International Forum on ANSI-41 Standards Technology www.ifast.org

IFAST JOURNAL

Published for IFAST by the Alliance for Telecommunications Industry Solutions March 2003 Vol. 2 No.1

SECRETARIAT'S CORNER

Over the past year, the IFAST has undergone significant changes in its approach to issues and in its leadership. Most recently, the longtime chair, Fred Gaechter, retired. Everyone involved in IFAST wishes Fred the best and hopes that he enjoys a long and enjoyable retirement. At the same time, I, for one, cannot help but be excited about the changes that can be promised with a change in leadership. At the March 2003 IFAST Meeting in Sao Paulo, Brazil, the Management Team will recommend a new chair for IFAST.

In January 2002, IFAST met in San Francisco, CA and adopted a new mission and scope, and instilled additional members to the Management Team. These changes have allowed IFAST to focus on the identification and resolution of issues to enable the interoperability of systems between countries, carriers, technologies, and standards.

In the next year, more changes are expected. At the March 2003 IFAST meeting, IFAST will institute working sessions that will result in faster and more efficient resolution of issues. In addition, the Management Team is working to develop an educational program that includes technical presentations by carriers, manufacturers and others to address implementation issues. In specific, at the IFAST21 meeting, there will be a presentation from a carrier that has implemented IMSI for a CDMA network. IMSI implementation is key to resolving many interoperability issues between air interfaces.

This edition of *The IFAST Journal* addresses SID Resource Management, GTT Routing, and Emergency Services for International Roamers. If you have any comments or suggestions for the *IFAST Journal* and/or for IFAST, please feel free to contact me, by email, at mhayes@atis.org. I'd like to hear from you regarding your future participation in the IFAST process.

Megan Hayes
IFAST Journal Editor
IFAST Secretariat

Seamless Emergency Service for International and Domestic Roamers

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Sustain Wireless Market Growth.
Add Value to Your Network.

Technology used today for roaming, number portability, and even local call delivery may be applied in new ways to improve wireless emergency service for international roamers and provide new benefits for all subscribers. This article describes one approach for ANSI-41 networks. It is also applicable to GSM and other mobile networks.

Assumptions.

- Mobile networks can support public safety in ways far beyond the limited capabilities of fixed landline networks. As a result, mobile emergency service (hereafter called M9-1-1) can and should offer more benefit than just some emulation of the selective routing and location determination capabilities of landline enhanced emergency service (hereafter called E9-1-1).
- Mobile networks are more valuable to subscribers when mobility-enabling technology is applied for public safety in the same way it is used for personal contact, convenience, time savings, improvements to business productivity, entertainment and much more. Just imagine, for example, the use of wireless high-speed data technology for instant messaging, imaging or multi-media service to improve emergency reporting, response management and law enforcement.

Enhanced Emergency Service.
In Somerset County, New Jersey, USA, a "9-1-1" emergency call from a wired phone is delivered to a Public Safety Answering Point (PSAP) with the directory number (DN) of the calling party. This number is used to route the call through an intelligent network to the

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IFAST MANAGEMENT TEAM MEMBERS

GLOBAL TITLE TRANSLATION (GTT) ROUTING

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Global Title Translation (GTT) routing is one of the important features that is planned for the evolution of the mobile wireless networks that use the TIA/EIA-41 standard. This routing employs the current functionalities that are defined in the Signaling Connection Control Part (SCCP) layer of an SS7 system. Some of the advantages of this kind of routing are:

·Transferring the Mobile Identification Number (MIN) and Signaling Point Code (PC) administration from each Mobile Switching Center (MSC) to the Signaling Transfer Point (STP). Therefore, the maintenance of MIN and point code tables is simplified and data input errors are less frequent.
·Providing independence of the signaling links. For example, the ANSI Mobile Application Part (MAP) layer could be running over ITU SCCP and Message Transfer Protocol (MTP) layers using ITU signaling points. In the future IP links will be used this way to run many applications of a Next Generation Network (NGN).
·Traffic is gracefully re-routed in the event of link or application failure through the SCCP layer.

