Control Roaming and Increase Margins with Intelligent Preferred Network Service
Objectives

Steer roaming in the right direction

The steering-of-roaming service enables home mobile network operators to connect users’ mobile devices to their preferred networks when users roam. This lets operators shape the user roaming experience and price roaming tariffs competitively. Operators also gain advantage in negotiating wholesale rates with roaming partners, helping them meet their revenue commitments.

To enable mobile operators to steer roamers, SAP offers an intelligent preferred network service add-on by Starhome Mach for the SAP® LTE 365 mobile service, Diameter hubbing. This cloud-based service runs on the SAP IPX 365 mobile service. Fully compliant with mobile industry standards, it addresses complex steering use cases that combine access through the full range of GSM network technologies (4G, 3G, 2G) and media (voice, SMS, data).

Benefits

Steer roaming in the right direction

Quick Facts

The intelligent preferred network service add-on enables the home network operator to meet business targets while providing quality of service and a positive roaming experience for its subscribers.
Voice and data roaming revenue is a significant part of a mobile service provider’s business. Understandably, excellent international connectivity is of paramount importance. When traveling, customers must be able to use mobile services as if they were in their home network; visiting users should get the best possible service if operators are to maximize roaming revenue.

The SAP IPX 365 mobile service increases operational efficiencies and reduces interconnect costs for operators, because there is no need to manage a multitude of interconnects on various technologies. One IP connection is all that is required for all interconnection services, providing a seamless roaming experience. With reach to virtually all networks that offer data services, it is one of the most extensive access services on the market.

To manage roaming between LTE networks, the SAP Digital Interconnect group (formerly SAP Mobile Services) provides the SAP IPX 365 mobile service and the Diameter hubbing option in the SAP LTE 365 mobile service. This allows operators to establish a single connection over which they can reach all of their roaming partners. In addition, the service enables an operator to configure the preferred network for its users when they roam so an operator can enforce a preferred outbound roaming policy and better meet its targets.
Gain competitive edge with a steering solution

Steering performed by the intelligent preferred network service is based on signaling. Patented and network based, it can be integrated into the operator’s network as a signaling relay with the home location register (HLR) and the home subscriber server (HSS). It controls the registration process of the visiting location register (VLR) and the mobility management entity (MME). It can relay (accept) update location requests or reject them. Rejection triggers the handset to resume the network selection process.

The service can be integrated into an over-the-air (OTA) function for controlling SIM data. SIM-operated steering can be added to the service, if desired. By probing international signaling, SIM-controlled steering detects roaming events and downloads country-specific public land mobile network (PLMN) lists and other relevant data.

With signaling and SIM-based steering, the service achieves a higher probability in meeting steering objectives. It lowers response times for users and minimizes signaling traffic with the virtual private mobile network (VPMN). See Figure 1 on the next page.

Reliably steer subscribers on any network, using any device, based on signaling and OTA channels.

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Add cloud-based services to IPX network layer protocol

**Gain competitive edge with a steering solution**

Manage LTE traffic

Steer the roaming decision to drive revenue

Configure categories to steer subscribers

Figure 1: How Roaming Is Steered in a 2G or 3G Environment

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SAP® IPX 365 mobile service

Accept? Reject?

Service platform

Roaming signalling over IPX

Roaming signaling

traffic

ISTP

VLR

ISTP

Visited network

Home network

ISTP

HLR = Home location register

IPX = Internetwork packet exchange

ISTP = InterStream transit protocol

SSCP = Signaling Connection Control Part

VLR = Visiting location register
Manage LTE traffic

The intelligent preferred network service steers an outbound subscriber by setting the preferred partner in the device’s SIM PLMN list dynamically according to location, target, access technology, and device. This helps the operator steer devices to meet targets. Operators can also define steering preferences based on a clear differentiation between 2G/3G and LTE partners. For example, a UK mobile operator could be designated as the second preferred partner for 3G roaming but the preferred partner for LTE. And by distinguishing between users registered on 2G/3G and LTE networks, the service provides operators with clear visibility of actual penetration and usage on LTE networks. See Figure 2 on the next page.

STEERING ACCORDING TO NEW STANDARDS

LTE uses the S6a interface to pass data between the mobility management entity and home subscriber server and to relay or reject registration attempts from 4G devices. Two ways of steering on LTE networks are:

- Network based – LTE provides a set of reject causes to force the handset to select another VPMN.
- SIM based – 4G SIMs have 3G- and 4G-preferred network lists. The 3GPP (release 8) uses a SIM-refresh command to update PLMN and forbidden PLMN lists dynamically.

