How to get rid of the SCC AS? {Part 1}

If you listen to the big players, IMS is a wonderful thing that can answer almost all your dreams… At the early times, IMS was created to be a platform on which new innovative services could be easily developed, rolled out and commercialized by mobile operators. This was back in 3GPP R5.

From these early days where IMS was seen as a "big web server", we have inherited two dogmas:

- IMS doesn't deal with mobility in access networks.
- IMS sees voice as any other data service.

With LTE, there was the dream of a simplified network with fewer nodes, and without this "stupid" Circuit Core. But when Voice over LTE was specified, legacy stuff had to be taken into account, especially 2G and 3G accesses that won't offer Voice over IMS. Instead of getting rid of above dogmas, many patches were added to IMS: T-ADS and SR-VCC (making the SCC application server); IMS Centralized Services; ATCF and ATGw; etc.

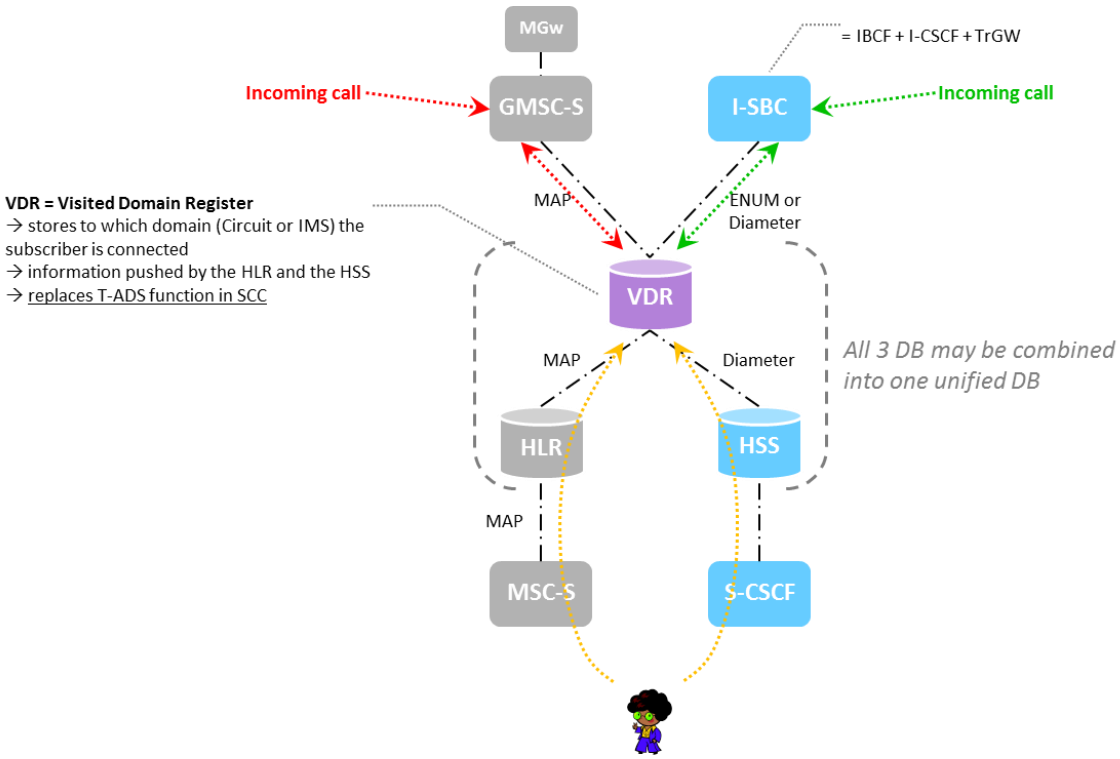
Even with all these patches, 3GPP specifications do not manage to answer all the issues, especially those related to voice services consistency and continuity between IMS and Circuit domains. But some solutions exist!

Let's get rid of T-ADS

With T-ADS hosted in the SCC AS, all incoming calls have to be rerouted to the IMS domain even if the called party is finally in the Circuit domain…

We can notice that in GSM the HLR knows which MSC-S is serving the called party, and in IMS the HSS knows which S-CSCF is serving the called party. So, why not having a small database identifying which domain, Circuit or IMS, is serving the called party?

