

Multi Imsi – Subscription Based Mobile Service

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Abstract- Today, it's almost true to say that we live in a mobile world. There are over 5 billion mobile connections worldwide, almost 4 connections for every 5 people on globe. When people's are roam across the world they most important things is to carry is Mobile phone but when they don't have valid subscription with network operator for roaming, communication with external world is affected. There is two option either he can subscribe for expensive Roaming & other way to buy the local SIM of corresponding roaming location (which may lead to carry multiple SIM). With this White paper we try to solve the issue of National / International Roaming without carrying multiple SIM card. With this concept a single SIM card may contain multiple International Mobile Subscriber Identity (IMSI) belongs to unique mobile phone number known as Mobile Station International Subscriber Directory Number (MSISDN) where MNO (or MVNO) are manage the MSISDN mapping with currently used IMSI at server end.

Index Terms- SIM, IMSI, MSISDN, MULTI IMSI

I. INTRODUCTION

Most of the people use mobile phones are generally familiar with terminology SIM (subscriber identity module) cards. SIM card are tamper proof microprocessor cards & are inserted into mobile device in order to authenticate the device to access a particular mobile network. SIM card have its own OS, memory and built-in security features, the SIM card also contains an 8-byte field that provides the subscriber with an International Mobile Subscriber Identity (IMSI). When the user of a mobile phone connects to his or her network, the IMSI basically acts as a "password" that says it is okay for that device to access that network. This security token may not work to access network if it's not in the range of network meant for it. This range of network depends on user subscription and the location SIM is registered for. In terms of location we meant is Roaming, It could be National or International. These national / International Roaming subscription are very expensive & if user have plan to buy a local SIM card of Roaming location then user need to carry multiple SIM to access the mobile network. The biggest disadvantage of this approach is user phone number will be change with each SIM & caller needs to update with users latest mobile number.

This concept would help not only to high end user who travels regularly between different geographic location and it help to those also who is having international office branches. Here only

one Subscriber identity will be active at a time which is purely depend on subscriber location.

II. PROPOSED IMPLEMENTATION

With this white paper implementation, a User account is defined as subscriber of MNO (or MVNO). Here MNO already have agreement to provide national or international roaming to their subscriber. To take this Multi IMSI approach user need to select / buy different IMSI according to their need. Like if users are frequently travel between India & Germany then he/she need to buy IMSI for these two countries. All the number subscribers buy must be active but at a time only one IMSI will latch on network.

Here MNO need to establish a system where a Multiple IMSI could belong to Unique Number. Here Multiple IMSI may belong to local, national or International account but serving MSISDN must be unique.

When a new subscriber signs up for the Multi IMSI facility, the subscriber will allocated for the quantity of roaming account (let say for India and Germany & allocated quantity is two). A new service to the existing SIM will be updated to subscriber SIM with a full complement of IMSIs. Here subscriber account within the MNO will be created and registered with the HLR with the IMSI, MSISDN subscriber have. if required at later stage the subscriber may opt for a more number for any country, The available new IMSI will be loaded on SIM via OTA & subscriber MSISDN will become immediately active and can be used straight away, this allows a user to add a new IMSI immediately prior to travelling to the new country, or even once the user is already there.

