RaaS
(RoamingSuite As A Service)

Build and manage relationships with both inbound and outbound roamers effectively and easily in real time

Defne Telekomünikasyon AŞ, headquartered in Istanbul, Turkiye, established in 1996, is a leading global provider of telecom solutions, software products, and services for communications networks. Defne's solutions enable network operators and service providers to monetize every potential connection beyond limits while enhancing the subscriber experience.

Backed up with professional and managed services, Defne offers solutions in call completion, messaging, value added services and roaming business lines of telco industry. Expertise in IN, IVR, and messaging combined with a wealth of skilled resources, allows Defne to provide reliable and scalable solutions that seamlessly integrate with existing customer infrastructure.

DiRoam, established in 2022, is the roaming business line of Defne with the first cloud-based roaming solution deployment for a mobile operator group.

Authors

Derya Kitis
Product Manager
✉ derya.kitis@defne.com.tr

Erhan Ermisoglu
Head of Product Management
✉ erhan.ermisoglu@defne.com.tr

Learn more through the following channels:

🖥 DIRoam.com	🐦 @di_roam	in DIRoam

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Don't pay separate roaming service costs for each member operator, pay it once! DiRoam provides a new Business Opportunity to Telco Groups, thanks to the Multitenancy structure of RaaS, Telco Groups would be able to utilize the platform for all their member operators with no additional cost or effort since the platform promotes centralizing the management and administrating from only a single platform.

The number of foreign travelers is expected to reach 1.8 billion by 2025, according to the World Travel and Tourism Council and roaming expectations will increase as travel statistics continue to rise. As a result, it is more important than ever for Telco Group's to improve their roaming services! RoamingSuite as a Service (RaaS) provides Telco Group's with a next-generation platform built on an extensible, flexible and cloud native architecture that is critical in the quest for member operators to establish and sustain loyal relationships with roamers. With configurable private, public, or hybrid cloud deployments, DiRoam's RaaS is a virtualized, compact, high-capacity, multiprotocol platform that offers improved flexibility and scalability.

DiRoam's RaaS is a great tool for quickly, securely, and effectively serve operators with its 'Steering of Roaming', 'Roaming Messaging Service' and 'Border Roaming Prevention' services.

Steering of Roaming

Steering of Roaming is a framework that allows a mobile operator to manage and distribute the registration traffic of their outbound roamers. To do this, the tenant network can specify roaming steering policies for each network using this module. This functionality enables the platform to choose which network subscribers will utilize while roaming and provides a roaming management solution to optimize roaming cooperation between operators, and it allows flexible network selection management for output roamers.

Border Roaming Prevention

Border Roaming Prevention Service regulates roaming registration in border regions by providing the served operator to prevent their subscribers from connecting to the border nation's operator unintentionally near border areas. Accidental roaming is eliminated simply by treating the networks on the other side of the border as non-preferred networks and filtering roaming requests towards them from users whose previous connections originated from the home network. Utilizing the system prevents unneeded conflicts between network users, enhances customer service, and lowers possible expenses and losses for the Operator's and its subscribers'.

Roaming Messaging (Welcome SMS)