This is what I call the VDR, Visited Domain Register. Such an implementation would simplify the call flow and thus enhance the reliability of the incoming voice calls.



It appears that merging HLR, HSS and VDR may be very interesting and simplify the call flows.

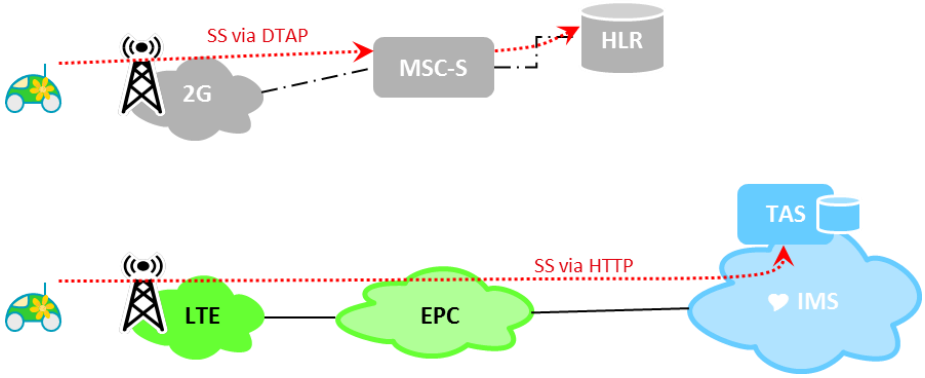
Let's get rid of SR-VCC

There is a really simple way of getting rid of SR-VCC (and of its related ATCF and ATGw which would lead to a replication of the Circuit core)… You "just" need to have a very good LTE coverage. Thus there is no more need to ensure the voice call handover from the IMS domain to the Circuit one. The small amount of broken voice calls will fall within the acceptable margin.

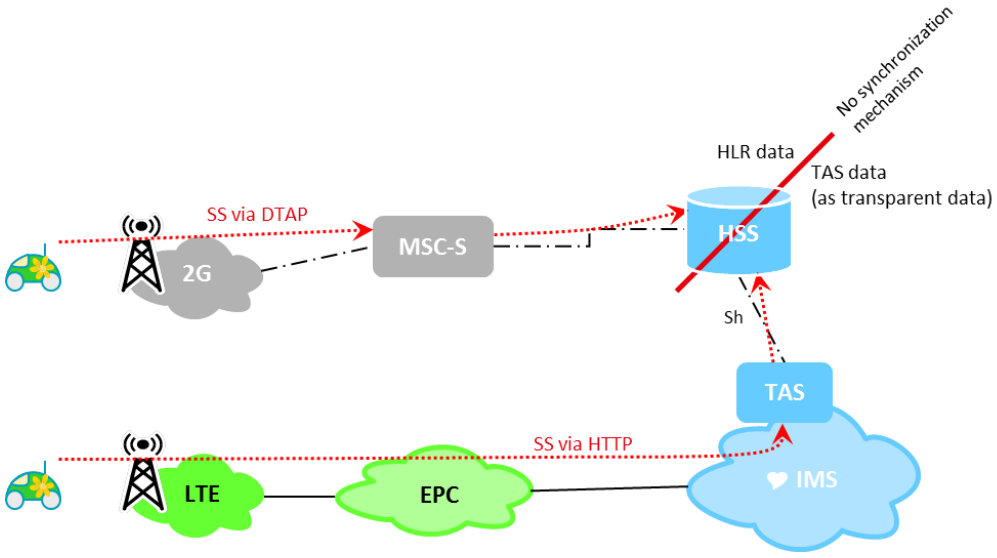
This is not as silly as it may seem. Contrary to what was done for UMTS, mobile operators prefer now to open their LTE network once the coverage is good and, above all, without big holes. This is facilitated by the refarming of the 1800 MHz band.

