LinqUs OTA & DMC for Algar Telecom
Technical Proposal

FINANCIAL SERVICES & RETAIL

ENTERPRISE

PUBLIC SECTOR

TELECOMMUNICATIONS

TRANSPORT

LinqUs OTA & DMC for Algar Telecom – Technical Proposal

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gemalto
security to be free

ABOUT GEMALTO: A WORLD LEADER IN DIGITAL SECURITY

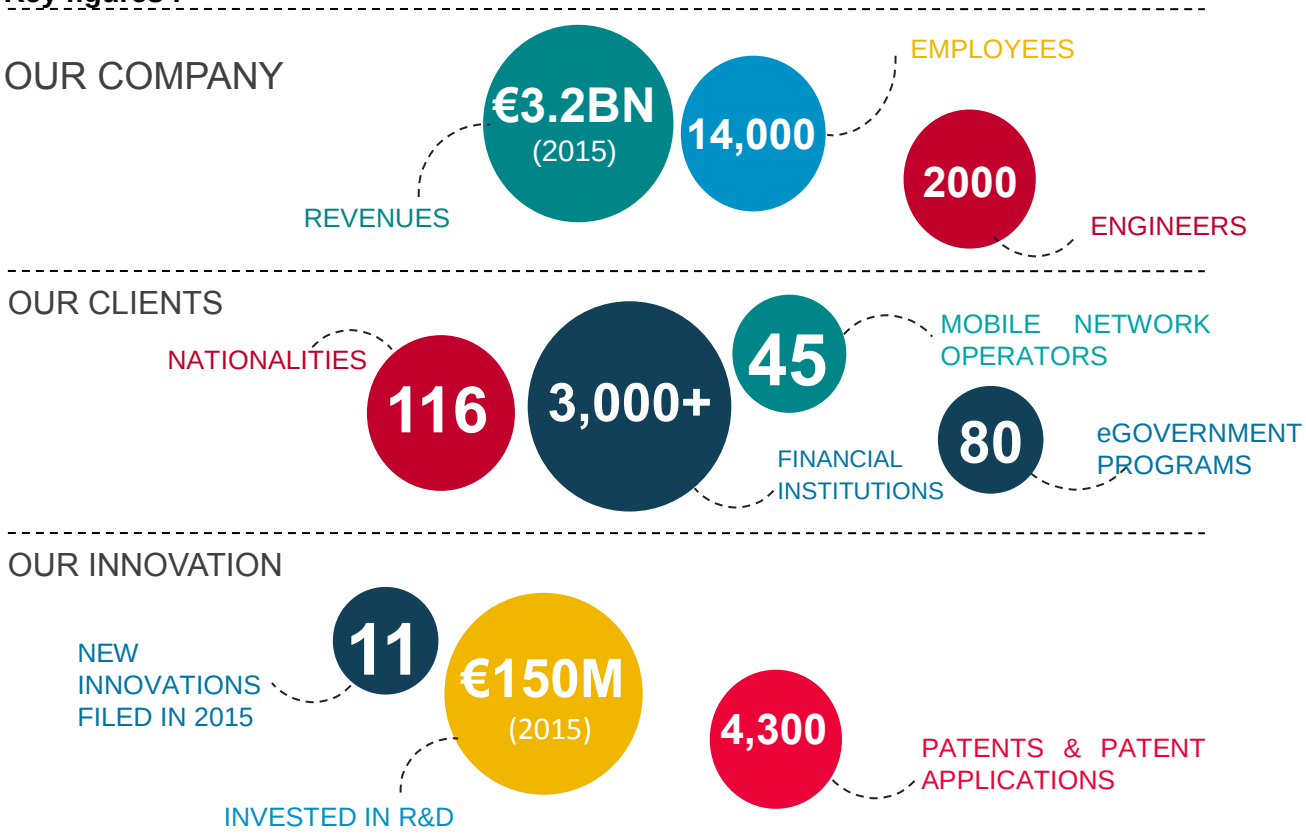
In a world where the digital revolution is increasingly transforming our lives, Gemalto's end-to-end security solutions are designed to make personal digital interactions more convenient, safe and enjoyable.

