GPRS Attach/Detach

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1. **Overview**
2. **GPRS Attach/Detach in the Overall Picture**
3. **Signaling by GPRS Attach**
4. **Signaling by GRPS Detach**
5. **Who knows what?**

1. Overview

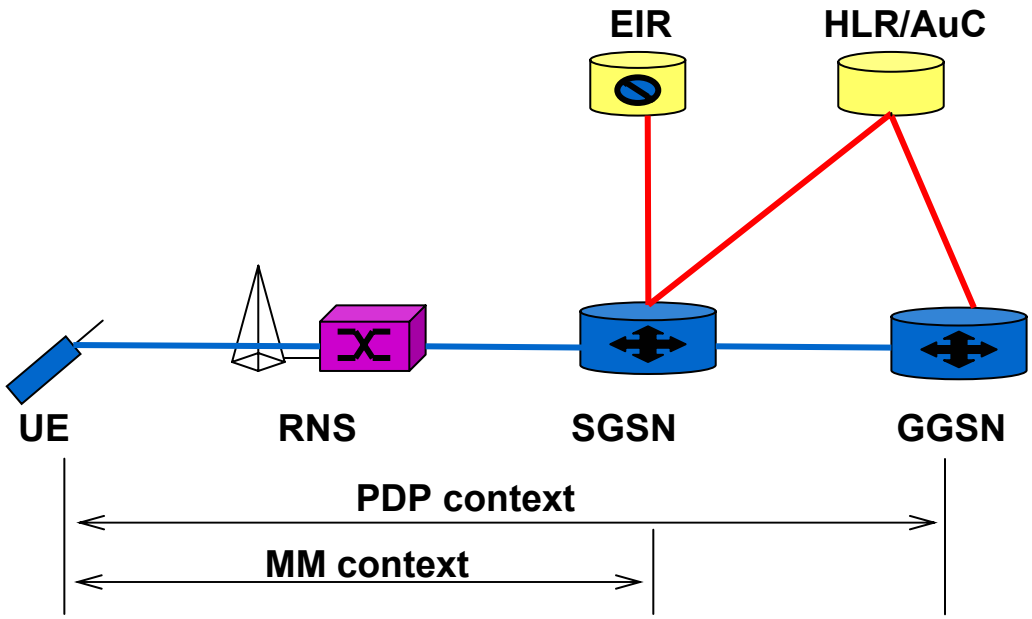
1.1. GPRS Attach/Detach - Registration/Cancelation of the UE by SGSN in PS-Domain

IMSI Attach/Detach - Registration/Cancelation of the UE by MSC/VLR in CS-Domain

1.2. GPRS Attach/Detach

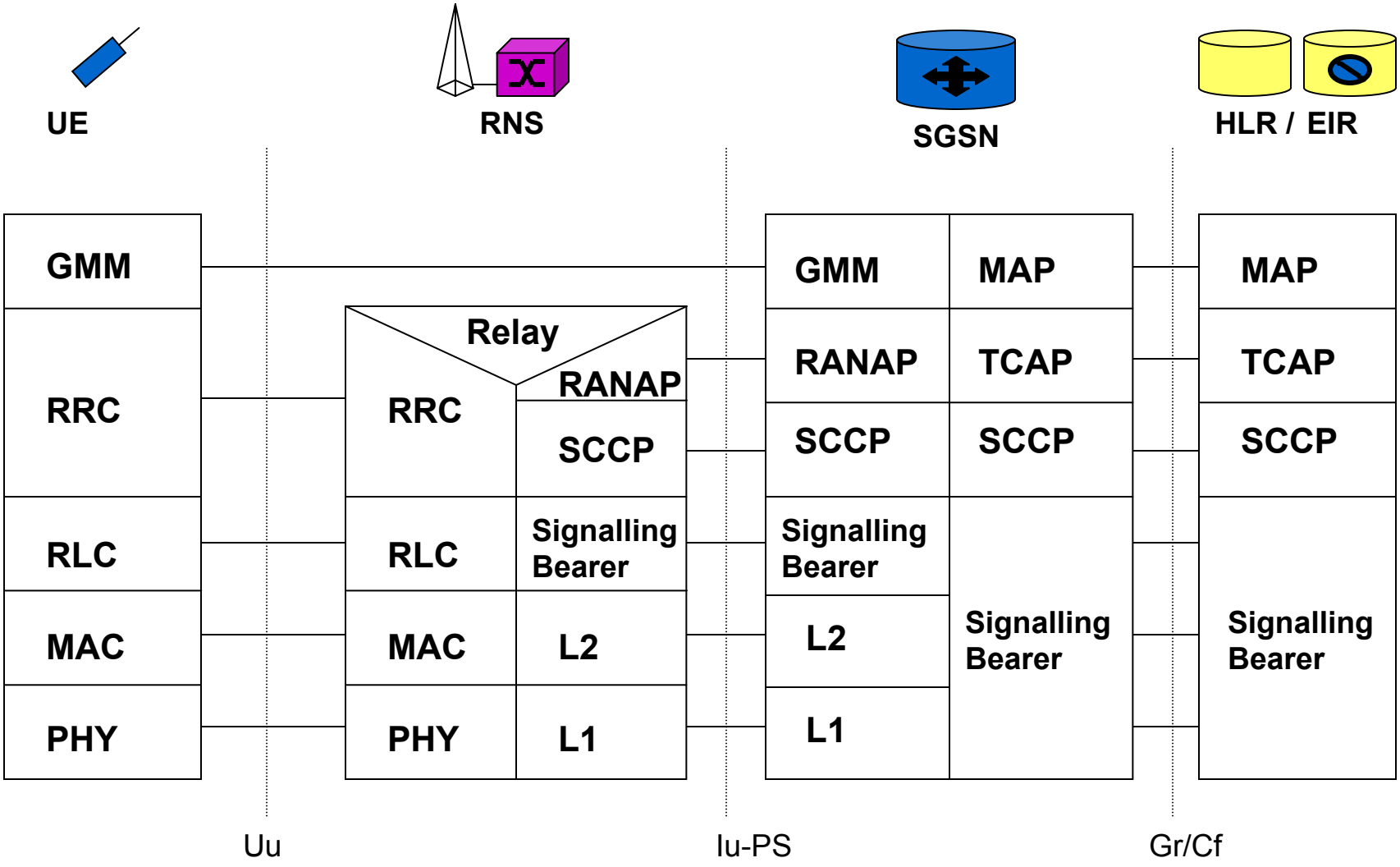
A connection (MM context) between UE and SGSN (CN), HLR and EIR can be involved. PMM states by UE and SGSN change:

