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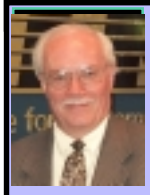
CHAIR'S CORNER



The IFAST has been in existence for more than 4 years; I'm proud to have been its Chairman since its inception. IFAST has many accomplishments on behalf of its members, including the creation International Roaming MINs (IRMs) to address the MIN ambiguity issue; the development, publication and continued maintenance of the International Roaming Guide (IRG) as an aide to service providers offering this service; and, just recently, the authorization of ANSI SS7 Point Code assignments to non-North American service providers on ANSI-41-based networks. These are just a few of our successes over the last 4 years.

Our anticipated successes for the near future include updating the IRG, mentoring IMSI implementation, developing cross-technology roaming capability with other forums, mentoring uniform dialing across ANSI-41 networks, resolving billing and fraud issues associated with international roaming, and encouraging the deployment of the most recent revisions of ANSI-41 standards.

IFAST has an aggressive near term work plan. The resolution of these issues is urgent for the marketing of international roaming services. We don't lack in creativity with regard to what issues require our attention. We do, however, need further assistance from network operators and equipment/service providers worldwide in order for us to adequately address issues in a global context.

This need for assistance gets me to the primary purpose for this *IFAST Journal*. We hope, by including interesting and timely articles, to stimulate increased participation in the IFAST process. We hope that you, our members, will write articles for the *IFAST Journal* identifying significant issues and how you might be resolving them in your network. Without your participation, IFAST will fail in its mission and we will all be left to resolve these issues locally – a hopeless situation that will allow technologies other than ANSI-41 to progress more rapidly and to dominate the marketplace.

So, as the IFAST Chairman, I look forward to seeing your articles in the *IFAST Journal* and to greater project participation by network operators from around the world. If you have any comments or ideas for the *IFAST Journal* and/or for IFAST, please feel free to contact me. I'd like to hear from you regarding your future participation in the IFAST process.

I hope you enjoy **your** newsletter.

Fred Gaechter
IFAST Chairman
fredgaechter@monmouth.com

IRM Use: Past, Present and Future

By David Crowe
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Cellular technologies have been such a huge success that the very size and extent of the resulting worldwide network has caused some problems, including ensuring that every one of the hundreds of millions of active mobile subscriptions is uniquely identified. This is critical to ensure that customers get the services to which they are entitled, that calls can be billed correctly and that carriers are protected from fraudulent access or from people whose accounts are in arrears.

Many wireless technologies use the 10-digit Mobile Identification Number (MIN) as a subscription identifer. This includes AMPS and N-AMPS analog systems as well as digital systems based on TDMA (ANSI-136) and CDMA (ANSI-95 and IS-2000, also known as cdmaOne and CDMA2000). GSM systems use the International Mobile Subscriber Identity (IMSI), which may be up to 15-digits long. This identifier is also supported by TDMA and CDMA systems, although it has not been widely implemented because of backward compatibility considerations.

AMPS analog cellular systems, commercially launched in 1983, were the first to utilize MIN. Because initial plans were for systems in the United States, it seemed logical for carriers to use the 10-digit North American Numbering Plan directory number to identify subscriptions. This had the advantage that carriers only had to manage one identifier for each subscription, as the MIN and the directory number would be the same.

The MIN uniquely identifies a subscription, and the first 4-6 digits identify the home system (HLR). It is important that the home system can be identified based solely on the MIN, because otherwise it would be difficult to route ANSI-41 signaling messages that are essential for roaming to the

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INSIDE THIS ISSUE

IFAST MANAGEMENT TEAM MEMBERS

TLDN Interchange for International Roaming

By Ricardo Gomez
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One of the key parameters for the implementation of international roaming service is that every carrier's roaming partners configure the temporary local directory number (TLDN). This number has the same format as other directory numbers and is utilized to route calls to a roamer on a visited ANSI-41 network. However, it is often restricted to a maximum of 10 digits, due to widespread implementation of early ANSI-41 revisions, which considered only the North American Numbering Plan (NANP), and used national numbers of 10 digits. On the other hand, some countries outside the NANP have national numbers of lengths other than 10 digits, and, in some cases, national codes conflict with the North American Area Codes (NPA). That is why some compatibility conflicts arise when two international networks are connected. Figure 1 illustrates the call delivery process between a USA carrier and a Mexican carrier, both having a 10-digit based Numbering Plan but with conflicts in the national codes.

