

AccuROAM

SIP Roaming Server Product Overview



Mobile Convergence Technology



CONNECTING NETWORKS

Roam, Talk and Text (without a Mobile Network)

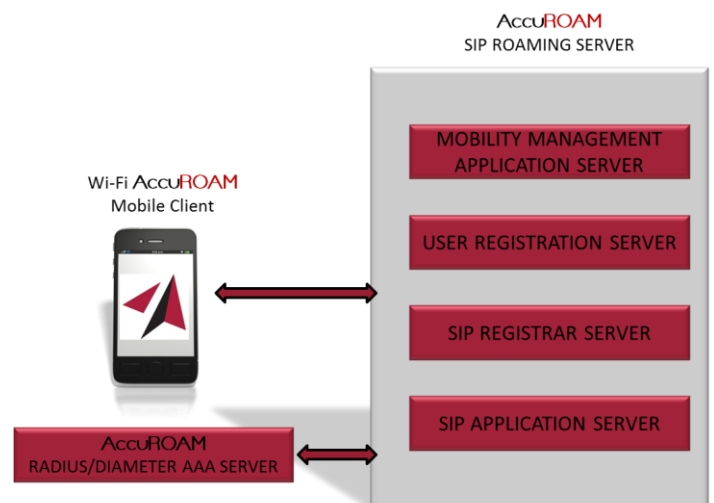
By interworking with existing communications infrastructures, **AccuROAM Session Initiated Protocol (SIP) Roaming Server (SRS)** offers operators and subscribers alike an inventive solution for roaming between GSM/CDMA and (pre/current) Internet Protocol Multimedia Subsystem (IMS) networks. In other words, **AccuROAM SRS** facilitates two-way connectivity between different network types, most popularly mobile and Wi-Fi technologies.

For example, a subscriber travelling outside of a CDMA network in North America can now travel to GSM countries where calls and texts can be made *and* received via a cellular phone number (MSISDN); this type of roaming, talking and texting was not previously possible due to differing radio frequencies, but **AccuROAM** technology enables this convergence by routing voice and messaging over SIP to a Pre-IMS/IMS network. The switch is instant, transparent and seamless.

Another use of this innovative technology is to provide voice and messaging in the absence of mobile coverage, such as in the air, train travel, underground buildings and transportation, rural areas and valleys. Operators may also use **AccuROAM SRS** to fill in network gaps where cellular and/or LTE coverage is not sufficient in terms of capacity, capacity density and Total Cost of Ownership (TCO).

Innately, **AccuROAM SRS** is a mobility manager that acts as a Visitor Location Register (VLR) to locate authenticated and authorised registered subscribers connected to Pre-IMS/IMS. **AccuROAM SRS** uses SIP, a standard used largely for voice and multi-media applications, to transfer all inbound/outbound voice and messaging traffic between the networks.

AccuROAM SRS accesses functions from multiple components in order to enable the delivery of voice and messaging services over SIP: **Mobility Management Application Server, User Registration Server, SIP Proxy and Registrar, SIP Application Server** (encompassing the Voice and Messaging Application Servers), **AAA Server** and **SIP Client**.



Roam with more Freedom

The **AccuROAM Mobility Management Application Server (MMAS)** is a SIP application server providing mobility management functions for subscribers who can connect to both a mobile network and a Pre-IMS/IMS domain. Assuming the service exploits SIP (when the subscriber's IP service is provided by Wi-Fi), the SIP Client can, on behalf of the subscriber, use an appropriate identifier and credential to establish the subscriber for SIP services. When roaming into Wi-Fi coverage, attachment and logging into the Wi-Fi service is automatic. The subscriber 'SIP REGISTERS' with the SIP Registrar in order for **AccuROAM SRS** to determine the location of the subscriber. **AccuROAM SRS** can act as a VLR while that user is connected to the Pre-IMS/IMS network. **AccuROAM** may request current radio status and handset capabilities, while at the same time ensuring the handset and subscriber profile always match.

AccuROAM MMAS maintains the subscriber attach status for both mobile and Pre-IMS/IMS domains. It tracks the locations and status of the cellular subscriber by passively tapping the signalling between the visited and home networks; the Pre-IMS/IMS attach status is maintained by information received from the **AccuROAM AAA** server and **AccuROAM SIP Registrar**. Having the subscriber status available allows **AccuROAM** to decide how and where to deliver voice and messaging services.