Roaming Messaging Service enables operators to build and manage relationships with both inbound and outbound roamers effectively and easily in real time. Mobile operators can genuinely elevate roamer messaging above the conventional "Welcome SMS" level. An operator can use RS to send "Welcome" and "Good Bye" messages to inbound roamers; "Bon Voyage" and "Welcome Back" messages to outbound roamers, promotional bulk messages to both inbound and outbound roamers or a pre-configured group of roamers, as well as a host of powerful, cutting-edge features to perform advanced messaging-based communication with roamers and open up revenue generation streams that can leverage existing infrastructure within the operator's environment!
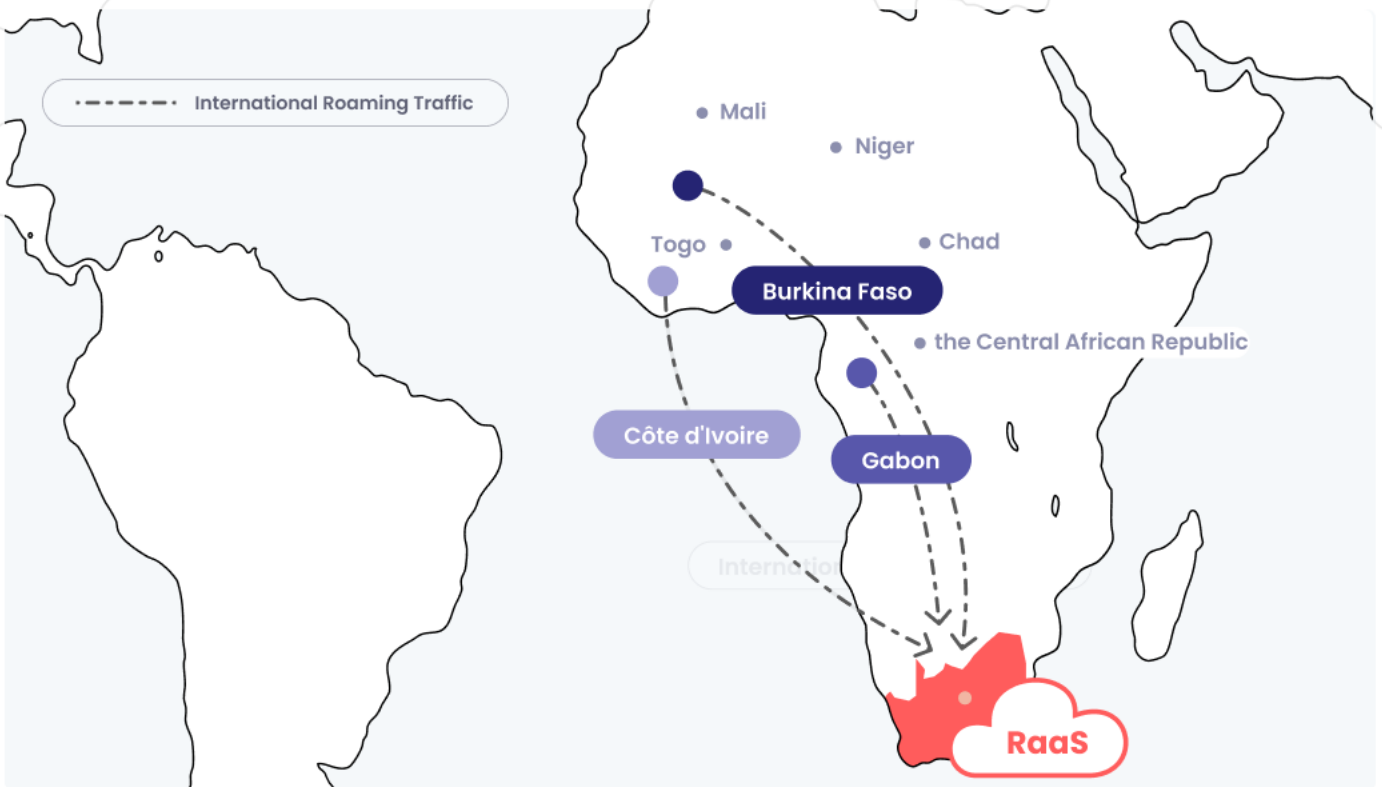
A GROUP TELCO WITH 20 OPERATORS WORLDWIDE CAN REDUCE THEIR OPEX FOR 6M USD IN 5 YEARS