Before November 2001, the Mexican Dialing Plan had 8 digits in the national number, so the TLDN sent to the USA carriers was composed of the country code "52" plus the 8 digits of the national number. This resulted in a 10-digit TLDN that was not in conflict with any other number in the USA since there was no NPA starting with 52. (Arizona uses the NPA 520. However, it was not in conflict because there was no Mexican number in which the national code started with "0".) However, the Mexican Numbering Plan last year increased the national number from 8 to 10 digits. So the new national numbers in Mexico began with national codes which are in conflict with the USA NPAs. To solve these incompatibilities, the scheme changed as shown in figure 2. Here, the TLDN sent to the USA carrier is 12 digits long because it includes the country code "52" and the new 10-digit national number. For this change, some updates had to be applied to the switches in Mexico so they were capable of sending TLDNs of 12 digits. In the US, carriers had to ensure that their switches had the correct digit analysis, allowing for a TLDN that would identify a caller from Mexico.

Fig. 1.- Current TLDN exchange between Mexico and the USA

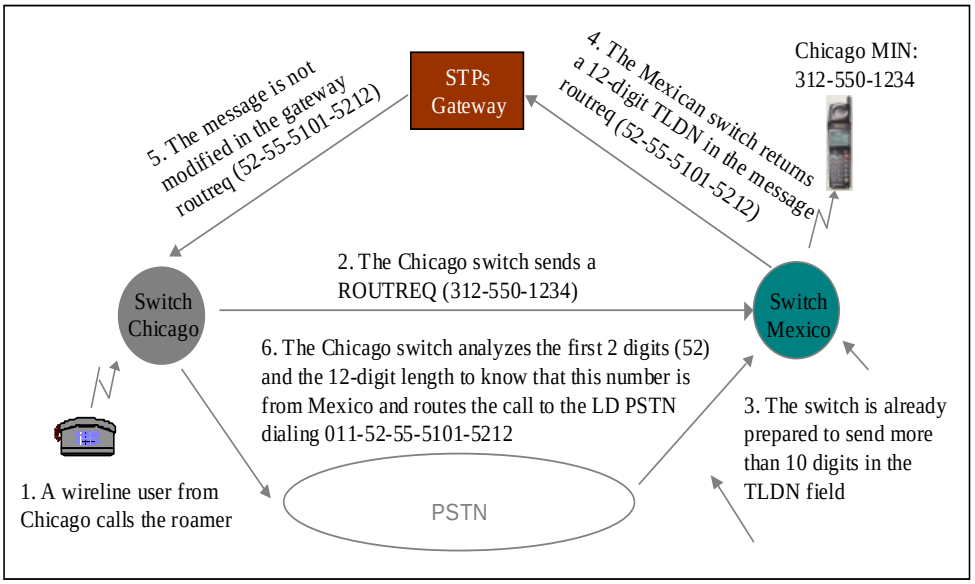
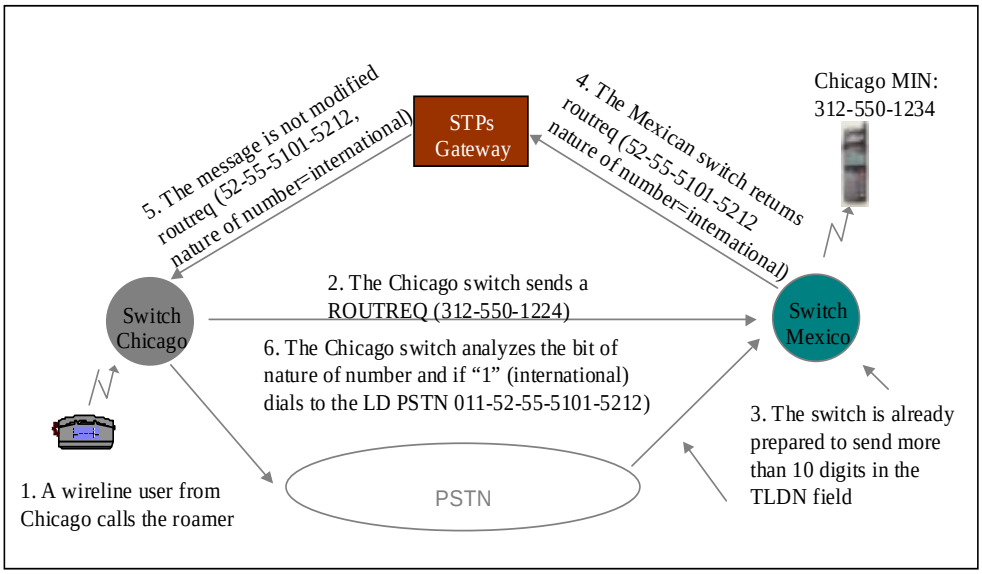