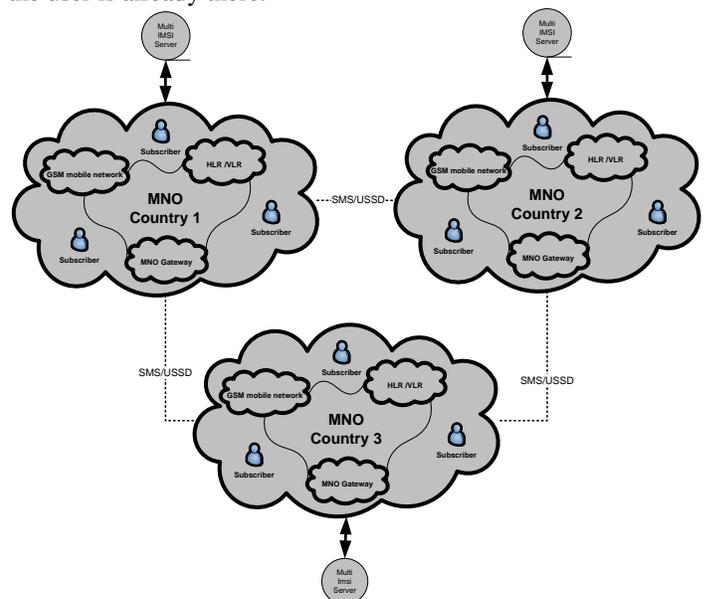


Figure1: MNO connectivity

While allocating IMSI, MNO may order SIM vendor to personalize multiple IMSI on card during personalization of SIM or any temporary IMSI could be personalized on card during personalization. The IMSI value that is allocated to a SIM card when it is manufactured is temporary and is overwritten by the definitive value. When ordering SIM cards, A unique MSISDN will be associated with IMSI personalized on card (here may be multiple IMSI may have single MSISDN), When SIM card is latch on network for the first time & If MNO want user to allocate different IMSI based on Roaming requirement (or based on user request) then MNO will use subscriber temporary IMSI to get authenticated on network (Only for first time), This Temporary authentication required from subscriber Home Location Registrar (HLR). Once subscriber get authenticated on network any Toolkit application may notified to MNO about current serving MCC/MNC. This notification to server from SIM application Toolkit can be done by SMS/USSD/GPRS channel. Once MNO get the notification they can check if subscriber has registered for Multi IMSI special service for specified MCC/MNC (i.e. for Particular Country and operator) then MNO may update the local IMSI value of current serving location over the air onto SIM card. Note: Here there must be an agreement between different MNO to follow the same standard across the globe where this service supposes to provide. With this concept local MNO to which service provider has agreement can map the local IMSI to the users unique MSISDN at backend. So that called party do not need to worry for new number of subscriber and subscriber do not need to worry to carry the multiple SIM, as single SIM is updated with different IMSI which map to same MSISDN.

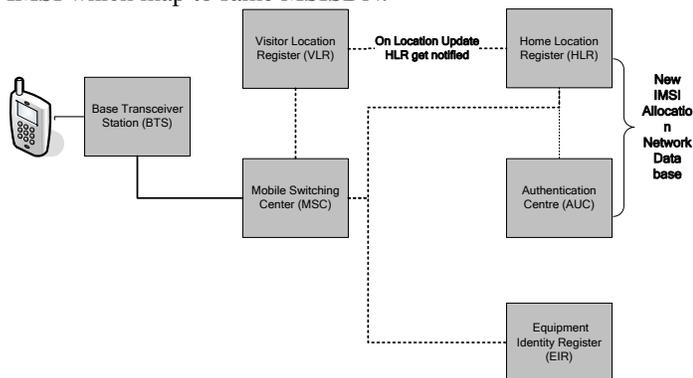


Figure2: HRL Notification & Database Update

Here HLR notified on network side when a mobile device registers on the network, SIM Toolkit application reside on SIM

card may also send notification to HLR with some parameter like current location to which new IMSI is required. The registration procedure is the cornerstone of mobility management in a GSM network & allowing the mobile device to inform the network of its location. A mobile device will register when it is first switched on as well as periodically when power on.

The figure shows that the solution is addressed as if it were an HLR when the device is first power on. The way out allocates a static MSISDN requested by user which establish a connection for the mobile equipment. The SIM profile allows device to take part in registration procedure via either SMS (Short Message Service) or USSD (Unstructured Supplementary Service Data). This communication may be interactive or silently done by SIM toolkit is depending on MNO requirement. The solution ensures that all network databases, such as the AUC and HLR, are updated correctly with the definitive values. Finally, the solution updates the SIM card to change the temporary IMSI to the definitive value. This is followed up with a short message reminding the user of the number has been activated for roaming location.

III. CONCLUSION

The Multi IMSI concept offers a scalable and robust solution for use with multiple MNOs. Anytime if a new IMSI is required, it can be easily added to the user with unique MSISDN. The SIM Application automatically changes to the correct IMSI when it detects a new country.

This makes frequent travel life easy without changing SIM card or Phone.

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