

Long Term Evolution (LTE) Tracking Area Update (Moving from Old to New MME (Serving GW Change))						
Cell Sites	LTE/SAE					EventStudio System Designer 4.0
Cell	New E-UTRAN	New EPC		Old EPC	CN	
UE	eNodeB	New MME	New Serving GW	Old MME	PDN GW	HSS
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A Tracking Area Update takes place if:

- UE detects it has entered a new Tracking Area that is not in the list of TAIs that the UE registered with the network;
- the periodic Tracking Area update timer has expired;
- UE was in UTRAN PMM_Connected state (e.g. URA_PCH) when it reselects to E UTRAN;
- UE was in GPRS READY state when it reselects to E UTRAN;
- the TIN indicates "P-TMSI" when the UE reselects to E-UTRAN (e.g. due to bearer configuration modifications performed on GERAN/UTRAN);
- the RRC connection was released with release cause "load re-balancing TAU required";
- a change of the UE Core Network Capability and/or UE Specific DRX Parameters information of the UE.

1:TAU Request

UE Core Network Capability,
old GUTI,
last visited TAI,
active flag,
EPS bearer status,
P-TMSI Signature,
additional GUTI,
KSIASME,
NAS sequence number,
NAS-MAC,
KSISGSN

2:TAU Request

UE Core Network Capability,
old GUTI,
last visited TAI,
active flag,
EPS bearer status,
P-TMSI Signature,
additional GUTI,
KSIASME,
NAS sequence number,
NAS-MAC,
KSISGSN

3:Context Request

old GUTI,
complete TAU Request message,
P-TMSI Signature,
MME Address,
UE validated

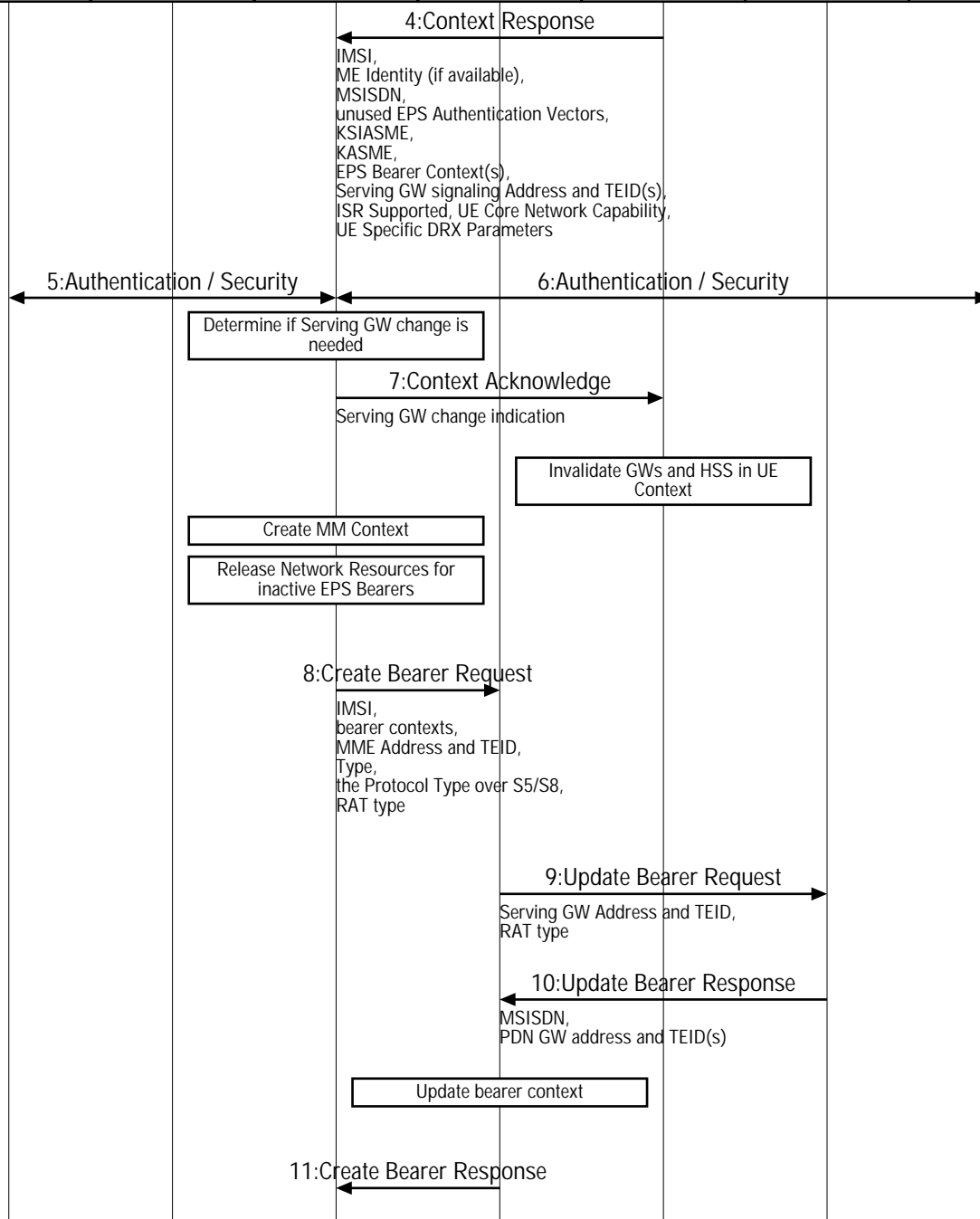
The UE initiates the TAU procedure by sending, to the eNodeB, a TAU Request message together with RRC parameters indicating the Selected Network and the old GUMMEI.