Annual Software License / Support & Maintenance Cost	×5

Salary & Outsourcing Cost	×5

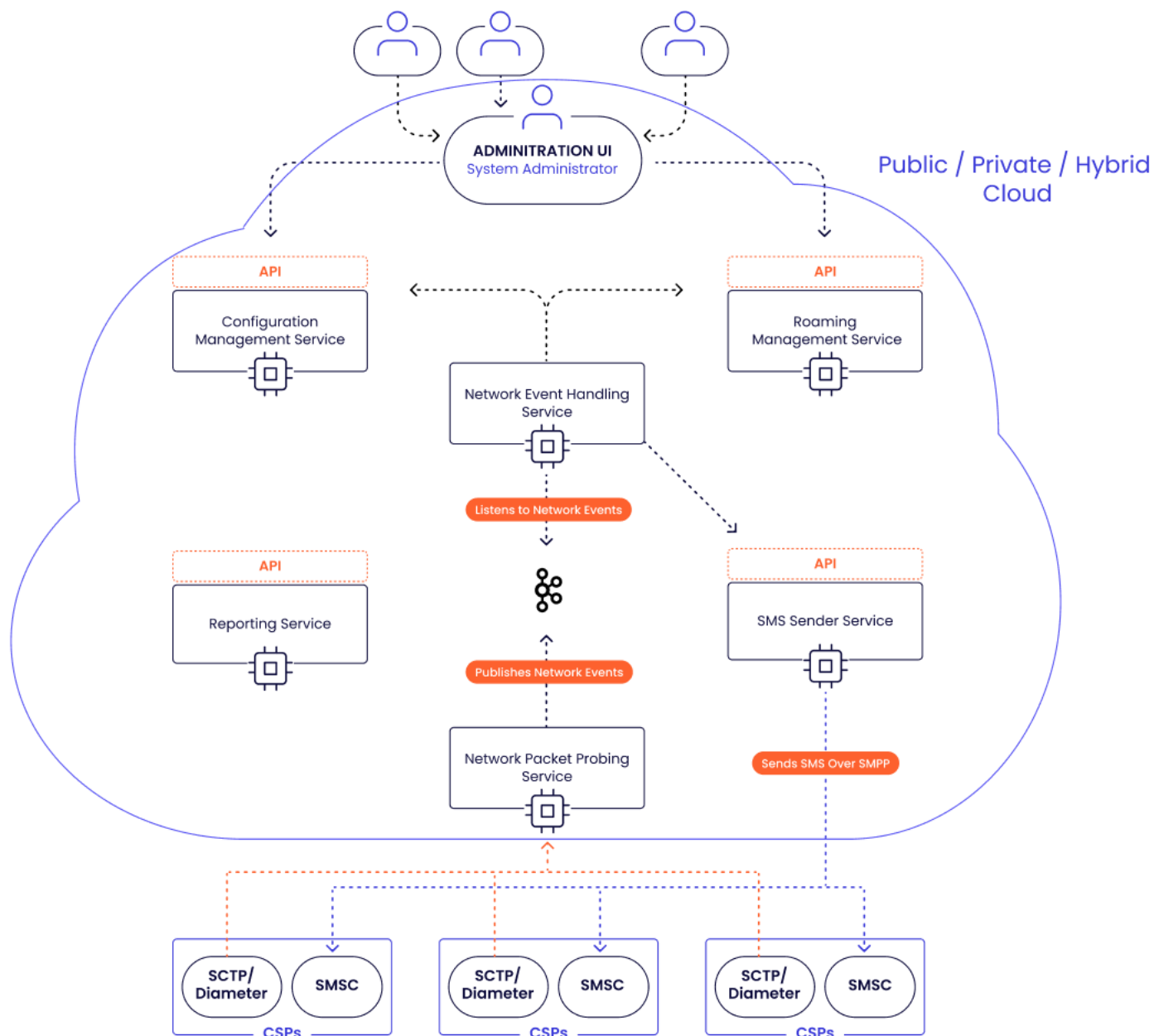| Utility & Facility Cost	×5

TOTAL 6M USD Cost Saving in 5 years !