Our activities range from the development of software applications through the design and production of secure personal devices such as smart cards, SIMs, e-passports and tokens, to the deployment of managed services for our customers.

More than 1 billion people worldwide use our products and services for telecommunications, financial services, e-government, identity and access management, multimedia content, digital rights management, IT security, mass transit and many other applications.

As the use of Gemalto's software and secure devices increases with the number of people interacting in the digital and wireless world, the company is poised to thrive over the coming years.

Key figures :



Gemalto's internationally renowned team of security and cryptography experts leads the way in the design and implementation of new anti-fraud solutions certified to the highest standards. We hold an extensive portfolio of patents and security certifications.

Gemalto's expertise spans the entire process for creating secure personal devices. We buy microprocessors, develop operating systems and software, and produce and personalize objects - of which we have already delivered 10 billions worldwide. We continue to innovate with new forms and architectures, and provide complete solutions for secure, convenient services.

Gemalto is a trusted partner for the individual personalization of millions of secure personal devices daily, certified to the best security level practices. Our issuance and post-issuance services oversee each step in delivering them all the way to the end-user, as well as replacing and upgrading them once in the field.

1. INTRODUCTION

1.1. Context and objectives

As requested by Algar Telecom, Gemalto presents LinqUs Over-The-Air (OTA) platform and Device Management Center (DMC) platform in Hosted Mode (SaaS).

1.2. Document Intellectual Property and confidentiality

2. BENEFITS AND KEY DIFFERENTIATORS

2.1. LinqUs OTA Platform

Gemalto experience

Gemalto has been providing Over-The-Air Management solutions for over **15 year** to more than **230** Mobile Network Operators in 90 countries, either installed at the MNO premises or as a service operated by Gemalto. This unique footprint covers over **2.8 billion subscribers** who are ensured to having the best service because their SIM card can be updated transparently remotely by their MNO.

Our expertise in SMS based OTA platforms is now delivered also on the data and HTTP networks, with the successful launch of **the first full-IP OTA platform at Verizon** on December 5th, 2010. Gemalto has been selected as the LTE vendor of choice for smart cards and related solutions, including OTA services, by more than 20 customers.

SaaS Services main benefits

✓ **EASY, FAST AND SIMPLE ADOPTION**

On new services: SaaS is a key actor to guarantee the right Time To Market due to:

- The simple process required to add these new services.
- The short time needed for installation, re-using the current connection in place.
- The friendly customer portal interface.
- The attractive business model.

Because of that, SaaS brings to customer the simplicity, speed and time to market to deliver revenue generator and/or administrative services in a competitive environment.

On new customers: To add a new customer requires a minimum time due to the simplicity to establish a connection between its network and Gemalto.

On Other services acquisition: Our customers have the rights to search for up and running SaaS services included in the SaaS store, even the services that they did not acquire previously; customers have the rights to know more for the other services (see information, check the demos, contact Gemalto representative for extra information, ask for the installation).

Thanks to all this possibilities, the presales stage could be reduced dramatically and Time to Market came to be a big differentiator.

✓ **PEACE OF MIND**

Establishing two ways to manage the solutions

Autonomy - Empower users to manage their services: Customer manages its business through the customer portal: scheduling, triggering campaigns and activations, making on line status reports. Gemalto is doing support & maintenance.

Gemalto manages the services: Doing the operative and administrative task, including additional services like: local Service Delivery Manager, business and operative reports, Business Intelligence analysis.

✓ **AVOID ANY RISK, COST EFFICIENT & QUALITY –WITH SECURITY**

- On the Business Model; reducing as much as possible the Capex, using a **pay per use model** where our customers can grow according with their business.
- Managing a Try and Buy option, business model that allows the possibility to do a pilot for an specific period of time for a proof of concept. Once this period is finished the customer is able to buy the services.
- On the operation, managing a secure shared environment, quoting only the infra that is needed with the flexibility to go up or down as is required, optimizing the resources.