To illustrate the differences between the traditional and GTT routing consider the diagram shown in figure 1.

As seen from figure 1, the MSC has to know the point code of the final destination in order to validate a roamer with their Home Location Register (HLR). Basically, there is no intelligence in the STPs because they only transfer the messaging with the point code routing information provided by the large tables stored in the MSC. By contrast, the GTT scheme shown in figure 2 does not require that the MSC know the final destination. The MSC only needs to know the point code of the adjacent STP pair and leaves the routing task to the STPs through the SCCP parameters: Called Party Address (CdPA) and Translation Type (TT) number 3, defined to indicate routing to an HLR, based on a MIN. Therefore, at least one of the STP pairs stores the routing information to reach the final destination that is an HLR in this case.

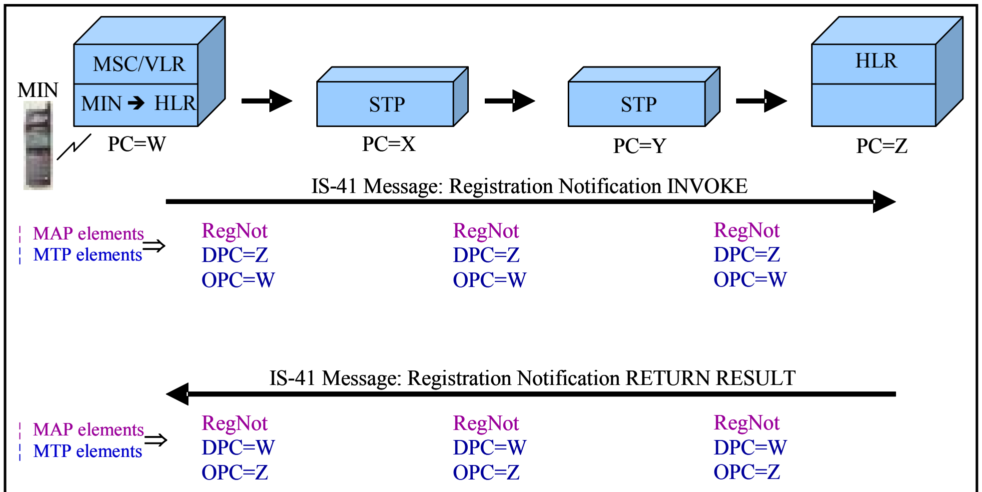


Fig. 1.- Current routing in ANSI mobile networks

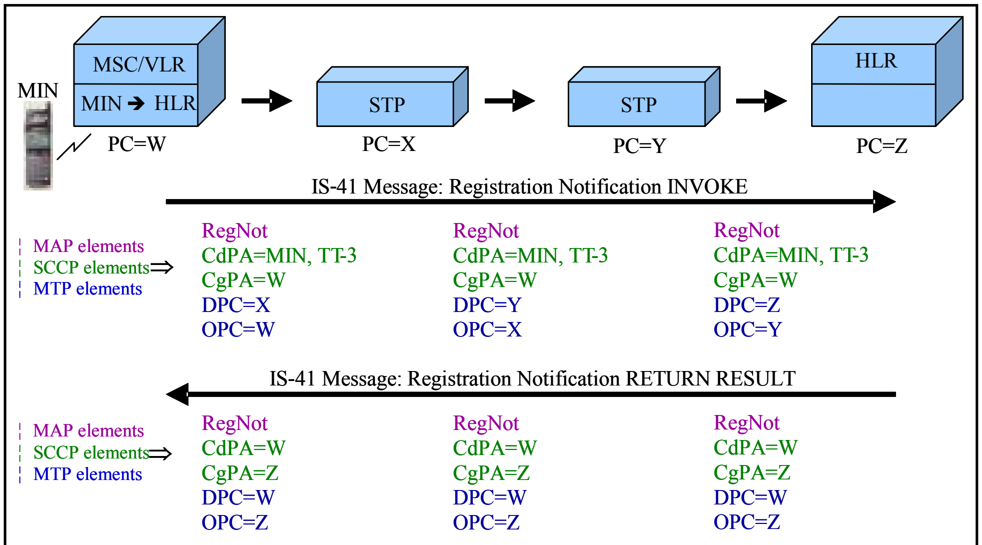


Fig. 2.- One way Global Title Translation (GTT) routing scheme

Under the GTT routing scheme, the large MSC's tables are not updated every time a new numbering range belonging to a roamer partner is open, as today. Instead, the routing information is updated once in the STPs that controls the routing, such as those belonging to the clearinghouse company.

Besides this, special STPs known as international gateways can perform another function with the GTT scheme. They can connect the MTP and SCCP layers from the ANSI and ITU standards through a translation function. The gateways have the capacity to deal with an incoming ANSI side and another outgoing ITU side and vice versa. This function is possible because the gateway can assign an appropriate destination point code (DPC) based on the converted GTT.

In summary, GTT routing provides two main benefits: simpler routing management and the possibility of interconnecting different networks whether they use ANSI or ITU standards in the lower layers MTP and SCCP. GTT is currently specified in the EIA/TIA-807 standard and will be included in the new Revision E of the EIA/TIA-41 standard. Besides, it works based not only with MINs but also with International Mobile Station Identity (IMSI) numbers. However, the migration to GTT routing can begin with the simple scheme of figure 2, which is a proven solution that is now supported by the equipment vendors and only requires the carrier's cooperation.