The multi-tenant and cloud native architecture of RoamingSuite as a Service (RaaS) enables Telco Groups to serve roaming services to their member operators on a single platform over a Public / Private or Hybrid Cloud network. RaaS will be constructed within a data center at one of the member network's location. Other member operators all over the world will have the opportunity of connecting and utilizing RaaS thru VPN. Presently, each member operator pays almost 50K USD as Annual Software License / Support Fees. If a wholesale agreement is made, **RaaS leads Group Telcos to reduce their Annual Software License / Support Fees drastically up to 630K/year USD roughly.**

Since there is at least one Operations & Support engineer responsible for the continuity of Roaming Services at each of the member operators, **a great deal of Salary & Outsorcing cost will be saved** when a single platform is built on only one location and all the configuration and maintenance is undertaken by DiRoam. **The expenditure originated from separate Infrastructure fees for each of the member operators is also eliminated.**

Below is a diagram of RaaS microservices:

ADMINITRATION UI
System Administrator

Public / Private / Hybrid Cloud

API

Configuration Management Service

API

Roaming Management Service

Network Event Handling Service

Listens to Network Events

API

Reporting Service

API

SMS Sender Service

Publishes Network Events

Network Packet Probing Service

Sends SMS Over SMPP

SCTP/ Diameter — SMSC — **CSPs**

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SCTP/ Diameter — SMSC — **CSPs**

Each member of a group operator routes international roaming traffic to the location where RaaS is constructed over Private Cloud. Other member operators can provide the service without the need to host this application separately in their own data centers. Each CSP also has the opportunity of performing its own configuration over RaaS Administration UI.

RaaS proposes some other unique innovative features to improve operational efficiency for Telco Groups at the same time increase their member operators' user experience with better margins.

Multitenant and Cloud Native Architecture

Multitenant and cloud native deployment of RaaS provides the opportunity of managing the roaming services of multiple operators with in a single platform and lowers OPEX drastically.

Cost-Free Welcome messaging

Many MNOs are not aware of sending SMS to inbound roamers are actually cost free, but encounter a bill shock when they send it via a Roaming Hub. RaaS offers an efficient way of sendiing messages to inbound roamers which reduces the operational costs to zero. Currently, inbound messaging is avoided by most of the MNOs due to high costs and the new revenue streams are ignored.

Personalized Messaging thru TMF Open APIs

Through RaaS's TMF open API compliancy nature, operators are now able to generate personalized messages dynamically on run-time containing external information about subscriber's tariff, previous usage, remining data allowence or any subscriber-related information examined with the zone-based conditions on roaming text messages!

Keep Embassy Phone Numbers Up-to-date

RaaS eliminates the obligation of detecting & adjusting variable values used in the roaming messaging texts to keep the service up-to-date to serve a smooth roaming messaging service for operators while reducing operational costs and manual processes.

Geofencing

RaaS allows operators to detect whether subscribers enter to or exit from a predefined area through its Geofencing feature which would provide not only a way to attract roamers for operators but also generate new revenue streams by partnering with businesses where Geofencing provides an effective approach on marketing applications for them.
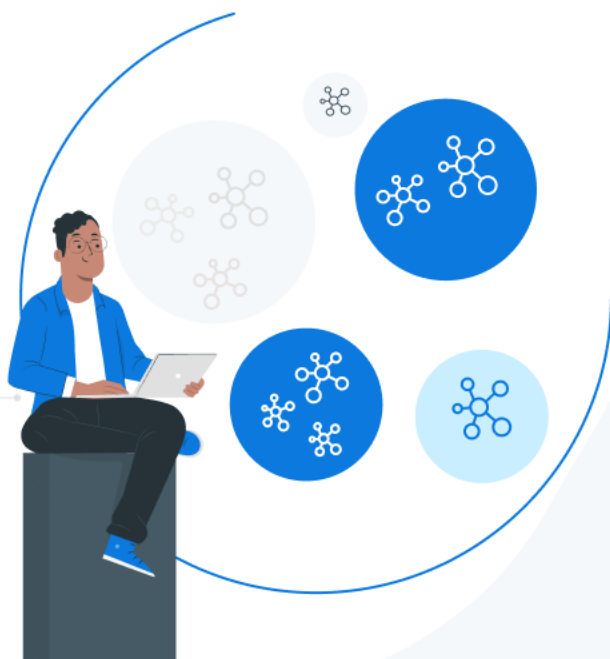
Silent Roamer Detection

