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Title: **Extension of FIGS to the packet switched domain**

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Agenda Item: **8.3**

1 Introduction

The Fraud Information Gathering System (FIGS) is currently described in ETSI specifications GSM 01.31 and GSM 02.31. The purpose of FIGS is to provide “near real-time” information to a home network on roaming customer‘s activities in visited networks to minimise the home network operator‘s exposure to fraud.

FIGS currently allows an home network to gather information on customers roaming in a circuit switched core network domain[1]. This contribution proposes that FIGS is extended to provide information about customers roaming in a packet switched core network domain.

In order to consider the requirements for extending FIGS to the packet switched domain we first consider whether FIGS is needed in GSM GPRS.

2 FIGS for GPRS

The HPLMN is exposed in (circuit switched) GSM as control of the roaming customer (and the charging of calls made by that customer) is performed by the VPLMN. Further exposure is caused by the potential delay in transmission of billing records via TAP.

It is useful to review GPRS roaming and the two distinct methodologies that may be employed.

2.1 Home GGSN Roaming

In the Home GGSN roaming model, a context is established via a SGSN in the VPLMN and a GGSN in the home network. This is shown in Figure 1 below.

The important thing to note with Home GGSN Roaming is the fact that as a GGSN in the HPLMN is used, G-CDRs are created within the HPLMN. This ensures that the HPLMN has reasonably early visibility of the activity of the customer. As such, it can be argued that FIGS is redundant in a packet switched network operating such a roaming model.

[1] It is assumed that FIGS is applicable to services offered by the CS domain when the customer is connected over GSM BSS or UTRAN.

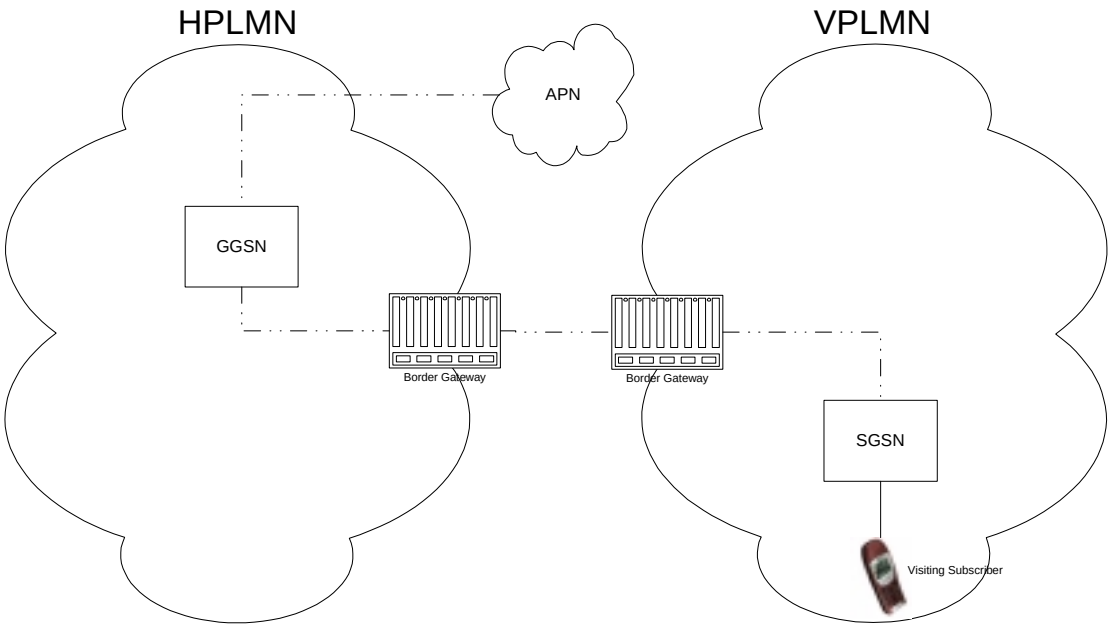

Figure 1 - Schematic of Home GGSN Roaming

2.2 Visited GGSN Roaming

In the Visited GGSN roaming model, the context is established completely within the VPLMN. This is shown in Figure 2 below. Here, the VPLMN has complete control of the call and generates all the CDRs (both G-CDRs and S-CDRs). This is similar to (circuit switched) GSM roaming and hence FIGS is required for early visibility of customer activity.