	Before GPRS Attach	After GPRS Attach	
		Data transfer	Other-wise
UE	PMM detached	PMM connected	PMM idle
SGSN	PMM detached	PMM connected	PMM idle



1. Overview

1.3. Protocol stack



2. GPRS Attach/Detach in the Overview Picture

<table>
<tr><td rowspan="4">Select a suitable PLMN</td><td rowspan="3">Scan all possible frequencies,
select the initial cell,
get system information e.g. PLMN-ID</td><td>Time slot synchronisation</td></tr>
<tr><td>Frame synchronisation</td></tr>
<tr><td>Read CPICH in order to get scrambling code</td></tr>
<tr><td>Read system information in BCCH (BCH, P-CCPCH)</td></tr>
<tr><td colspan="2">Select a suitable PLMN according to a preference list stored on the USIM</td></tr>
<tr><td>Select a suitable cell</td><td colspan="2">Create a list of suitable cells, select the best cell</td></tr>
<tr><td>Attachment in CN</td><td colspan="2">IMSI Attach in CS-Domain
GPRS Attach in PS-Domain</td></tr>
<tr><td colspan="3">Data transmission via PDP context
LA/RA update, Intra/Inter SGSN relocation etc.</td></tr>
<tr><td>Detachment in CN</td><td colspan="2">IMSI Detach in CS-Domain
GPRS Detach in PS-Domain</td></tr>
</table>

3. Signaling by GPRS Attach

3.1. Overview

GPRS Attach is initiated by UE and has 3 phases:

1. Request over RRC:

   Establish RRC connection between UE and RNC.

   A Request of a GPRS-Attach initiated by UE will be sent to SGSN.

2. Authentication and encryption:

   SGSN authenticates the identity of the user and equipment.