RaaS paves the way for operators to detect outbound silent roamers. Accordingly, by offering specialized tariffs to them, operators can turn silent roamers into real roamers back and boost roaming revenues.

| Multitenancy | Effective Targeting with Geofencing | Strengthen Personlized Messaging | Attractive Personalized Packages | Boost Revenue and lower your OpEx! |

DON'T PAY SUPPORT FEES FOR EACH MEMBER MNO. INSTALL RaaS IN A SINGLE DATA CENTER

RaaS supports deployment in a multi-home mode, which is enabling roaming messaging services of all the networks within the network group operator from all around world to be managed from only one platform! The operators in the multitenant structure can have sub-networks within itself, called 'Tenants'.

Easen the Network Group Operators' roaming services !

With RaaS's Multi-tenancy feature, Telco Groups are allowed to combine their roaming services in one base which in turn reveals operational efficiency and minimizes their cost. For example, there are 6 networks within the Telco Group in 5 different countries; Administrator is eligible to operate those operators from a single UI by means of RaaS multitenancy feature.

Multi-tenancy in RaaS is provided by collecting infrastructure, storage and computing resources in the same single cloud network for each Telco Group. Thus, this collection will benefit Group Telcos in the following cases:

- Minimize Operational Costs: Highlighted feature of multi-tenancy is cost-minimizing. CNF deployment and adjusting resources between teams are provided by DiRoam. Moving to SaaS IT solutions reveals considerable amount of cost saving. In our solution cost cutting will be a few hundreds percent. Here is why:
- CapEx obligations for member operators are abolished with RaaS since there is no need to allocate physical or virtual resources for each operator.
- Maintenance and Updates: As a service provider, DIRoam will be responsible for regular maintenance and updates for the cloud services on behalf of the member operators without necessity of allocating dedicated human resources. This will decrease the OpEx and operational workload of organizations.

RaaS

DO NOT PAY ROAMING HUBS FOR SENDING MESSAGES TO INBOUND ROAMERS

ISSUE

Sending SMS via HUB is costly. In addition to this, operators face alphanumeric sender address restrictions. Thus, they need to cope with SMS rejection.

CURRENT STATUS

Currently, most of the operators avoid from sending Welcome SMS to inbound roamers due to high OPEX. Operators miss out an important revenue channel due to lack of more efficient way to send inbound messages.

TECHNICAL DETAILS

As soon as the Foreign operator subscribers are attached to the domestic operator's network, IMSI, and VLR address details are detected by RMaaS. Then MAP Forward SM is sent directly to the VLR. Since the VLR address belongs to the home PLMN, SMS is sent without any interaction with HUB or subscribers' home networks and interconnection costs are eliminated.