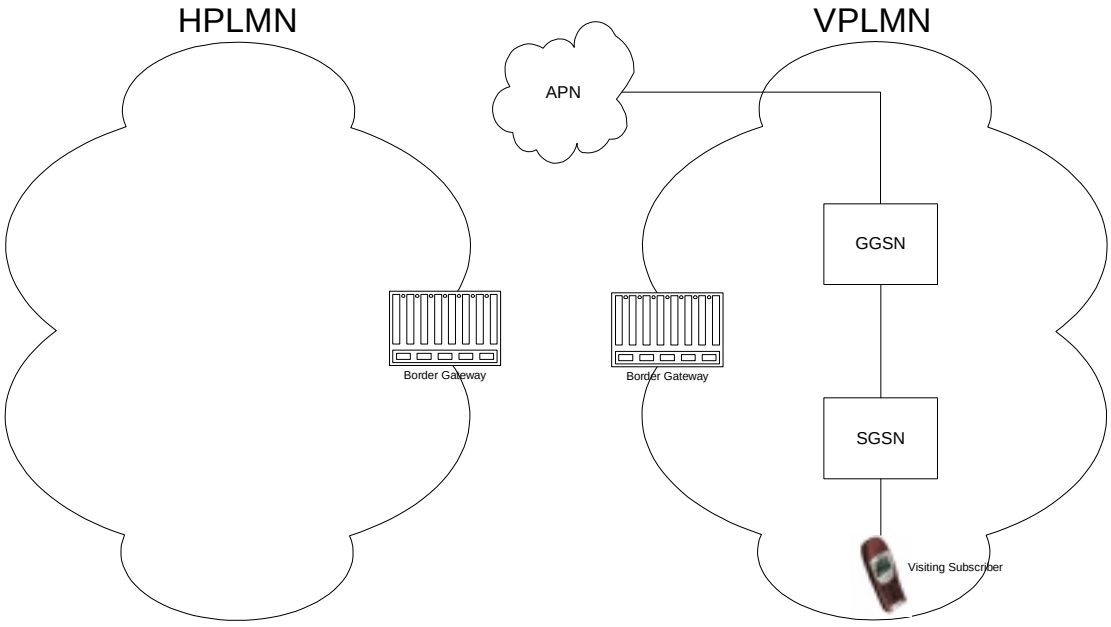

Figure 2 - Schematic of Visited GGSN Roaming

3 FIGS for the packet switched domain – Proposed Specification

FIGS for (circuit switched) GSM is focused on monitoring call duration. This is reasonable as GSM calls are typically charged based on call duration.

In the packet switched domain, it is expected that this may change. Operators may charge not just on the basis of duration but also on volume transmitted or received.

It is therefore proposed that Packet Switched FIGS (hereafter referred to as PS-FIGS) monitors the following event types:

- CONTEXT START
- CONTEXT END
- MID-CONTEXT NOTIFICATION

It is proposed that the MID-CONTEXT NOTIFICATION messages can be transmitted at certain levels of data volume being reached (e.g. a notification every 500 KB of data transmitted) and at certain times during the context. Initialisation of PS-FIGS should be as per GSM.

It is recognised that this form of mid-context notification may lead to 'bursty' notifications, as (inherently) the data transfer rate may be 'bursty'. Further work could be done to develop a scheme that notifies the HPLMN at certain non-linear volumes of data to minimise the notifications while still allowing the HPLMN to obtain accurate and timely information about customer activity.

PS-FIGS should also allow the operator to define a different periodicity for different APNs. For example, an operator may wish to receive more frequent notification messages for access to the wildcard APN as opposed to a corporate APN.

PS-FIGS will not explicitly cater for any instances where the content is subject to an additional premium charge to the customer. It is proposed that the ability of FIGS to monitor chargeable events at the application layer is not considered in the first phase but that it may be considered in future phases.

4 Proposed Context Information Record

Within the current FIGS specifications (GSM 02.31, version 8.0.0, Release 1999), a "charging information record" is specified – this being the record of information sent to the HPLMN by the VPLMN for a customer monitored by FIGS. In Table 1 below, a proposal is presented for a "context information record" for PS-FIGS. Note that all fields within the Circuit Switched Column record are defined in GSM 02.31 and all fields defined within the Packet Switched Column are defined as GPRS CDR fields within GSM 12.15, version 7.6.0, Release 1998. Note that the order shown is not necessarily the order that should be used within the standardised PS record.

Circuit Switched Record	Packet Switched Record
Dialled Digits	APN Requested
A Subscriber	IMSI or Served PSP Address
B Subscriber	APN Network Identifier
C Subscriber	N/A
CGI	Cell Identity
IMSI	Served IMSI
IMEI	Served IMEI
Call Start Date / Time	Record Opening Time
Call Duration	Duration
Call Reference	Local Record Sequence Number
MO / MT Indicator	Network Initiated PDP Context
Visited MSC address	SGSN Address
Type of SS event	N/A
Type of Basic Service	N/A
	List of Traffic Data Volumes
	PDP Type
	APN Operator Identifier

Table 1 - Proposed Context Information Record

5 Further work

- It is understood that CAMEL phase 3 provides for some services across the GPRS bearer. If there are any specific requirements on CAMEL so that it can support PS-FIGS, then these must be identified quickly for inclusion in CAMEL phase 4. A Liaison Statement to N2 may be desirable.
- Support of PS-FIGS using TAP should also be considered. A Liaison Statement to TADIG may be desirable.
- It is recognised that FIGS output may encourage operators to terminate service to a customer using Immediate Service Termination (IST). This paper has not considered how IST may be extended to the packet switched domain. Further work in this area is recommended.

6 Conclusions

Vodafone propose that FIGS is extended to provide information about customers roaming in a packet switched core network domain.

FIGS is an important tool for GSM operators who permit their customers to roam. There are valid reasons why FIGS is equally valuable in a GPRS (or more generically, packet switched) environment.

A proposed extension of FIGS for the packet switched domain has been described and a suggested information record has been defined.

Vodafone can continue to act as rapporteur for the existing FIGS specifications and any new specifications that may be required.