SIP Roaming Server (SRS) Components

| | |
|--|--|
| Mobility Management Application Server User Registration Server | Acts as a MSC/VLR/SGSN by communicating with the SIP Client, SIP Registrar and HLR or HSS to establish the location and status of the subscriber; Controls SIM-related registration by issuing a mobile device Digital Certificate for each subscriber (once only); MSISDN, device number, IMSI (if available) and other identity parameters are used for secure signing; |
| SIP Registrar | Binds a SIP Client to a “SIP service location” at SIP Registration time. The SIP Client’s Address of Record is bound with their SIP Contact, upon SIP registration; holds subscriber profile and device details from registration; |
| SIP Application Server | Communicates with the Messaging and Voice Application Servers to enable voice and messaging services over SIP; |
| AAA Server | Checks with operator/end user subscription details and only allows access to Wi-Fi services to which the subscriber is permitted; |
| SIP Client | Communicates with the SIP Registrar using provisioned credentials (from initial registration) to establish a SIP Registration; provides the user interface to make and receive voice and messaging services; |

Stress-Free Registration

There are two types of registration steps, AccuROAM Registration and SIP Registration; AccuROAM Registration is required only once, whereas SIP Registration is completed automatically each time a device connects to a Pre-IMS/IMS network. The registration stays ‘active’ or ‘on’ until the user disconnects the session.

Only Register Once with AccuROAM

Subscribers must complete a once-off, secure AccuROAM subscriber registration via the AccuROAM SIP Client (or other approved SIP Client). The AccuROAM User Registration Server creates a subscriber record, including the IMSI, serial number and other key identifiers, in the AccuROAM SRS database. The subscriber registration also establishes the key credential to use when authenticating that subscriber. Depending on service-provider requirements and device/Wi-Fi network constraints, this may be the subscriber’s SIM, a signed X.509 certificate or other credential. The SIP Client on the device receives an authenticated and authorised subscriber service profile from AccuROAM to perform the next step, SIP registration.

SIP Registration is Automatic & Invisible

Once the SIP Client registers with AccuROAM, it performs a ‘SIP REGISTER’ to let the SIP-enabled network and service know that it is ready to conduct SIP services. Network architectures like IP Multimedia Subsystem (IMS) assume pre-existing Registrar functions, such as the Call Session Control Function (CSCF). The AccuROAM SIP Client is set up to REGISTER with the IMS CSCF. In turn, the IMS Serving-CSCF (S-CSCF) uses service-filtering criteria to direct SIP call-session control information to the AccuROAM SIP Application Server.

If IMS is not available, AccuROAM SRS provides a SIP Registrar function to consume Client SIP REGISTER requests and handle SIP call-session control information from the SIP Client. Non-IMS SIP registration and authentication occurs via the AccuROAM SIP Registrar (or operator-provided SIP Registrar) by sending a message ‘REGISTER’ to the SIP Registrar. The SIP Registrar stores the subscriber profile and address binding in order to locate the user when a call or text is to be routed to/from that user. This location binding remains valid until the SIP Client sends a message that the user is no longer located within the IP domain.

During IMS SIP registration, AccuROAM SRS interworks with the Call Session Control Function (CSCF) and Session Border Control (SBC) Function to provide a SIP-based bridge between IMS and legacy network services. AccuROAM SRS also contains a full suite of support functions such as provisioning, charging and operation & management (O&M).

Add Voice and Messaging into the Freedom Mix

The **AccuROAM SIP Application Server** contains the Voice and Messaging Application Servers for converting SIP and mobile network calls and texts. Subscribers are reachable using their existing mobile number and calls and texts made from the subscriber appear from their mobile number.

The **AccuROAM Messaging Application Server** forms the SMS Gateway functionality that enables SMS to interwork with the SIP-enabled messaging service within the SIP Client. The server converts received SIP messages to GSM (or CDMA) short messages and sends them to the home SMSC for onward delivery. Equally, the server converts received GSM (or CDMA) short messages into SIP messages and sends these to the subscriber connected to Pre-IMS/IMS.

The **AccuROAM Voice Application Server** creates and controls both sides of a SIP/ mobile call (MO and MT) and can perform service functions for the subscriber (such as call forwarding) and also for the operator (such as billing). By mediating received and initiated calls, the server provides complete service between Wi-Fi and mobile, beginning with Voice over IP support and migrating to full Voice Call Continuity (VCC) service implementation, if required.