SOLUTION

Instead of sending SMS towards inbound roamers via HUB, sending through SIGTRAN node is eligible for operators. Thus, the cost of sending welcome messages is reduced to zero and the alphanumeric sender address restriction is abolished.
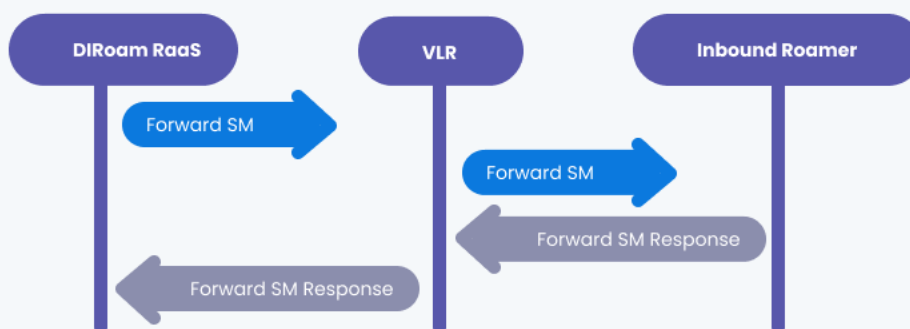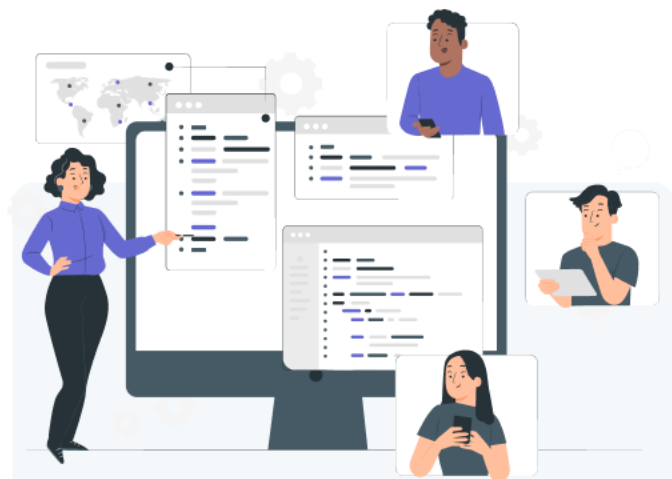
CURRENT SITUATION

```
Other              →        SMSC      ──SMPP──→   Interconnection
Welcome SMS Vendor                                     HUB
```

SUGGESTED SOLUTION

```
                        Forward SM
DIRoam RaaS      ───────────────→       Home Operator VLR
```

DETAY

```
DIRoam RaaS          VLR          Inbound Roamer

  Forward SM →

                  Forward SM →

              ← Forward SM Response

← Forward SM Response
```

RaaS

STRENGTHEN PERSONALIZED MESSAGING THRU TMF OPEN APIs

RaaS offers the ability to generate personalized messages dynamically on run-time containing information about subscriber's tariff, and such allowances like previous usage, remaining usage amount.
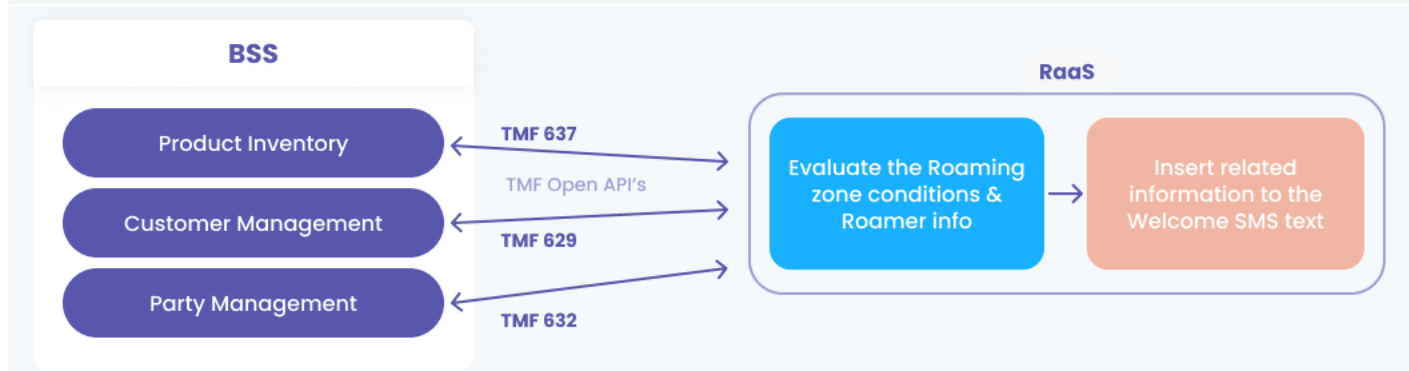
This feature becomes possible by fetching product catalog and customer information data from **BSS via TMF open APIs** and substituting onto related placeholder within the message text.