Service excellence

Gemalto recognizes that Algar Telecom needs to rely on a partner that has a proven track record in providing comprehensive and mission critical solutions for its LTE network deployment. Gemalto is a strategic contributor to our industry and have been the recipient of several awards.

- Winner of 6 LTE Awards Informa Telecoms and Media from 2011 to 2013. Our Latest award being "Best LTe security product" in June 2013.

Multi-bearer operations

Gemalto offers to the customer the possibility to use the available channel depending on his needs and the use cases he would like to perform. The bearer SMS or HTTP could be choosen by the user of the solution when he is requesting to launch a campaign of services for a list of subscribers.

Simplicity

The Advanced OTA solution by Gemalto benefits from the LTE intrinsic advantages of Full IP network management. It is built on **open standards and is fully interoperable**.

Furthermore Gemalto has specifically designed it for easy integration of services & with your network infrastructure thanks to its **API connection**.

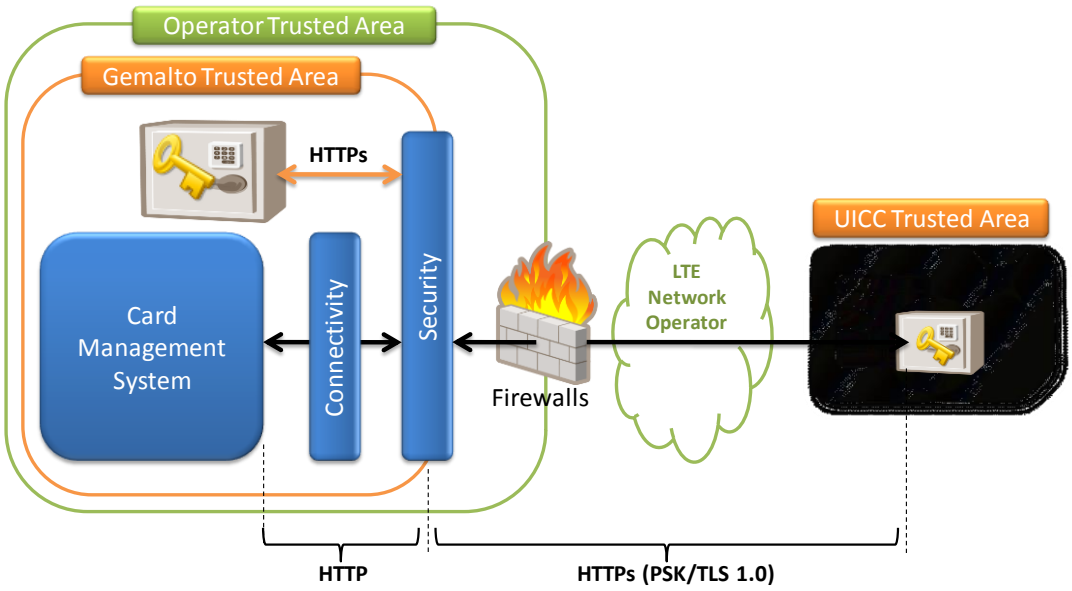
Thanks to the Software as a Service offer, Gemalto provides the peace of mind of a fully transparent solution, providing Algar Telecom with just the service required.

Security

Interface with wireless data networks

LinqUs Advanced OTA communication interface with UICCs implements two interfaces to protect the Card Management System from external attacks:

- An security interface implemented over PSK-TLS 1.0 based on private keys known by both entities, to ensure mutual authentication, integrity and privacy.
- An connectivity interface implemented using SOAP over HTTPs with WSS header that makes available specific services.



Security deployment schema

In short: Why partner with Gemalto?

Gemalto has a high level of expertise in terms of solution delivery and software product support with dedicated R&D team and a Professional Services organization composed of 400 engineers based in different regions worldwide covering all continents.