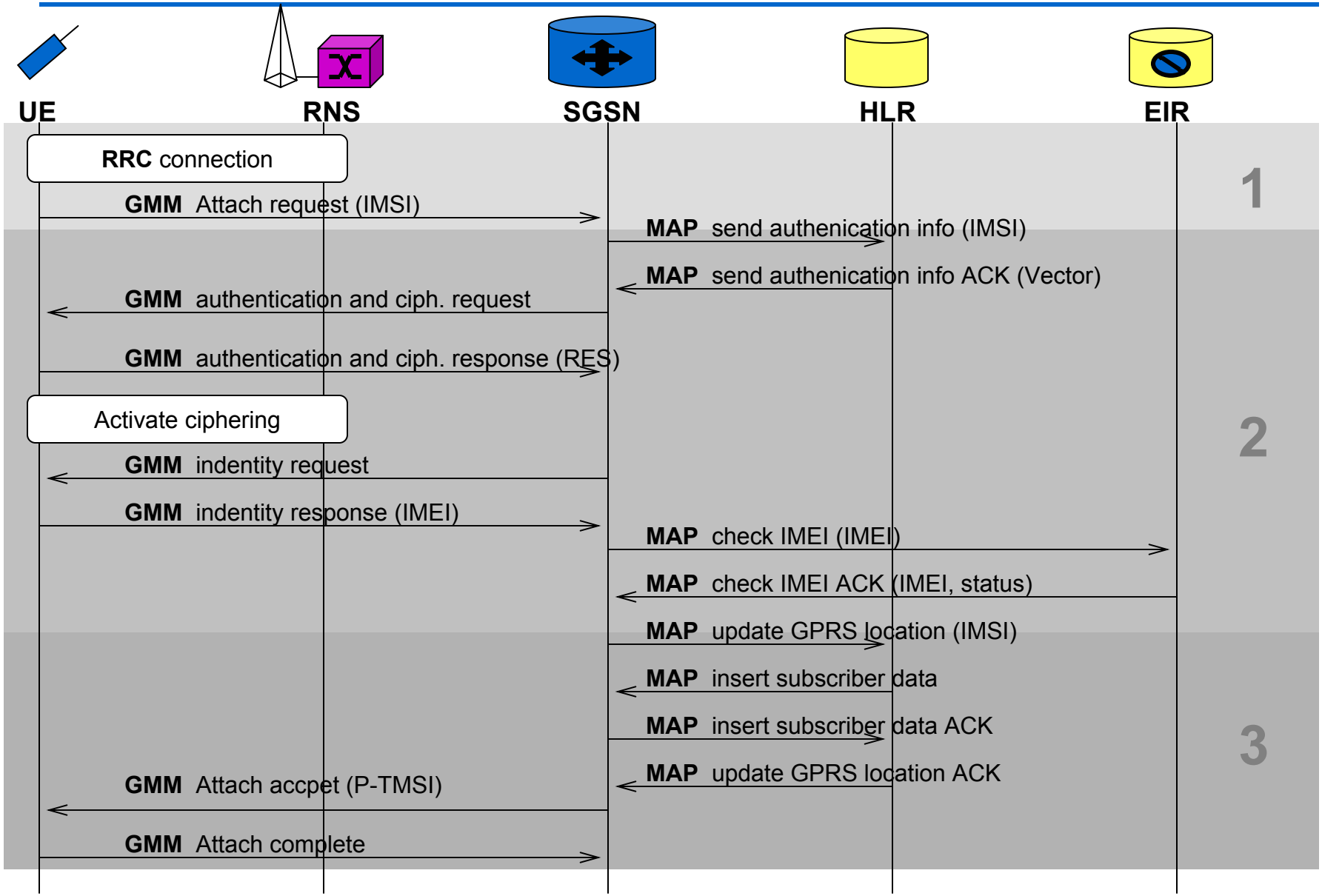
   Data exchange will be ciphered.

3. SGSN address will be registrated in HLR.

   SGSN gets the services which the UE can use from HLR (Authorization).

   UE gets the P-TMSI.

3. Signaling by GPRS Attach – 3.2. Signaling flows



3. Signaling by GPRS Attach

3.3. GPRS Attach may be denied

a) by SGSN when:

IMSI is invaild, GPRS Attach request will be rejected by HLR.

IMEI is invalid, GPRS Attach request will be rejected by EIR.

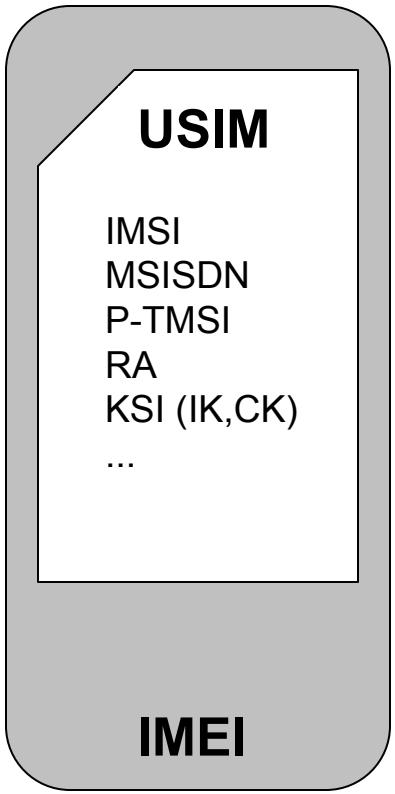
Both cases will suspend the USIM card – Registration later impossible

b) by UE when:

PLMN is “forbidden” in USIM: e.g. no roaming agreement between HPLMN and this PLMN, the UE not allowed to switch PLMNs.

LAI is “forbidden” in USIM.

No RRC connection will be started.