Operators now have the opportunity of revenue growth and increase efficiency while being able to innovate with roaming services!

To utilize placehorders within the pre-configured dynamic templates in order to create roaming messages, values are substituted dynamically with data from a variety of internal and external sources. Most of the operators are obligated to enter the related parameters as per subscriber according to their tariffs manually to be able to send personalized roaming messages. The difficulty of using dynamic variables on message templates that are applied to the subscriber zones is overcome via BSS integration provided by RMaaS.

As an example: To decide whether the data packet X for subscriber Y is allowed for free or not; tariff plan related information of subscriber Y is extracted from BSS. Comprising the data usage rights with the roaming zone related congigurations; 'Welcome message' with the usage information is sent to the subscriber.
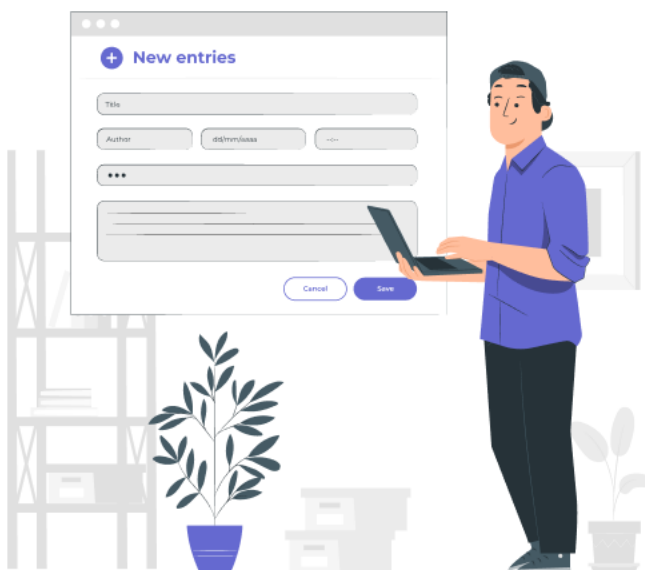
"Welcome to Germany! You can use the data package in your **Postpaid 300 Plan** for up to **30 GB** with the charging details **5 TRY/10 MB.**"

PERSONALIZED MESSAGING

BSS

Product Inventory

TMF 637

TMF Open API's

Customer Management

TMF 629

Party Management

TMF 632

RaaS

Evaluate the Roaming zone conditions & Roamer info

Insert related information to the Welcome SMS text

RaaS

DIROAM UPDATES EMBASSY PHONE NUMBERS USED IN ROAMING MESSAGES FOR YOU!

Pre-configured dynamic templates are used to create Roaming messages. Variables can be flexibly created and configured per countries, per networks, per group of networks or per subscriber groups. Furthermore, placeholders are dynamically substituted with data from a variety of internal and external sources.

1. Most of the operators are obligated to enter the related parameters for each one of the target group to constitute a dynamic structure. **By having RaaS, operators would eliminate the necessity of manual entry of the variable values since DiRoam handles it by itself!**

2. For the internal substituted variables, operators are also obligated to check the regulations and detect possible changes on variable value on any of the entity regularly and adjust them on the platform to make variable values up-to date. **RaaS eliminates this obligation of operators and keep the variable values up-to-date to serve a smooth roaming messaging service for operators.**

As an example: In case the 'Embassy Number' of Portugal is changed, RaaS is updated automatically by DiRoams operations team with the new phone number while served operators are informed.

Here are some examples of the variables constructed within RaaS:
- Emergency phone numbers
- Embassy phone numbers
- Consulate numbers
- Costumer Service Representative phone numbers

ENCOURAGE THE TOURISTS TO BENEFIT FROM PROMOTIONS WHEN THEY ARE CAUGHT IN A PARTICULAR LOCATION.

At the moment an inbound roamer attaches to the network, operator has a chance to get the roamer as a subscriber. Operators should be the one who strikes whilst the iron is hot and turn the roamer into a subscriber!