Our experience in building and managing solutions on behalf of our customers spans over our complete range of solutions and relies on experienced teams throughout geographies.

Further on our training department is there to ensure your professionals get the most from your solution in the shortest time, and represents a reference in the market.

Gemalto remains in a unique financial position amongst vendors in our industry, ensuring that Algar Telecom choice remains that of a solid partner.

2.2. Device Management Center (DMC)

Gemalto DM-Center is a complete solution for automatic device detection, identification, configuration, analysis and network access control.

The industry's largest repository of information on device management capabilities

- A knowledge database identifying **100,000+ devices references** from more than **1,200+ manufacturers**.
- **Regular updates** sent to operators as new handsets references are added (currently at an average rate of **2,500 per year**).
- **High hit ratio observed** with at least **95% identified** subscribers' devices and **78% configured** properly in average (this information is based on a Gemalto internal survey of DM-Center solutions deployed in various networks, therefore shall not be construed as contractual).
- **Extensive coverage of connected devices categories** (basic device, feature phone, smartphone, tablet, dongle, M2M equipment …).

Maximize device coverage with grey market devices

Grey market devices are non legitimate ones (not registered to the GSM Association or cloned), that is to say with unknown characteristics. Gemalto DM-Center is able to detect them in Algar Telecom network and to maximize the odds of correctly configuring them by sending optimized default settings.

The killer-application for customer-care savings …

Gemalto Device Management makes a major contribution to customer care costs savings:

- **Up to 42% savings out of total support costs on configuration issues**
  - Up to 12% savings on automatic handset configuration: by remotely sending new parameters, while taking into account the complexity of the device
  - Up to 15% savings by reducing call duration: avoiding subscriber errors, listing all services on board, and fixing any issue by pushing them
  - Up to 15% savings on self-care support, with no need for any customer care staff involvement
- **Up to 10% savings on management costs for «returned handsets»**

  Handsets returned at the Algar Telecom points of sale are mainly because of a wrong configuration. However, 6 out of 10 handsets are returned without any issue, this raises an opportunity for a Device Management solution. Those costs management can be as high as yearly customer care costs. Gemalto's Device Management solution is aimed at reducing those costs by up to 10% during the first year.

… and for data service adoption rate increase!

Complex but hassle free device configuration happening automatically in the background as soon as the subscriber attaches to the network generates immediate revenue. The "golden hour" during which the subscriber unpacks his/her brand new device is addressed efficiently, hence reducing customer churn.

Launch new services with full knowledge of the devices in the network

The ***Marketing Analysis*** provides Algar Telecom a powerful data mining tool to generate detailed statistics of their subscriber's devices base which is invaluable information prior to new service launch.

A future proof architecture well poised to accompany your growth and evolution

Gemalto DM-Center is designed for mobile operators willing to increase ARPU, promote new services, reduce operational costs and fully control handset lifecycle. Operators need an efficient way to cope with the rapid turnover of mobile phones and to control their subscribers' device in order to allow them to fulfill their mobile experience.