Emergency Service (Continued from Page 1)

nearest local PSAP. The DN is displayed at the PSAP and used to identify the location from which the call originated. It allows the PSAP to callback the caller if the original call drops. These capabilities are needed to manage emergency response and deter prank emergency calls or false alarms.

The location from which a mobile emergency call originates is not fixed. Even if a mobile phone were nailed to the floor, its precise location could not be identified from the mobile directory number (MDN). This problem is being addressed through wireless enhanced 9-1-1 service (WE9-1-1) in J-STD-036-A (1). This standard, however, can not guarantee a MDN will be available to the PSAP with every emergency call. This is especially true for international roamers.

Emergency Service for Roamers

The MDN is signaled to the serving system through the registration process. But registration is not required before an emergency call can be originated. Therefore, the MDN for a roamer may not be known by the serving system before the emergency call is delivered. It may never be known to the serving system if there is no roaming agreement between the serving system and the home service provider.

MSID/MDN separation contributes to this problem. The Mobile Station Identification (MSID) could be a Mobile Identification Number (MIN); an International Roaming MIN (IRM) or an International Mobile Subscription Identification (IMSI). None of these are dialable numbers. If the MSID is displayed at the PSAP to identify the call rather than the MDN, no direct local callback is possible today.

Historically, MIN and MDN were the same. MIN could be delivered to the PSAP and used for callback. With the introduction of IRM and IMSI for international roaming, we can no longer expect the MIN and MDN to be the same.

If the MDN were known at the serving system, such as from a R-UIM or SIM card, and delivered by the serving system to the PSAP, the PSAP may not be able to place an international call or display an international number of up to 15 digits.

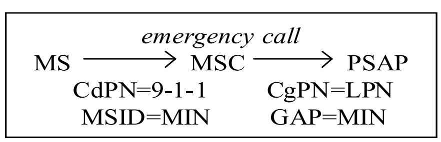
Finally, even if the PSAP knew the directory number and could place an international call, this seems like an inefficient way to route an emergency callback to the other side of town. There's the risk of delay and even blockage in setting up the call through many networks.

