

Optimize Revenue with NET-7 IRMA Intelligent Roaming Monitoring Application



As more and more people are expected to travel abroad in the future, usage of roaming services can be expected to increase, making mobile roaming service more important and profitable than ever before. Tektronix' Intelligent Roaming Monitor Application (IRMA) is an essential tool for helping network operators to realize and optimize revenue from roaming mobile customers.

Roamers are mobile subscribers who use services outside the area of their home service provider. Several factors exist that make roamers among the most valuable customers for mobile network operators.

- **Revenue** – Network operators can count on more than 20 percent of their income resulting from roamer activities
- **Tariffs** – Roamers' tariffs are higher to those for home subscribers
- **Costs** – Cost of service for roamers is generally a secondary issue because they are often high-end users, such as frequent travelers or business people whose main concern is concern ubiquity, or people traveling abroad for vacation and holidays who have less concern with expenses and money available for spending
- **Fraud** – Service providers have no exposure to fraud or bad debt for in-roamers because their home service provider covers the billing

IRMA Meets Critical Business Needs of GSM Operators

IRMA is a powerful application that enables GSM operators to understand and take control of in-roamers' and out-roamers' activities and to make meaningful assessments of the level of quality of service that roamers perceive. IRMA provides real-time alert messages that inform the network operator of any decline in perceived service quality, and in decreased volume, which provides network operators the advantage of early problem identification and proactive intervention.

These features make IRMA an essential tool that enables GSM operators to capture additional revenue – particularly in a business environment where numbers of new subscribers are not growing as rapidly as in the past, and where roamers constitute a great source of potential revenue.

Net-7 IRMA Intelligent Roaming Monitoring Application

► Application Note

IRMA supports GSM operators in their critical mission of winning in today's extremely competitive environment. IRMA helps enable mobile operators to attract and maintain in-roamers' business, as well as to encourage their own subscribers to become out-roamers when traveling abroad and to use the service as much as possible.

Key Benefits

- Locate and quickly resolve problems affecting roaming service
- Improve roaming service profitability
- Reduce roamer churn rates
- Sustain high customer satisfaction
- Helps to maintain end-to-end quality and high level of ASR and network effectiveness
- Provide comprehensive set of reports for planning activities

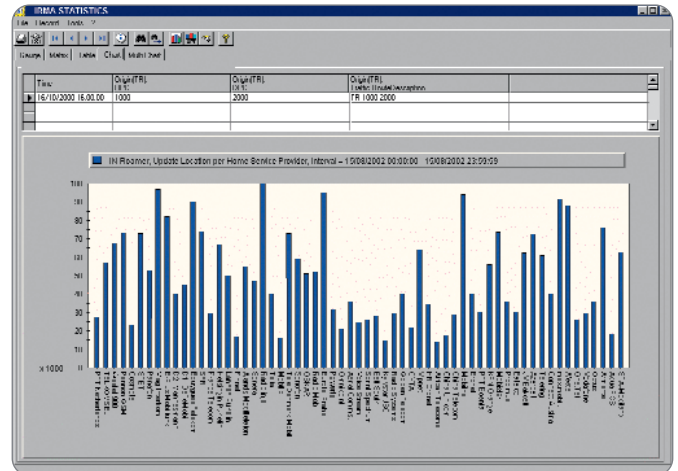
A Solid Foundation Supports IRMA

IRMA is a modular software component that can be added on top of an existing NET-7 network monitoring and analysis system – without any interference to existing applications. Alternatively, it may constitute the sole application of a newly implemented NET-7 system.

IRMA activities are triggered by the data collected by NET-7 probes located at the interconnection trunks of mobile operator network. IRMA capabilities include analysis of call processing (ISUP signaling) and mobility management events (MAP signaling).

Data collected is involved in the inter-working between the networks visited by the roamers and their home networks. It constitutes an extremely valuable source of information which is useful in assessing quality of service, as well as volume related to the activity performed by roamers. This solution is much more effective than those based on information provided directly by switches. The main advantages of the IRMA implementation are:

- **Scope** – Correlation among mobility management and call processing events; total visibility within and beyond network boundaries
- **Independence** – Operation is totally independent of network
- **Availability** – Continuous monitoring



► Figure 1. Update visitor's location by service provider.

In-Roamer Analysis

In-roamers are customers from other service providers that are visiting the network. These customers should be captured whenever they enter in the network coverage area, but they can only be captured and remain connected only if the inter-working with their home network is operating properly.