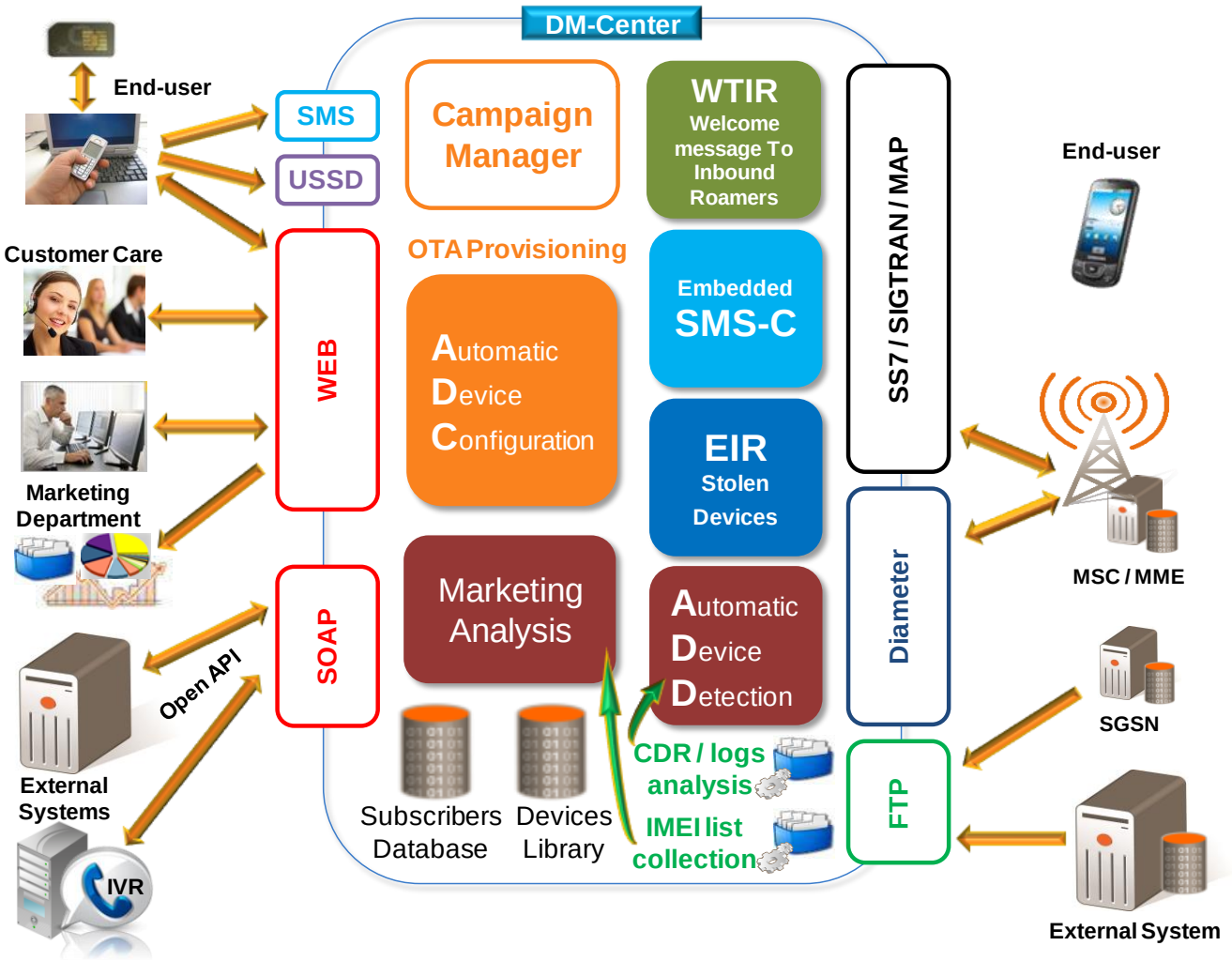


Figure 1 – Overview of the generic Gemalto Device Management platform(*)

(*) Provided for information only, not to be construed as representing the actual scope of the project.

This intelligent and proactive device management and provisioning system supports hundreds of existing phone models as well as new phones. Gemalto DM-Center provides operators a complete set of Device Management features such as parameters provisioning capabilities for GPRS, WAP, MMS, and Email and other settings. These features allow mobile users working with the same data on different devices and to upgrade to a new device without hassling and keeping its data. Gemalto has designed its DM-Center as a component based paradigm.

Automatic Device Detection (ADD): automatically detects user handset changes and trigger the Gemalto DM-Center for configuration sending. Gemalto DM-Detect may also provision MMSC node to activate the MMS service activation for a given subscriber.

Automatic Device Configuration (ADC): this component deals with the configuration of the device settings. After analyzing the device characteristics based on Gemalto DMR outputs, this component initiates over-the-air setting updates, as appropriate.