Fig. 2.- Future TLDN exchange between Mexico and the USA



The last solution is proprietary for a specific case and it cannot be generalized when many carriers are connected because it becomes very complex and ambiguities can result between countries. The optimal solution is to use the Revision D of the IS-41 protocol which allows for identification if the TLDN is coming from a National or International network. This solution however, requires updates in the switches that will be ready in the midterm, because the major parts of the switches currently have implemented IS-41 Revision C or less. The optimal solution as depicted in figure 2 is widely recommended in the future to spread the international roaming in IS-41 and even the worldwide roaming as stated by the ITU with its IMT-2000 initiative. For more information about TLDN, please refer to the International Roaming Guide.

IRM Continued From Page 1

HLR, where the roamer can be validated and authenticated, and roamer profile information obtained. When a mobile first registers a subscription identifier is the only information available to route registration messages to the home system.

Cellular quickly spread to countries outside the United States in the mid- to late-1980's. AMPS was soon the dominant technology in the Americas and parts of Asia. These carriers had to decide how to program the MIN codes in their customer's phones, and often chose to use the local phone number, just as North American carriers had done.

Few countries had 10-digit numbering plans, so carriers had to determine additional digits to obtain a 10-digit identifier. Mexican carriers, for example, used their country code (52) to fill the first two digits of the MIN, as their national phone numbers were only 8 digits long. Other countries used their 3-digit IMSI Mobile Country Code (MCC). These schemes were implemented without any coordination.

The first cellular systems were standalone, but soon roaming between systems was implemented. At first this was just national roaming, but soon international roaming was being considered. The lack of coordination between national MIN numbering plans loomed as a barrier to successfully implementing international roaming capabilities. If two carriers used the same MIN prefix, ANSI-41 message routing would be difficult, if not impossible. This messaging protocol is essential to roaming.

An organization named the JCCR (Joint Committee on Cellular Roaming) was established by organizations from Mexico, the United States and Canada to find a solution. Two potential solutions were studied: 'Double-Dipping' and the International Roaming MIN (IRM). Double-Dipping requires querying multiple HLR's until a match is found with both the MIN and associated ESN. This solution was rejected because it could not be guaranteed that even two queries would suffice, and it would require all ANSI-41 MSCs and VLRs to be upgraded.

The International Roaming MIN concept was to use MIN codes that are not valid North American phone numbers, specifically those that begin with the digit '0' or '1'. After extensive debate, this solution was chosen by the JCCR. After some testing, it was found that this solution was compatible with virtually all cellular hardware and software, and only required the provisioning of the IRM codes in roamer agreement tables - an activity that is required for regular MIN codes as well.