New technology can provide all mobile emergency callers, including international roamers, with a unique, local callback number. This would allow the PSAP to control the emergency response with confidence and without delay. This, at a minimum, would make mobile emergency service at least equivalent to fixed line emergency service and potentially far superior by handling the most severe, wide area, mobile emergencies.

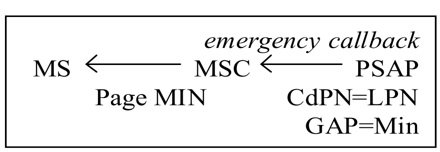
The Local Public Safety Callback Number (LPN)

M9-1-1 technology is being introduced through the National Emergency Number Association (NENA) at their 2003 Technical Development Conference beginning March 17 in Orlando, Florida. It involves the use of a new Local Public Safety Callback Number (LPN). Here's how it works.

1. Each wireless MSC is assigned a unique number from its native number block. This is its LPN.
2. When a mobile emergency call is placed, such as by dialing "9-1-1", the LPN is used as the calling party number (CgPN) rather than the MDN of the calling subscriber.
3. The mobile subscription identity (MSID) of the caller is sent in the ISUP generic address parameter (GAP) with the LPN as the CgPN. This makes the call identity unique. The MSID may be a MIN, an IRM or an IMSI.



4. At the PSAP, the LPN and the MSID are provided together as the callback number. When a callback is initiated by the PSAP, the LPN is used as the called party number (CdPN) and the MSID is carried in the GAP.



5. At the serving MSC, the LPN is used to provide priority queuing for the callback. The MSID from the GAP is used to page the original mobile and complete the call.

Priority queuing may be implemented for calls to an LPN to avoid delay or blockage due to MSC traffic congestion. The callback is delivered even if the subscriber's prepayments are exhausted since there is no MDN to screen. There is no need for the PSAP to place an international call or for the serving system to provide a temporary long distance number (TLDN) to route the call from the home MSC. These advantages are available to every subscriber, not just international roamers, by using an LPN for callback rather than an MDN.

M9-1-1 Technology Application

M9-1-1 technology improves emergency service for all subscribers while it solves specific WE9-1-1 problems for international roamers. It's a single, universal method for the PSAP to uniquely identify every mobile emergency call; originate a callback directly to the serving MSC; and deliver the callback to the original mobile station without risk of delay or blockage.

The LPN is a dialable mobile emergency callback number for all roamers, international and domestic, to improve the timeliness and reliability of emergency response. It opens the door to improve WE9-1-1 service far beyond some emulation of fixed E9-1-1 service. The following additional applications for the LPN are being explored.

- The PSAP could callback the mobile caller, or even an emergency responder who may have moved into the serving area of another system, without dialing the MDN.
- The PSAP can callback mobile phones that have no MSID. Phones without an MSID are available on the market for emergency calls only. Phones with an expired subscription, exhausted prepayment, un-registered or non-initialized phones or phones without a SIM or removable UIM can be used to place an emergency call.
- Wired networks could use the LPN method to callback emergency callers at phones out of service or from which the directory number may have been ported.

Did You Know?

At the IFAST21 Meeting in Sao Paulo, Brazil, Education Sessions will be conducted regarding IMSI Implementation and SID Conflicts.
For more information, **visit the IFAST Web Site**.

SID Resource Management

By David Crowe
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In the last issue of the *IFAST Journal*, I talked about the IRM (International Roaming MIN), and the role of IFAST in assigning these important identifiers. The SID (System Identification number) is equally important, although assignment of these numbers is much less frequent. IFAST also plays an important role in managing this resource.

The SID is a 15 bit number (0-32,767) transmitted by every AMPS, N-AMPS, TDMA (ANSI-136) and CDMA (ANSI-95, IS-2000) base station to identify a portion (or all) of a carrier's network. It is equivalent to the call sign of a commercial radio or television station.