Advanced Marketing Analysis: this component allows the customer operators to run in depth analysis of their subscribers' handset installed base to then drive targeted marketing campaigns.
Optionally, Gemalto proposes several components that can be added to the Device Management solution as paying options:

Equipment Identity Register (GEMALTO EIR embedded product**)**: Gemalto integrates an embedded EIR into its system to bar access to the network to handsets reported as lost or stolen. Even when not legally mandatory, EIR helps the operators increasing their safety and quality of service on their network and avoiding abuses by stolen or prohibited devices. It also ensure maximum security and enforce SIM/device association for M2M applications.

Short Message Service Centre (GEMALTO SMS-C embedded product**)**: Gemalto integrates an embedded SMS-C into its system to perform the handset device settings sending. This prevents legacy SMS-C overload.

Welcome To Inbound Roamer (**GEMALTO WTIR** embedded product) to send personalized message per home country, network and device capabilities.

A comprehensive suite of Automatic Device Detection channels to choose from

Gemalto DM-Center offers virtually all possible means to automatically detect devices to configure. Selection is made at installation time based on the network and environment constraints. To support the selection of the most appropriate automatic device detection method, their respective benefits and constraints are summarized in the below table.

DETECTION METHOD	BENEFITS	CONSTRAINTS
SIM based detection method		
SIM Toolkit Application sending SMS when inserted into a new device	Allows Automatic Device Detection without the complexity of operator core signaling network integration.	Application must be uploaded on all SIM or STK SIM cards must be distributed to all subscribers. SIM profile and memory size must support the application.
Core network based detection method		
Operator core signaling network integration to intercept enhanced MAP checkIMEI from MSCs or Diameter ECR from MME	3G and 4G network real-time detection method allowing: • accurate reporting of active vs. inactive subscribers • monitoring geographical area network activity Seamless activation of optional features: • Embedded SMS-C • Embedded EIR • Welcome To Inbound Roamers	Integration to operator core signaling network is more complex than SIM application. MSCs must implement enhanced MAP checkIMEI with optional IMSI parameter. MME must implement Diameter S13 interface.
HLR MAP trigger (UDCD)	Reduce DM-Center traffic load as actual device changes already filtered by HLR	Integration to operator core signaling network required. Supported by Ericsson HLRs only.
API based detection method		
HLR UDP trigger	Seamless integration method over VPN. Reduce DM-Center traffic load as actual device changes already filtered by HLR	Supported by NSN and Huawei HLRs only. Require customization for each deployment.
DM-Center trigger web service called from network node (IVR, USSD-GW, CRM …)	Seamless integration method over VPN. Reduce DM-Center traffic load as actual device changes already filtered by node.	Require specific development for integration into the operator network node.

DETECTION METHOD	BENEFITS	CONSTRAINTS
CDRs based detection method		
Triggers built from analysis of CDRs collected on network nodes such as SGSNs	Seamless integration method with automatic logs collection via scheduled SFTP sessions and post-processing scripts.	Slightly delayed operation as the information is not obtained in real-time but several minutes after a call. Require customization to adapt to log format.

Table provided for supporting trigger channel selection only, not to be construed as representing the actual scope of the project.

On-target delivery with Gemalto professional services

To meet our customers' high expectations and to deploy products and solutions rapidly and efficiently, Gemalto has established a dedicated organization named Gemalto Global Service (GGS) with strong expertise and worldwide presence.

- **500+ projects a year** – With an indisputable expertise in telecom solution delivery over decades; Gemalto is the experienced and reliable partner for your business.
- **Certified project managers** and **quality monitoring** – Programs such as CMMI (Capability Maturity Model Integration) and PMI (Project Management Institute) are at the heart of Gemalto project management to always put a priority on the quality of our deliveries and ensure our customers to always have skilled and efficient teams at their side.
- **Blend of experts and professionals at your service** – Gemalto's project team consists in different highly skilled roles and responsibilities such as of project manager but also technical leader, solution architects, developers, integrators and validations teams. This mix of expertise is there to accompany your teams into the best delivery.