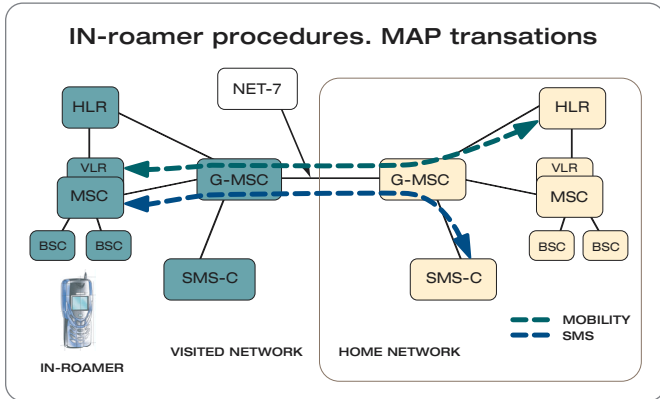
NET-7 probes, located at interconnection trunks, monitor all messages exchanged between the two networks, then NET-7 IRMA analyzes both ISUP and MAP signaling, correlates these messages, and provides alarms and synthesizes written reports that are easy to read and understand.

The MAP procedures taken into consideration are those that are:

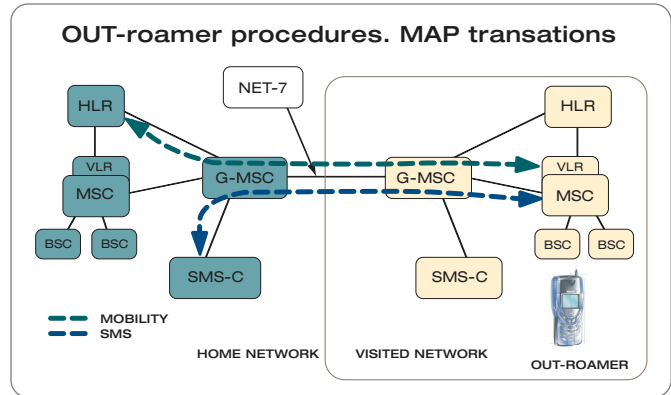
- Originated by the in-roamers' home network HLRs (home location registry) and terminated to the visited network nodes
- Originated in visited network nodes and terminated to in-roamers' home network HLRs
- Originated by the visited network nodes and terminated to in-roamers' home network SMS-Cs (SMS Centers)

ISUP calls traced for in-roamers include:

- Mobile Terminated Calls
- Mobile Originated Calls (collected on the border trunks)



► **Figure 2.** In-roamer procedures and MAP transactions.



► **Figure 3.** Out-roamer procedures and MAP transactions.

Out-Roamer Analysis

Out-roamers are comprised of your own subscribers who are hosted in the network of other service providers. These networks are normally located abroad, but there are exceptions such as where national roaming is allowed and visited networks are located in the same country as that of the home network.

Out-roamers are captured whenever they enter in the visited network coverage area and they can use the service, but only if the inter-working with their home network is working properly. NET-7 probes, located at interconnection trunks, monitor all the messages exchanged between visited and home network, then NET-7 IRMA analyzes ISUP and MAP signaling and provides appropriate reports and alarms.

The MAP procedures taken in consideration are those that are:

- Originated by the out-roamers' visited network VLRs (visiting location registry) and terminated on the home network nodes
- Originated by the home network nodes and terminated on out-roamers' visited network VLRs
- Originated by the out-roamers' visited network MSCs (mobile switching centers) and terminated to the home network nodes

The ISUP calls traced for out-roamers are those related to:

- Mobile Terminated Calls

Comprehensive Set of Measurements

NET-7 IRMA provides a comprehensive set of measurements and statistics regarding both MAP transactions and ISUP calls. These statistics, representing the most relevant information depicting volume of roaming activity and QoS roamers experience, are grouped in user-definable time intervals and provided as tables, graphs, and histograms supporting any kind of representation.

MAP transaction

Transactions belonging to MAP signalling contribute to the calculation of the following counters:

- Total invoked in the interval
- Number terminated in the interval
- Number terminated per error in the interval
- Number aborted in the interval
- Number timeout ended in the interval
- Number rejected in the interval
- Error rate (percentage of unsuccessful transactions)

Additionally for each procedure there will be the possibility to obtain reports on the specific cause of error including:

- Terminated with error due to abort, timeout, reject, and all the release causes specified by the recommendation for the specific transaction
- A counter of the occurrences for the specific error cause

Reports are provided separately per incoming and outgoing procedures.

ISUP calls

Every call belonging to ISUP signaling contributes to the following counters:

- Total calls traced in the interval
- N. successful calls
- N. unsuccessful calls
- ASR (Answer to Seizure Ratio)
- NER (Network Effectiveness Ratio)
- PDD (Post Dial Delay)

NET-7 IRMA for Excellent International Service

NET-7 Intelligent Roaming Monitoring Application supports Mobile Network operators to sustain the high level of service expected by international roamers. It hosts comprehensive monitoring and reporting capabilities that continuously examine the international roaming services and provide real-time alert information on service degradation, allowing proactive intervention to identify and solve the issues affecting the service.

Beside this, IRMA provides meaningful reports to assess the volume of roamers' activity, and to discover where they are using the service, resulting in a valid support to planning activities.

Additionally it helps to assess QoS provided by new roaming partners and to assist the launch of new services to roaming customers and partners.

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