4. GRPS Detach

4.1. Overview

GPRS Detach can be initiated explicitly by UE or SGSN, or implicitly by CN without notifying the UE.

PDP context may be canceled between UE and CN.

User data will be deleted by SGSN.

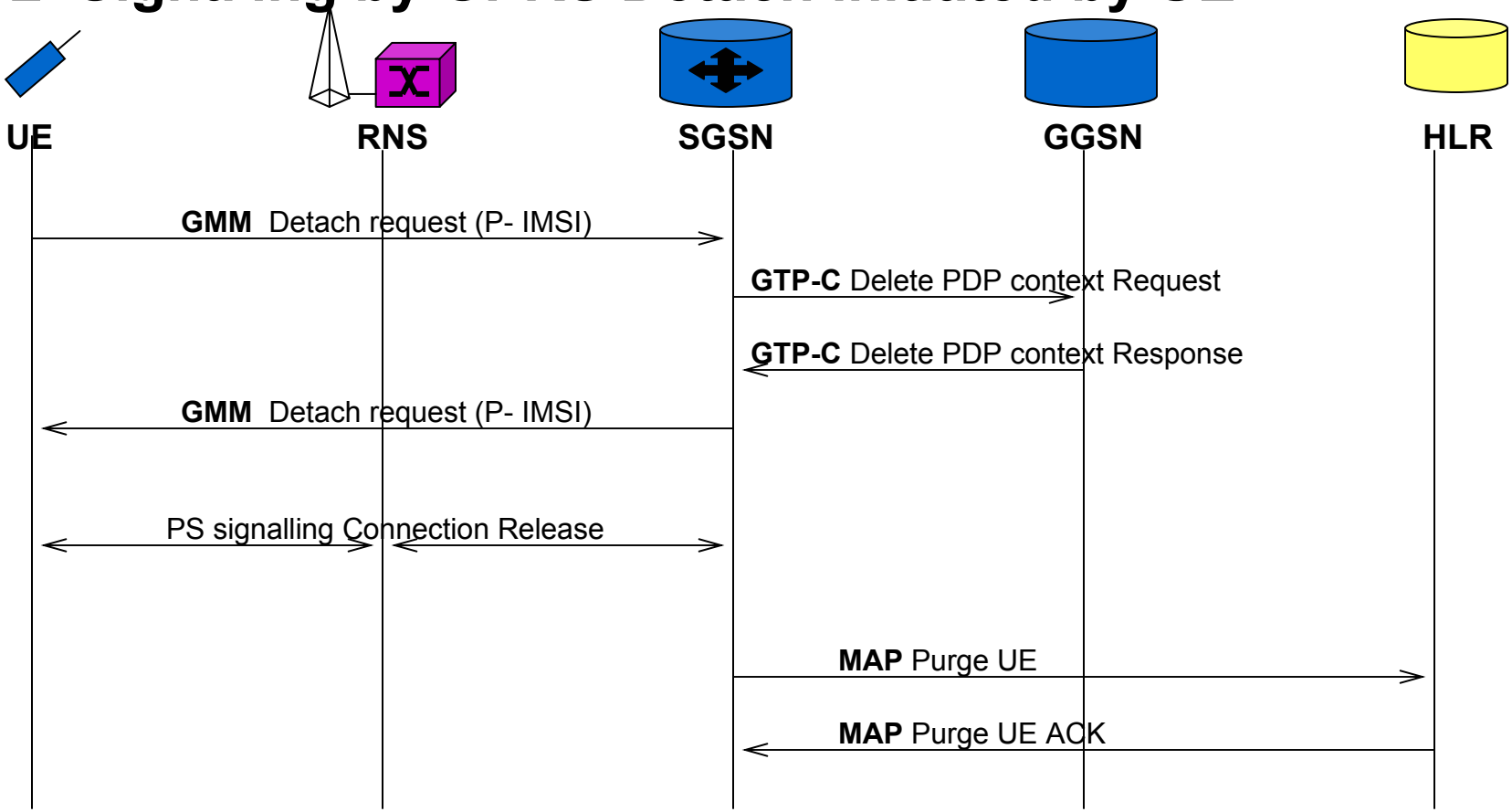
RRC connection will be released.

PMM states of UE and SGSN change to PMM detach.

HLR can be updated later (Purge function).

4. GPRS Detach

4.2. Signaling by GPRS Detach initiated by UE



5. Who knows what?

Information stored before and after GPRS Attach for one UE

	UE	SGSN	HLR
Before GPRS Attach	IMSI MSISDN RA KSI(IK,CK) QoS profile		IMSI MSISDN KSI(IK,CK) QoS profile
After GPRS Attach	PMM State P-TMSI	PMM State P-TMSI MSISDN RA KSI(IK,CK) QoS profile	SGSN address