The usage of the SID has evolved over time. At first it was used to optimize the signaling protocol for home subscribers, and also to control the 'roam' light on analog phones. Digital systems are more sophisticated, and mobile phones generally have a list of SID codes classified according to their desirability. A phone that encounters more than one signal can use the SID codes to pick the one that will offer the customer and the carrier the best rates and service. SID codes are also extensively used in billing operations to identify the carrier. Every CIBER billing record, for example, contains the SID code of the serving carrier. This makes the SID crucial in the settlement of roaming charges.

The number of SID codes being broadcast has gone down over time as carriers consolidated. Particularly with analog systems, it was useful to have the same SID code over a large area to avoid the 'roam' light going on, which often caused customers to avoid making calls. Billing requirements are different, however, and the concept of the BID (Billing ID) was invented. This identifier is very similar to a SID, but is not transmitted over the radio interface, and can be used to divide a system broadcasting a single SID into multiple regions for accounting purposes. Because of this, the BID can actually be 16 bits in length (i.e., including the range 32,768-65,535). BID codes are assigned by Cibernet Corporation (www.cibernet.com).

SID conflicts can create difficulties for international roaming, although not as great as those due to IRM conflicts. If signaling optimization is turned on, call attempts will fail when a roamer (thinking it is in its home system) transmits only a partial MIN. On digital systems, a phone may attempt to register with a system that will not give it the best rate, and may not give it service. Billing will also be impacted, and sometimes SID-code translation is required to ensure that revenue is shared between the correct carriers.

In the late 1980's the TIA (Telecommunications Industry Association) attempted to solve this problem by defining ranges of SID codes for every country then in existence within TSB29. This responsibility was transferred to IFAST in the late 1990's. Since most countries have an adequate SID range, requests for new SID ranges are infrequent. However, it is still important that the SID database be maintained, and that SID conflicts are properly documented, with the hope that they can be resolved over time.

IFAST assigns SID codes to national regulatory authorities so that they may administer them to the service providers in their respective countries. In the United States, for example, the Federal Communications Commission is responsible for SID administration. In November 2002, the FCC has announced an interest in privatizing its SID assignment activities. In other countries, SID codes were sometimes assigned without coordination with IFAST, resulting in SID conflicts.

IFAST not only assigns ranges of SID codes to countries, but also assigns SID codes to international entities, such as mobile satellite carriers. These companies may also broadcast a SID code, and may need a SID code to participate in CIBER billing record exchange.

Due to the low volume of assignments, IFAST does not charge any fees for assigning SID codes, but does have Assignment Guidelines and Procedures to avoid assigning SID codes to entities that do not have a use for them.

Until recently the SID resource was close to exhaustion. This occurred because of the initial assignment by the TIA to every country in the world. Since then, additional countries have been formed, and the number of available SID codes was inadequate for their needs, while many SID codes languished in countries that had no need for them, or had an assignment that was too large. In the 1980's it was believed that every cellular system would broadcast a unique SID but, as mentioned above, carrier consolidation has dramatically reduced the number of SID codes required. Most carriers outside North America can suffice with a single SID.

IFAST made a major effort to correct this over the past couple of years by writing to every national SID administrator and requesting that they review their SID assignments and return some or all of their SID codes, if they were not needed. This effort was successful, with SID codes being returned from Poland, Sweden, Ireland, Finland, Malta, Saint Vincent and the Grenadines, Belize, Mexico, Chile and Denmark. Consequently, about 15% of the transmissible SID codes are now available for assignment. This should provide enough SID codes for many years to come.

IFAST maintains the list of SID codes at www.ifast.org (click on the 'System Identification Number (SID)' link on the home page). There is a list sorted numerically, and another sorted by country name. A third list contains all known SID conflicts. The author (David.Crowe@cnp-wireless.com) is the volunteer SID administrator. Any updates to the SID database should be directed to his attention.

IFAST Calendar of Events

February 2003	March 2003	April 2003
	IFAST Meeting 24-25 March Sao Paulo, Brazil	