By specifying the cells serving at the airports and defining the geofenced areas covering these regions, in addition to the regular 'Welcome SMS' to be sent to the inbound subscribers connected to the network, information about the direction of the mobile operator's communication center at the airport or various campaigns specific to inbound roamers can be provided. Messages can be sent as flash (non-permanent) or permanent SMS in different languages depending on the home country of the subscriber.

Sample Text Message:

''Welcome to Antalya. Before you check-in, You should constitute your personal Health Status (HES) Code through 'Life Fits Into Home' mobile application. You can download the app via <link>. To get more information about the legal obligations determined by the Ministry of Health and to get benefited from the advantageous package recommendatitons, which includes the right to use 15 GB for 10 hours, for only 60 TRY, you can stop by <operator_name> Communication Center at Antalya Airport International Lines Exit Number 4.''

Businesses can use the service to detect their potential customers and offer them special campaigns when they get close to the store.

Business will make one's name at the same time gain new customers. Roamers will be eager to benefit from the only store offering a discount specifically for them in a foreign country.

Thanks to this feature, operators can easily reach the roamers located at specific cells which can be used as not only a marketing tactic, but also an informative channel!

For instance; in Nepal, while people are hiking to Mount Everest, a message is sent to them to inform them about weather conditions and alert them about the possible hazards abroad when they get close to the specified cells.

BY OFFERING SPECIALIZED TARIFFS, OPERATOR CAN TURN SILENT ROAMERS INTO REAL ROAMERS BACK AND RAISE ROAMING REVENUES.

Attractive tariff plans which are prepared specifically for silent roamers can be offered to the silent roamers periodically in updated versions with the purpose of gaining those roamers back. Some of the silent roamers will be back to use their home network and operator would be prevented from losing existing subscribers. Silent roamers refer to the roamers with zero ARPU. (average revenue per user)
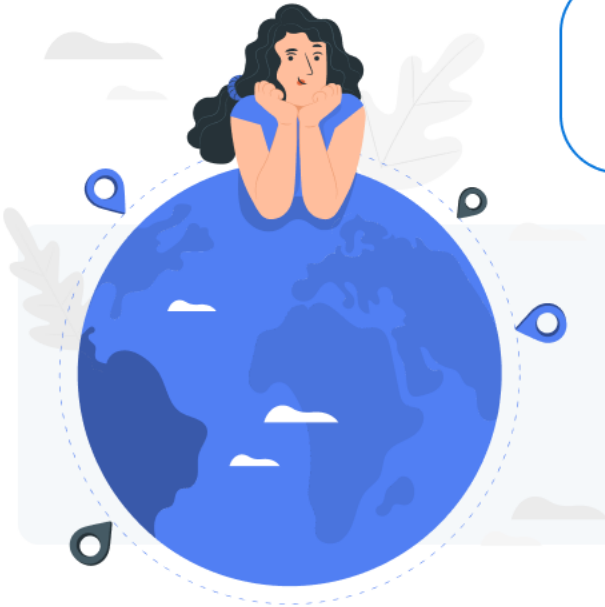
For the silent roamers who prefer to get service from an operator in the roaming country can be detected by no use of their home network at all. These roamers are probably will become permanent roamers and offering them long-term, repeatable packets would be more convenient.

The tariff plan offered to those roamers may remind the roamer how much cheap they would communicate with home network users by using home network other than using a local network in the roaming country.

For the silent roamers who prefer using local free Wi-Fi when got chance rather than get a SIM card from any operator in the roaming country can be detected by very little amount of use of their home network. These subscribers are probably not permanent roamers and will return back to their home country.

So, offering them plans for short term would be more effective than offering permanent plans. The tariff plan should contain an informative part about the disadvantages of connecting only local Wi-Fi sources and the time lost with unsatisfactory services.

+90 212 909 85 85

sales@diroam.com.tr

Maslak Mahallesi, Maslak Meydan Sokak, Spring Giz Plaza,
No:5, Kat:9 Sariyer, ISTANBUL, 34485 Turkiye