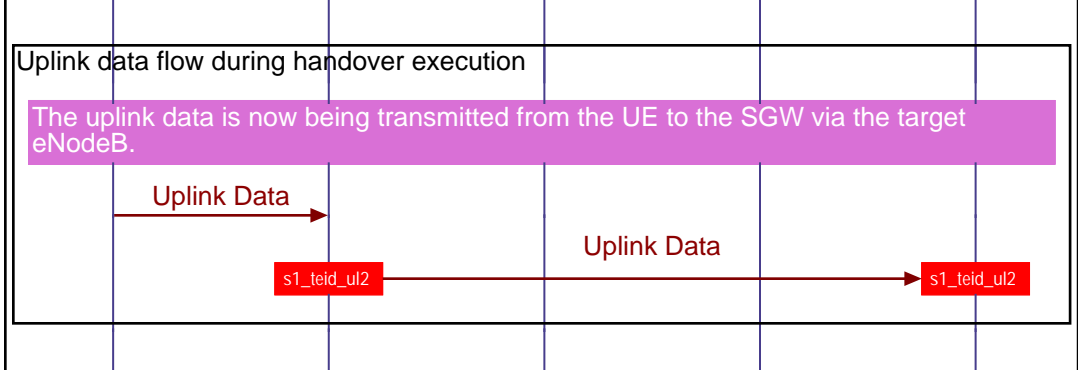
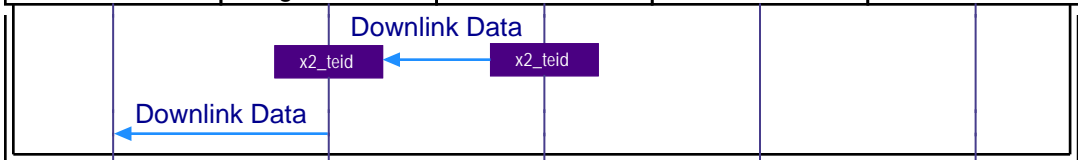
Downlink Data

Downlink data flow during handover execution

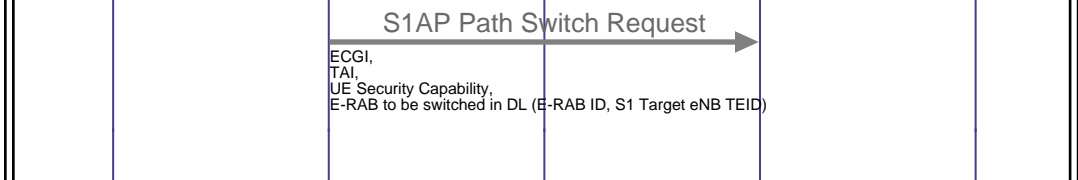
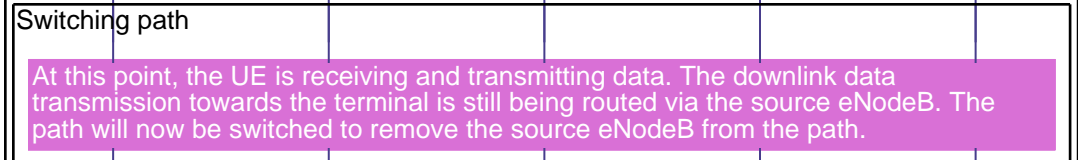
During handover execution the data being routed from the SGW to the UE via the source and the target eNodeBs.

Target eNodeB Interfaces (Successful Handover)

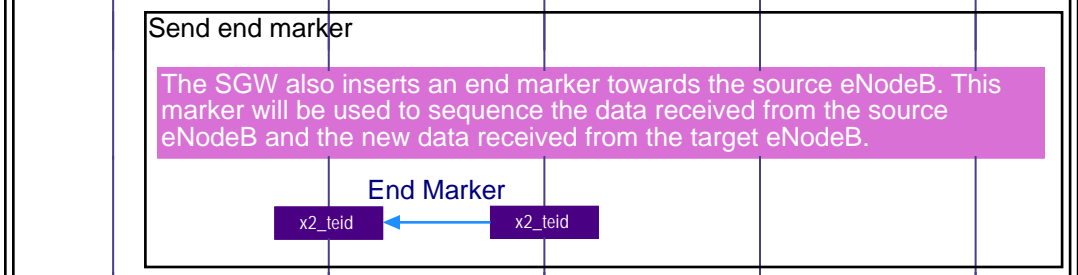
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Handover completion

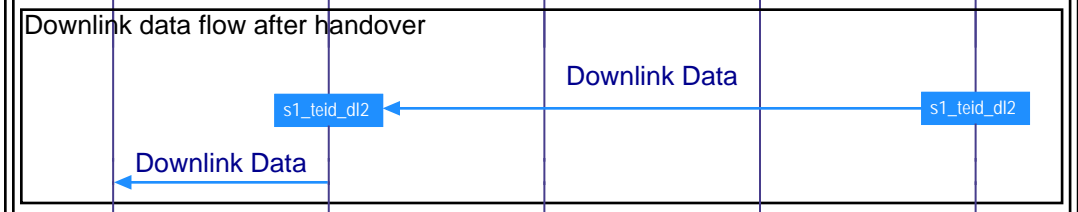


The target eNodeB requests the MME to switch the path from the source eNodeB to the target eNodeB. (Click on the message name above the arrow to see message details)

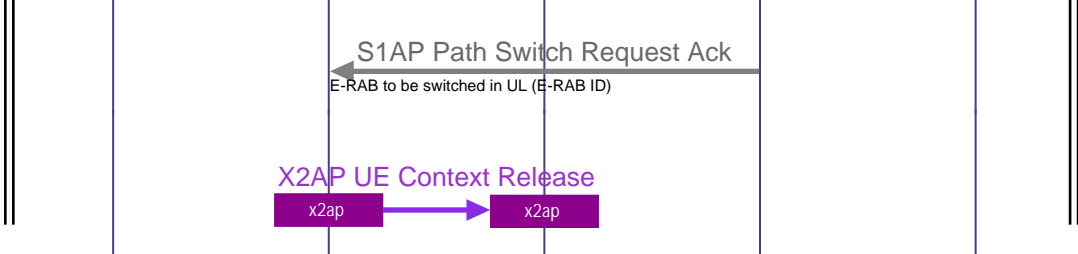


Keep receiving the data from the source eNodeB until the end marker is received

The target eNodeB will buffer data directly received from the SGW until all the data received via the source eNodeB has been transmitted. This is needed to maintain the transmission order.



SGW is now sending the data using the target eNodeB TEID.



MME responds back to signal the completion of the path switch. (Click on the message name above the arrow to see message details)

The end marker has been received at the Target eNodeB. At this point

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					the target asks the source eNodeB to release resources for the UE. (Click on the message name above the arrow to see message details)

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