After solving this problem, the JCCR re-convened as IFAST, to provide a venue for entities from around the world to address other international roaming problems. Today, IFAST has members on every continent (except Antarctica). Although it studies several different international roaming problems, the resolution and ongoing management of the MIN uniqueness problem is arguably its greatest achievement.

Like most solutions, the acceptance of the IRM concept created another problem. An organization had to assign the IRM codes to ensure global uniqueness. The IFAST, having just invented the IRM, agreed to fulfill that role. It decided that it would assign the first four digits of the MIN as an 'IRM Network Identifier', with the remaining 6 digits being assigned by the network operator. This created two thousand distinct network identifiers, each able to uniquely identify one million subscriptions.

One of the challenges of managing the IRM was 'grandfathering' - obtaining information about all unofficial IRM usage that had occurred before IFAST existed. Several US-based data systems had utilized many IRM Network Identifiers, not realizing that this numbering resource had benefits for international roaming. Gradually, these older assignments were identified. It was decided to recognize them even when the efficiency of the assignment was very low. IFAST decided that an attempt to remove IRMs from these companies would just create conflict, and could threaten the viability of the entire IRM concept. It is hoped that, over time, these companies will rearrange their numbering plans to make better use of the IRM resource.

All companies that use IRM codes now recognize the role of the IFAST in administering the IRM resource. They recognize that without IFAST, chaos would result, and service providers' ability to sign roaming agreements would be threatened.

Management of the IRM resource requires the involvement of several people, requiring compensation for their time and travel expenses. It was decided that this activity should be self-funding, through the imposition of assignment and maintenance fees. The fees are currently US$175 per year for each IRM assigned, and a one-time $175 application fee for each IRM. The only carriers that have not paid these fees are those with which IFAST has lost contact. One of the advantages of charging a fee for IRMs is that it requires annual contact with each carrier. Furthermore, it allows the reclamation of codes when companies recognize that they no longer need their assigned IRMs.

The IRM assignment process occurs in several phases. First, a company may notify the IRM administrator that they intend to apply for one or more IRM Network Identifiers. This optional step ensures that the IRM codes are reserved for 60 days, at no charge, to allow for the process of invoicing and payment to take place. Following this, an IRM application form must be completed, and accompanied by payment. Invoicing by the IFAST Secretariat (Alliance for Telecommunications Industry Solutions-ATIS) can be provided, upon request. Once payment is received, the IRM Network Identifiers are tentatively assigned. Within approximately two weeks following this, an IFAST assignment email is sent out, requesting comment from IFAST members. Assuming that no objections are received, the assignment is made official in the next IFAST email, approximately two weeks later.

Current IRM assignments are posted on the IFAST Web site (www.ifast.org) and are updated within a few days of each IFAST email being circulated. The assignment list is available in both html and PDF formats. Approximately 56% of the IRM resource is currently assigned. This has remained relatively stable for the past couple of years, as returns of unneeded codes has balanced the many new codes assigned. It is expected that the IRM resource will last until after the transition to IMSI can be accomplished.

Implementation of the IRM concept by IFAST has been a big factor in allowing international roaming between ANSI-41 cellular and PCS carriers. The challenge of turning chaos into order has been overcome by IFAST, and now IRM assignment is a routine activity, accepted by wireless carriers and other industry entities around the world.

Did you know?

IFAST has 5 open Study Projects:

IMSI Implementation
Uniform Dialing Plan
International Roaming Guide
IS-41 Implementation Awareness
Fraud

Interested in becoming involved?

Contact Megan Hayes
(**mhayes@atis.org**)

An Introduction to the IFAST International Roaming Guide

By Syed Zaeem Hosain
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The definition of "International Roaming", within the ANSI-41 environment, is complicated. Roaming between countries that adopt the North American Numbering Plan (NANPA) - for example, Canada and the USA - is generally not a problem. However, the ANSI-41 standard was not originally intended to support International Roaming and did not take into account conflicts with numbering plans and routing schemes in other countries that use ANSI-41 protocols - particularly those in South America and the Asia/Pacific Rim region.