The eNodeB derives the MME from the RRC parameters carrying the old GUMMEI and the indicated Selected Network. The eNodeB forwards the TAU Request message together with the TAI+ECGI of the cell from where it received the message and with the Selected Network to the new MME.

The new MME uses the GUTI received from the UE to derive the old MME/S4 SGSN address, and sends a Context Request message to the old MME to retrieve user information. If the new MME indicates that it has authenticated the UE or if the old MME correctly validates the UE, then the old MME starts a timer.

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The old MME responds with a Context Response message. The PDN GW Address and TEID(s) (for GTP-based S5/S8) or GRE Keys (PMIP-based S5/S8 at the PDN GW(s) for uplink traffic) and the TI(s), is part of the EPS Bearer Context. ISR Supported is indicated if the old MME is capable to activate ISR for the UE. The MSISDN is included if the old MME has it stored for that UE.

Authentication and security functions are performed.

The new MME determines to relocate the Serving GW as the old Serving GW cannot continue to serve the UE.

The new MME sends a Context Acknowledge message to the old MME. Serving GW change indication indicates a new Serving GW has been selected.

The old MME marks in its UE context that the information in the GWs and the HSS are invalid.

The MME constructs an MM context for the UE.

The MME verifies the EPS bearer status received from the UE with the bearer contexts received from the old MME and releases any network resources related to EPS bearers that are not active in the UE.

Since the new MME selected a new Serving GW it sends a Create Bearer Request message to the selected new Serving GW. The PDN GW address is indicated in the bearer Contexts. Type indicates to the Serving GW to send the Update Bearer Request the PDN GW. The Protocol Type specifies the protocol to be used over S5/S8 interface. RAT type indicates a change in radio access. If the PDN GW requested UE's location info, the MME also includes the User Location Information IE in this message.