Your business is safe in the long run thanks to our support and maintenance services!

It is one thing to deliver on target, but the Gemalto know-how goes beyond this boundary and Gemalto has put as a top priority to accompany its customers with the best in class support and maintenance service:

- **Over 25 support and maintenance locations in the world** – Your solution delivery just took place, it will be looked after wherever your location is!
- **12 years of experience** – The world leader support and maintenance teams have leveraged on 12 years of experience and their know-how is an incomparable asset for your business.
- **Keeping both eyes open on your business at all time** – Gemalto's support and maintenance teams have an important focus on making sure your business is ensured : 24/7 availability, on-line ticketing tool.
- **Best in class service level agreements** – Commitments that Gemalto support and maintenance teams take have been rated as above industry standards for our customers to feel more than on the safe side with our services.
- **Knowledge network powered and dedicated support engineers** – Your business is safe and followed by expert engineers not only on Gemalto's products but also on your specific needs, and your specific constraints. The whole of Gemalto is behind support and maintenance engineers and tools/teams/processes have aligned to rapidly pinpoint and correct any issue that may happen.
- **Training** – With more than 6,000 people trained and more than 10 years of experience, the Gemalto Training Department offers the fastest route to effective operations.

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3. THE OFFER - LINQUS OTA PLATFORM

3.1. Advanced OTA use cases

The LinqUs Advanced OTA solution allows to manage the life cycle of UICC via SMS and HTTP. With Over-The-Air (OTA) management MNOs can handle various business situations such as:

- **Subscription Identity Management** (IMSI, ….) to optimize the operator' data plan and manage dynamically end-users' subscription credentials.
  - Provisioning and possible update of subscriber's network identifier (IMSI)

- **Network Services Management** (SMS-C, SDN, Rebranding,) to increase the efficiency of their operations
  - Segment your quality of services: Assign a specified SMS-C to a specific group of subscribers, update the address of the SMS-C with the SMS-P file update
  - Re-branding: Manage your brand "SPN" changing the Naming of the Operator with an update of the Service Provider Name file content
  - Operator's standard services numbers definition and update (Voice mail, Customer Care, …) in SDN file
  - Roaming Management – basics: Changing the preferred roaming partners list with an update of the PLMN file content

- **Application Management** (Service Menu update, RAM – STK, delete applet, …) :
  - Download and install new information or applets as they become available to stimulate the adoption of end users services and adapt to their ever changing & competing environment without incurring the costs and delays of renewing SIM cards
  - Update of the operator's services menu tree, stored in the card.
  - Remote Applet Management: Download, Activate, De-activate, Delete, Update. As an example, applicable applets can be : SIM backup, Dual-IMSI, etc…or any JavaCard application

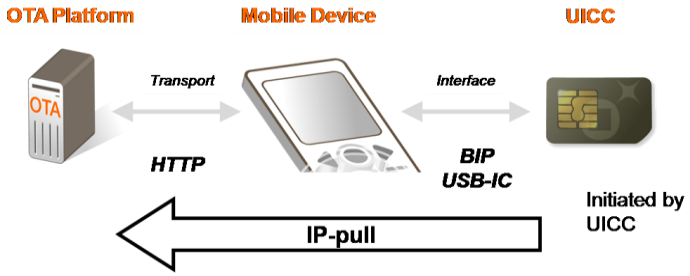
- **Instant subscription activation:**
  - Gemalto's OTA activation solution will help to dynamically provision the UICC when customer care provisions a new subscriber in the LTE network.
  - This solution is based on the latest UICC-OTA technologies designed by Gemalto and standardized by ETSI. During this activation process, the OTA system updates the UICC parameters identified by Algar Telecom including but not limited to the ISIM parameters to activate IMS access.