Let's solve the voice services consistency issue

Even with T-ADS or IMS Centralized Services, voice services consistency is not ensured between Circuit and IMS domains since Supplementary Services (SS) parameters are downloaded from the HLR when you are in the Circuit domain (GSM) and from the TAS when you are in the IMS domain (LTE).

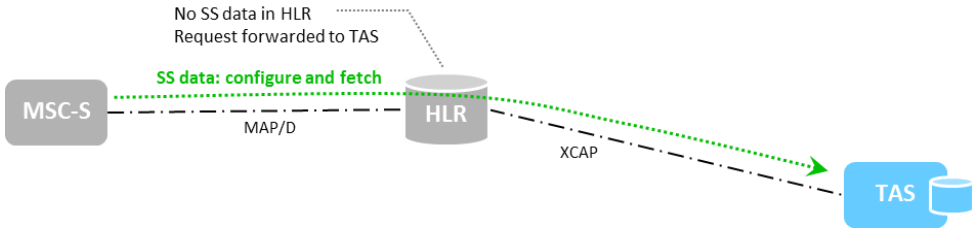


The first idea you may have is to merge into one big HSS the databases from the HLR and the TAS. Unfortunately it doesn't work. 3GPP specifications clearly state that HLR data and TAS data (stored as "transparent data" via Sh interface) are strictly separated in the HSS. Worse, no synchronization mechanism has been specified between the two data sets.

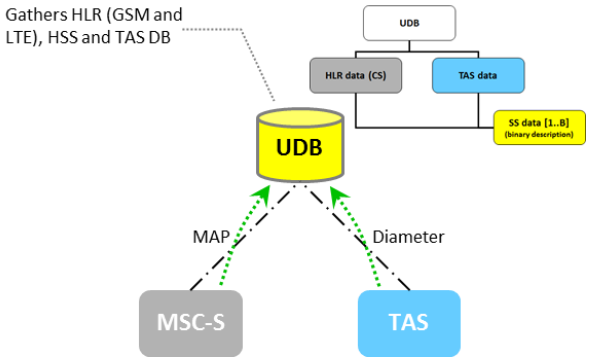


Then the only solution is to be creative and to deviate from 3GPP specifications. Here are two proposals.

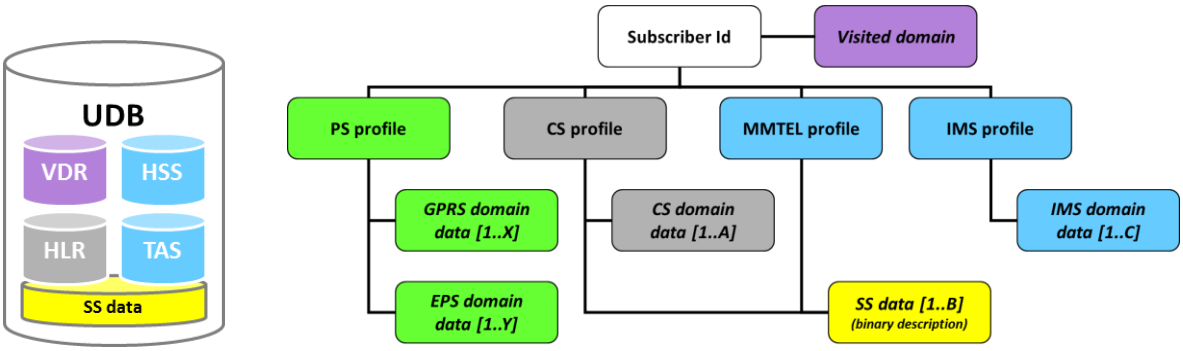
The first one consists in transferring everything related to Supplementary Services from the HLR to the TAS. This requires some adaptation in the HLR, including an XCAP interface towards the TAS.



The second one is again based on the merge of the HLR and TAS databases; but this time the data model deviates from 3GPP specifications and is adapted in order to have the Supplementary Services data stored only once in a Unified Database (UDB).



When combined with the HSS and the proposed VDR, this last solution is expected to be the preferred one. And it would minimize the number of databases to manage in the network and ease the provisioning process of all subscriber's data.



This is the best solution if you want to maintain a Circuit domain.

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