AAA Security within SIP Registration

With the help of the **AccuROAM AAA Server**, **AccuROAM SRS** can exchange and verify authentication credentials at any time from the SIP Mobile Client under a variety of authentication methods. 3GPP and 3GPP2 standards feature security requirements aimed at safeguarding the network against unauthorised access (for example, subscriber impersonation) and protecting subscriber privacy (such as eavesdropping). During each SIP Registration, **AccuROAM AAA** performs secure subscriber authentication by verifying credentials from the SIP Client before checking with service profiles to grant authorisation for SIP.

The App makes Life Easy

A SIP Client (**AccuROAM** or other third-party provided client) is an essential element for ensuring secure registration and SIP voice and message delivery. The SIP Client can be downloaded onto the mobile device. As part of the download/install procedure during **AccuROAM** registration, **AccuROAM AAA Server** and the **AccuROAM SIP Client** agree the authentication framework and subscriber credential. **AccuROAM** registration is the result of establishing this credential, which is usable in subsequent 'SIP REGISTER' procedures. Where devices support this credential, **AccuROAM** to perform authentication steps, which is based on the subscriber's cellular profile and physical device. When **AccuROAM SRS** and SIP registration have been completed, the SIP Client is used to perform all voice and messaging tasks. The SIP Client is used like the native device system, with access to contacts and the ability to save text interactions.

AccuROAM SRS is useful when...

- No frequency-compatible roaming network access is available (such as CDMA to GSM and vice versa)
- No mobile network access is available (air, train, underground, rurality and valleys)
- 2G/legacy network subscribers wish to avail of IMS services
- Existing mobile 3G/LTE networks cannot meet market demands

While Connected to IP Networks:

- Make and receive calls & texts
- Call forwarding, call waiting, call barring
- Calling Number Identification (CNID) / Caller Line Identification Presentation (CLIP)
- Value added services (such as voice mail)
- Message waiting notification
- SMS extended character set mapping with support for segmentation and concatenation

By interworking with existing communications network infrastructures, AccuROAM SRS offers operators and subscribers an innovative solution for roaming between 3GPP/3GPP2 and data networks.

For the Operator

- Facilitate domestic and international roaming
- Provide GSM/CDMA voice and SMS services via IETF SIP and 3GPP/3GPP2 IMS technology
- Complement existing mobile and LTE networks
- Offer IMS services to 2G subscribers
- Increase global coverage
- Extend mobile subscriptions to IETF SIP and 3GPP/3GPP2 IMS technology
- Benefit from carrier grade performance and scalability
- Provide automatic and secure authentication / authorisation with AccuROAM AAA
- Support any IP capable devices
- Deliver seamless and consistent user experiences
- Use existing AAA
- Wholesale potential (single sign-on/bill)
- Prevent fraudulent intrusion
- Adapt to any WLAN controller
- Control subscriber and service policies, much like on mobile
- Collect data for accounting, billing, clearing and settlement
- Compliant with the IMS and mobile standards (3GPP and 3GPP2)

**Subscribers are reachable
using their existing mobile number ...
and calls and texts made from the subscriber
appear from their mobile number.**

What about Subscribers?

- Keep the same phone number
- Roam, talk & text using data network technology such as Wi-Fi
- Install and register only once
- Sign-on transparently – always automatic connections once device is IP/IMS connected
- Control usage – launch app when roaming is desired
- Call forwarding, call waiting, call barring, caller ID, voice mail
- Message waiting notification
- SMS extended character set supported
- SMS segmentation and concatenation
- Increase global coverage
- Extend footprint while roaming
- Cut roaming costs

About Accuris Networks

Accuris Networks is a leading provider of Wi-Fi Offload and Roaming interworking convergence solutions for data, voice and messaging offload to Tier 1 operators. Accuris Networks produces proven carrier class performance solutions and is an established supplier of competitive, cost effective platforms internationally. Accuris Networks' strengths lie in mobile core integration and the company is a committed contributor to the Wireless Broadband Alliance (WBA) and the GSM Association (GSMA).



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Mobile Wi-Fi convergence technology is merging mobile services with broadband IP communications infrastructure to gain cost-efficient services, uniform service accounts, high volume transactions, faster mobile-service access speeds and value-added services.