

***Transaction  
Network Services®***

**INTERNATIONAL  
SIGNALLING POINT CODE  
FILING –  
Service Description:  
TNS CDMA/TDMA (ANSI-41)  
International Roaming Hub**

**Contents**

**SERVICE DESCRIPTION..... ERROR! BOOKMARK NOT DEFINED.3**

## 1.1 Service Description

In addition to administrative and strategic difficulties, operators must contend with technological issues that make it costly and complex to support roaming. Specifically, the protocol for CDMA, ANSI-41, was not designed for roaming. Different deployments of ANSI-41 still present a problem to both the home and serving networks, as different operators in different countries often use identical codes and numbers, resulting in conflicts and inhibiting seamless roaming service delivery. ANSI-41 also lacks a standard for dialing international numbers, leading to difficulty for subscribers as they navigate dialing patterns in foreign countries.

Many networks employing the ANSI-41 protocol utilize PC/SSN for routing while others utilize GT (e.212) for message routing. To complicate matters further, some networks use PC/SSN for mobility management messages, but use GT for SMDPP messages for SMS.

Complicating the task is the diversity of vendors' switch and network types. One carrier might have a Motorola switch, and one of its roaming partners might have a Lucent switch. The coordination between carriers can be a daunting task.

Interoperability issues often impede subscribers' international access to some of their home-market services. Operators want their subscribers to have access to features such as voice mail, caller ID, SMS and data services while roaming internationally, but, other than voice mail, these features are often unavailable.

Prepaid requires further consideration. Prepaid subscribers represent approximately 70% of mobile subscribers worldwide. In emerging markets, that number jumps to nearly 90%. To date, prepaid subscribers have had limited options for international roaming.