For circuit-switched fallback, the intelligent preferred network service has dual connectivity over SS7 and the IP-based Diameter protocol.
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**Figure 2: How Roaming Is Steered in the LTE Environment**

- **DEA** = Diameter edge agent
- **DRA** = Diameter routing agent
- **HSS** = Home subscriber server
- **MME** = Mobility management entity

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Steer the roaming decision to drive revenue

The intelligent preferred network service delivers tangible business benefits. Traditionally, steering decisions have been managed by roamer distribution, with each roamer given the same weight. But this service lets operators steer roaming based on contribution per roamer, that is, by the traffic each roamer generates.

With this service, the operator can set usage targets and target dates and express priorities in terms of those targets as well as other preferences, for example, percentage of roaming distribution. The operator can activate specific steering profiles in volume-based steering mode or by roamer distribution. Operators can add steering profiles and fine-tune them in order to develop accurate customer profiles that can help achieve business targets. Traffic-based goals are defined in terms of minutes and data usage for “mobile originated” (MO) and “mobile terminated” (MT) calls. The service monitors current usage level using transferred account procedure (TAP) files to steer roamers to help achieve the objectives specified.

The service can prioritize preferred networks for specific users. If voice targets have been reached in one network but not data targets, the service redirects to this network subscribers who generate data, while redirecting other subscribers to networks where voice targets have not been reached.

Add cloud-based services to IPX network layer protocol

Gain competitive edge with a steering solution

Manage LTE traffic

Configure categories to steer subscribers
Configure categories to steer subscribers

The intelligent preferred network service allows an operator to activate or deactivate the OTA channel and the signaling channel for any of the following categories:

- The entire service
- A country or group of countries
- A community
- A community within a country
- Black and white lists
- The International Mobile Station Equipment Identity (IMEI)
- A VLR or MME

The service provides the operator with a comprehensive toolkit for outbound roaming management that includes:

- An intelligent configurable application to achieve revenue or business objectives
- A user-friendly Web-based GUI for provisioning interfaces
- A tool to steer outbound roamers to the mobile network operator’s preferred roaming partners
- Support for generating reports on, for example, online and offline revenue, steering goals, and usage or traffic generated by roamers

Steer subscribers based on the value they generate for your network, not on traffic alone. Set roaming targets based on country, community, and traffic.
Steer subscribers reliably and manage roaming revenue

By steering outbound roamers to preferred roaming partners, the intelligent preferred network service enables operators to control roaming traffic and allocate roaming percentages to preferred roaming partners. A volume-based steering engine continuously monitors and fine-tunes steering of roaming decisions to improve steering results and help meet targets set by the operator. The engine also gives clear snapshots of steering performance.

Because the service is based on various information modules, it can provide operators with data on data clearing, fraud management, invoicing of roaming partners, and repricing. It also provides aggregated data subscriber numbers over a rolling period of 12 months.

With the intelligent preferred network service, operators can:
• Evolve with the market by adding automatic roaming management over the IPX cloud
• Develop and evolve a steering strategy using comprehensive business and network parameters
• Reduce the need for SS7 and LTE rejection to improve the user experience
• Use network resources efficiently with optimized reject methods
• Extend steering irrespective of handset models or devices
• Increase immunity to antisteering of roaming practices
### Summary
As competition in the roaming business environment increases, mobile network operators must adapt their roaming strategy based on an understanding of the entire roaming value chain. They must optimize routes and utilize technologies to connect to preferred networks. The intelligent preferred network service add-on by Starhome Mach for the SAP® LTE 365 mobile service, Diameter hubbing, helps by enabling mobile operators to steer roamers.

### Objectives
- Deliver multiple services and enable a seamless roaming experience over a single connection
- Provide a cloud-based steering-of-roaming service on top of the IPX cloud
- Enable an operator to enforce a preferred outbound roaming policy and meet targets

### Solution
- Connections that steer roaming users to the network preferred by their home network operator
- Management of the most complex steering use cases, allowing the home network to meet business targets while maintaining high-quality service

### Benefits
- Evolve with the market by adding steering-of-roaming features over the IPX cloud
- Provide better user experience by advising subscribers well
- Reduce signaling traffic and use reject methods effectively
- Negotiate roaming agreements better to increase control of traffic and type of traffic

**Learn more**
To learn more about how your business can benefit, visit [www.sap.com/digital-interconnect](http://www.sap.com/digital-interconnect).