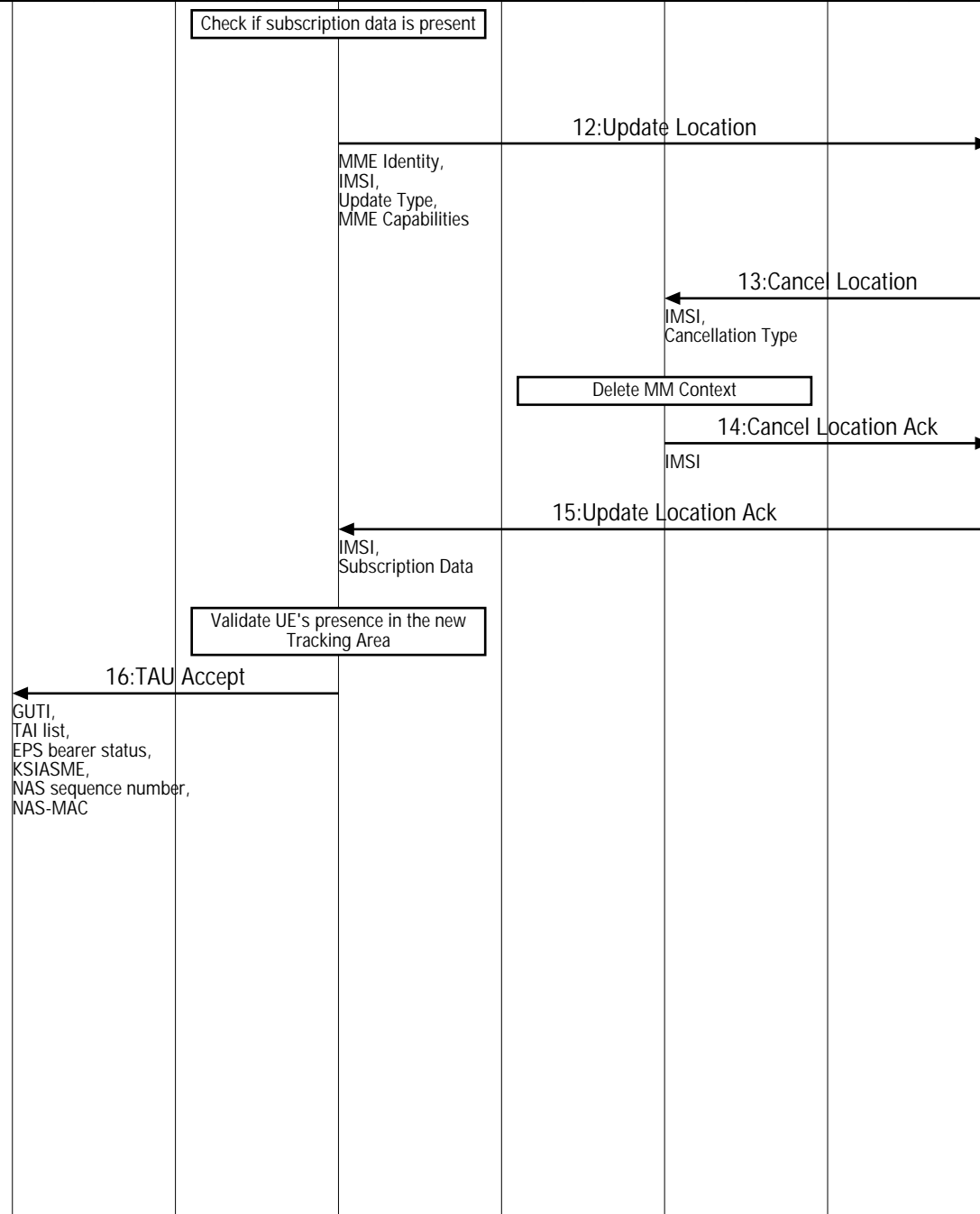
The Serving GW informs the PDN GW about the changes. The radio access type is included in the message. User Location Information IE may also included.

The PDN GW updates its bearer contexts and returns an Update Bearer Response message. The MSISDN is included if the PDN GW has it stored in its UE context.

The Serving GW updates its bearer context. This allows the Serving GW to route bearer PDUs to the PDN GW when received from eNodeB.

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The new MME verifies whether it holds subscription data for the UE identified by the GUTI, the additional GUTI or by the IMSI received with the context data from the old CN node. No subscription data is found.

Since there is no subscription data in the new MME for this UE, the new MME sends an Update Location Request message to the HSS. Update Type indicates that only the MME registration shall be updated in HSS. Update Type indicates whether HSS should cancel location to the other RAT as well. The MME capabilities indicate the MME's support for regional access restrictions functionality.

The HSS sends the message Cancel Location to the old MME with Cancellation Type set to Update Procedure.

Delete the mobility management context on the old MME.

The old MME acknowledges with the message Cancel Location Ack.

The HSS acknowledges the Update Location Request message by sending an Update Location Ack message to the new MME.

The new MME validates the UE's presence in the (new) TA. There is no access restriction, so allow the tracking area update to go ahead.

The MME sends a TAU Accept message to the UE. GUTI is included if the MME allocates a new GUTI. If the "active flag" is set in the TAU Request message the user plane setup procedure can be activated in conjunction with the TAU Accept message.