In the past, most of the problems with International Roaming related to numbering assignments and different dialing plans. Recently, many other issues that influence the carriers' ability to support International Roaming have been identified. The IFAST has been actively trying to resolve such problems - IFAST members have been actively working to resolve many of the issues on a consensus basis. An example of this is the assignment of International Roaming MINs (IRMs) and System Identifiers (SIDs) that has enabled carriers to realize the benefits of International Roaming.

At one of the early IFAST meetings, the IFAST members recognized the need for a set of recommendations and guidelines to help carriers, who were interested in providing International Roaming to their subscribers, to become more knowledgeable about the issues and the resolutions. Hence, the reason for existence of the IFAST International Roaming Guide (IRG), available on the IFAST web site!

The primary purpose of the IRG is to provide, to all carriers worldwide (who are using the ANSI-41 standard), just such a set of recommendations and guidelines. It is hoped that the lessons learned and the input from carriers who deal with these issues, may help other carriers benefit from the issues and find common solutions to the challenges facing International Roaming.

The IRG covers a wide ranging set of topics, such as: Numbering Conflicts, Dialing Issues, Signaling Issues, Fraud Problems, Billing and WIN Services, etc. Each of these topics has a subset of issues. These issues and their resolution (or recommended solutions) are described in the various sections of the IRG. The solutions are based on work by the IFAST member partners. Selections from the IRG will be presented in future editions of this IFAST Newsletter.

Everyone should note that the IRG is an evolving document and is still incomplete in a number of sections. In addition, new problems related to International Roaming continue to be identified by the IFAST members. The document sections that are incomplete need input and resolution of the problems that are identified.

The IRG is currently being edited to improve its readability and access to information contained in it, as well as to improve the accuracy of the information. IFAST would like to encourage all readers and interested parties to make suggestions to improve its content and accuracy - contributions to the incomplete sections are welcome! Please send all your input to Syed Zaeem Hosain at Syed.Hosain@aeris.net for inclusion in future releases of the IRG.

International Availability of ANSI SS7 Point Codes

By Fred Gaechter
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The American National Standards Institute (ANSI) and Standards Committee T1 have authorize the ANSI SS7 Point Code (PC) Administrator - Telcordia Technologies - to assign ANSI PCs to non-North American ANSI-41-based service providers that are offering international roaming service between their country and countries served by the North American Numbering Plan (NANP). This authorization has occurred through the approval of a revised T1.111.8 Standard. This Standard describes the use, assignment, and administration of these resources both within North America and, now, internationally, as well.

The IFAST was instrumental in obtaining this authorization. It was an IFAST contribution to Committee T1 that proposed this authorization and IFAST members that attended Committee T1 meetings to explain and support such assignments. This project was a major 2002 IFAST success on the behalf of its worldwide membership.

Prior to this authorization, non-North American service providers intending to offer international roaming services between their countries and North America received ANSI PC assignments from the resources assigned to the gateway operator with which the service provider had a contractual agreement. Such an arrangement required that the service provider change their PC assignments throughout their network and interconnecting networks if they changed gateway operators – a very time consuming and expensive process. The new authorization to assign unique PCs to these international service providers allows their networks to maintain their PC assignments no matter which gateway operator provides their gateway functionality.

To obtain further information regarding the assignment of international point codes, service providers should contact the ANSI SS7 PC Administrator – Anne Walker – at +1 732 699 4204 or by email at awalker@telcordia.com. The Administrator also maintains a website containing the above referenced ANSI Standard, including PC application forms. The web site address is www.ss7pcadmin.com.

IFAST Calendar of Events

August 2002	September 2002 **IFAST Meeting** 25-26 September ATIS Conference Center Washington, D.C.	October 2002
November 2002	December 2002	January 2003 **IFAST Meeting** 29-30 January Brazil