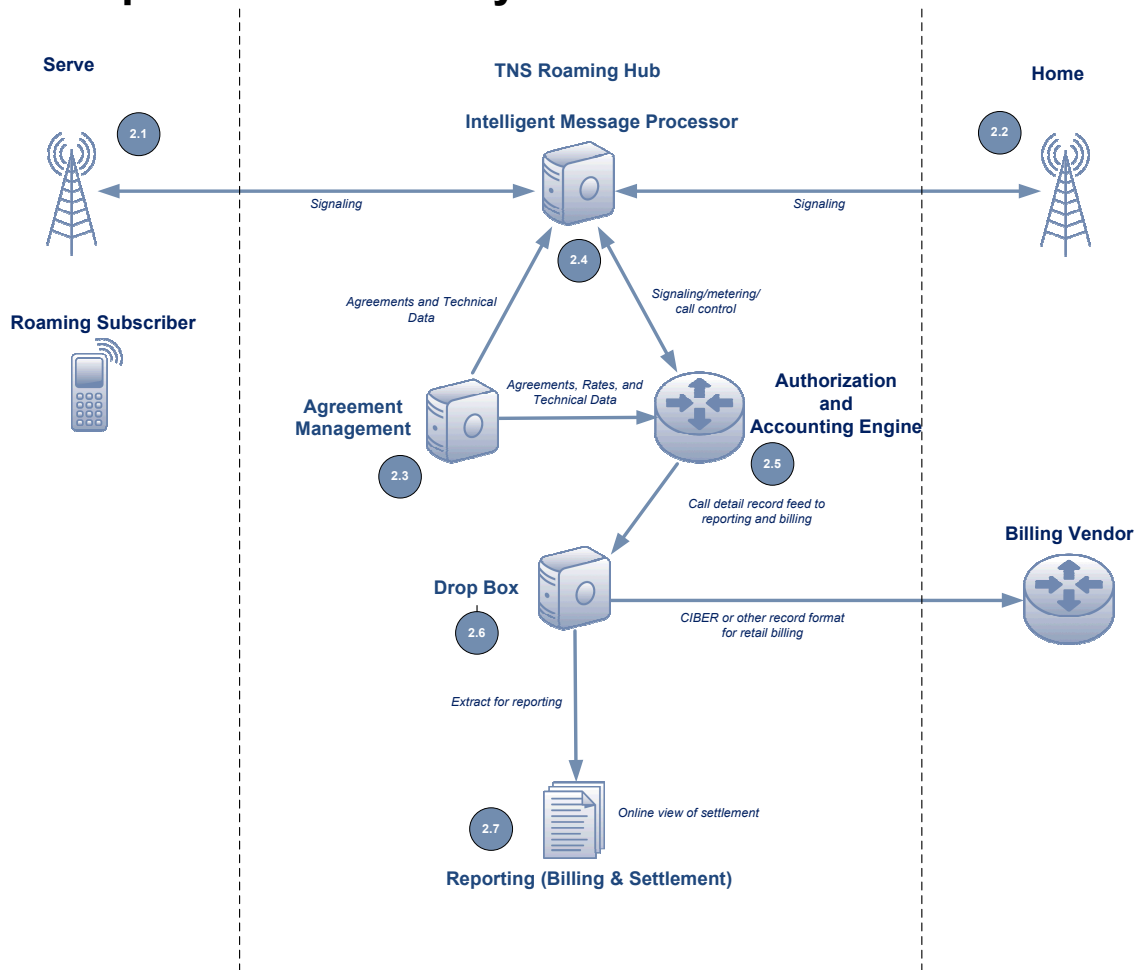
## 1.2 Product Concept and Overview

The TNS Roaming Hub is a one-stop-shop service that offers mobile operators accelerated global roaming through a single implementation and reduced operating costs. The hub enables roaming among all clients of the hub and is an alternative to the current model of effort-intensive bilateral roaming agreements and implementations.

Today many subscribers are denied roaming due to lack of roaming agreements between the serve and home. When a subscriber roams into a market in which provider does not have an agreement, the serve switch rejects their registration. These rejects can be forwarded to a point code for a secondary check where our Roaming Hub will either facilitate post-paid roaming or provide the subscriber with prepaid roaming within the Serve market.

When a subscriber roams into a market that their provider does not have an agreement with the switch rejects their registration. These rejects can be forwarded to a point code for a secondary check where Roaming Hub will first check our Agreement Management to determine if the Home is a member of the TNS Roaming Hub and if they have an agreement through the Hub. If they do not have an agreement or the Home is not in the hub the system will provide a prepaid roaming option. If they do have an agreement the call is validated by the Roaming Hub which monitors the call and creates a call detail record that will be rated and used to produce a receivable position.

# Hub Operation Summary



## Serve Carrier

1. The Serving Carrier shall join the TNS Roaming Hub and provide default wholesale rates.
2. The Serving Carrier shall establish direct connectivity (e.g. VPN or leased line) to the TNS Hub platform.
3. The Serving Carrier shall redirect all IS-41 registration messages for unrecognized or rejected MIN's (Mobile Identification Number) to the TNS Hub Point Code.

## Home Carrier

1. The Home Carrier must join the TNS Roaming Hub and agree to all serving default wholesale rates.
2. The Home Carrier must accept the TNS Roaming Hub as a valid roaming partner.
3. The Home Carrier must provision a VPN between the Roaming Hub and their billing vendor to provide retail billing to their subscribers.

## Agreement Management

1. Serve Carrier default wholesale rates are posted to the TNS Roaming Hub.
2. Serve and Home Carriers agreements are document and with default or negotiated wholesale rates.
3. Agreement conditions are pushed to the Intelligent Message Processor.
4. Agreement conditions and wholesale rates are pushed to the Authorization and Accounting platform for metering and rating calls.

## Call Setup

1. The Serve Carrier rejects a subscriber to the TNS Roaming Hub where the Intelligent Message Processor determines if there is a roaming agreement in place.
  - a. If there is an agreement between Serve and Home Carrier in place the registration is routed to the Authentication and Accounting platform to authenticate, create profile, and begin metering the call.
  - b. If there is no agreement between Home and Serve Carrier then the registration can be rejected or provided with a pre-paid roaming option.

## Metering and Rating

1. The Authentication and Accounting platform authenticates the call based on the Roaming Hub agreement in place.
2. The Authentication and Accounting platform validates the subscriber with the Home Carrier.
3. The Authentication and Accounting platform meters each call by actively monitoring usage via the SS7 (Signaling System 7) network.
4. Once a call has been completed the Authentication and Accounting platform will rate each call and create a call detail record.
5. The Authentication and Accounting platform shall provide a daily feed of call detail records to TNS via VPN connection to the TNS drop box.

## Record Processing

1. Call detail records are processed and converted into a record format the Home Carrier's billing vendor can accept for retail billing of their subscribers.
2. Call detail records are processed to feed reporting and billing.

## Settlement and Billing

1. TNS shall provide online reporting for settlement between Home and Serve Carriers.
2. TNS shall provide the Home with billing for the service.