    This service includes:

    - Subscription creation in LinqUs Advanced OTA
    - UICC HTTP polling at first switch on and its retry policy
    - Set of OTA updates (configurable at subscription creation)
    - NAA refresh and set of activation flag on UICC
    - Notification of completion of the activation process to Customer subscription management system

- **Manage the subscriber's UICCs with Mass Management Pull mode:**

with an important innovation in OTA management by reversing the classical OTA server push model to a pull model, in which the UICC initiates the dialogue, with a polling applet.



Mass management Poll mode means REACH

This OTA Polling applet facilitates the use of OTA updates with a poll method over HTTP, to ensure desired card updates reach 100% of Algar Telecom active subscribers. This requires the subscribers being equipped with a BIP TCP capable device.

LinqUs Advanced OTA relies on a connected mode that significantly reduces the number of problems caused when a mobile device loses its network connection in the middle of an update, and recovers gracefully when it does happen.

Mass management Poll mode means EFFICIENCY

This mass management allows to perform file as well as heavy application management thanks to its ability to download rapidly bigger applications Over The Air using HTTP

- OTA over HTTP requires support of BIP-TCP client by mobile equipment.
- Necessary for NFC applications

- **Manage the subscriber's UICCs using Campaign Manager in Push mode:**

This campaign manager allows to do a remote management file and update some files on UICC card for a set of subscribers in a push mode, this required:

- A VPN connection between Gemalto datacenter and the customer network
- An integration and configuration with the SMSC of the customer

3.2. Services description

The LinqUs Advanced OTA scope of work describes the functional scope of the solution delivered as well as the services scope, the technical scope and the available options.

3.2.1. Advanced OTA SaaS customer set up

3.2.1.1. Definition

Gemalto will host in Gemalto datacenter and maintain the LinqUs Advanced OTA platform and provide Algar Telecom with Advanced OTA SOAP API accessible from Algar Telecom's system to the OTA platform. The deployment will be performed by the Gemalto professional services team. The overall project will be split into 3 phases – configuration, integration, and acceptance.

Configuration Phase
The configuration phase of the UICC OTA deployment will include:
-Delivery of the following documents:UICC OTA Architecture and Call Flows between the production platform and customer system
-Configure the platform to access customer environment and set a VPN connection between Algar Telecom's network and Gemalto's hosted platform.

At the end of this phase, the production platform will be configured and ready for integration services.

Integration Phase:
The integration phase includes setup of the Gemalto services and integration with the Algar Telecom network. The professional services performed in this phase are:

- Provisionning of customer card profile;
- Algar Telecom backend billing/provisioning system integration: Gemalto will provide list of Gemalto OTA SOAP APIs and connectivity information;
- Integration with Customer DNS server (HTTP communication);
- Integration with customer SMSC: Gemalto will configure and integrate 1 SMSC connection following standard protocols: SMS-C compliant with SMPP 3.3 and 3.4;

Acceptance Phase:
The acceptance phase will include the following points:

- Deliver of ATP corresponding to the scope of work submitted and agreed with the customer during pre-sales stage
- The ATP is fully executed by Gemalto engineers to ensure that the services are performing as expected.
- One (1) handset and two (2) live UICCs will be required as part of the ATP phase supplied by the operator. The handset and UICCs will remain in Gemalto's possession for perpetuity of the duration of this contract.

Algar Telecom will accept or reject the deliverable within 10 business days of the Acceptance milestone. Algar Telecom may reject the deliverable only if the deliverable does not substantially comply with the requirements and specifications stated in the ATP. A rejection notice will be effective only if it provides a detailed description of any such failures in a manner sufficient to allow Gemalto to reproduce them. Commercial use of the platform and/or failure to give notice of acceptance or rejection within 10 business days will constitute Acceptance. If Algar Telecom properly rejects the Deliverable, Gemalto will use commercially reasonable efforts to correct the failures properly specified in the rejection notice. Upon Acceptance, Gemalto will have met its obligations and invoice for Platform Acceptance in addition to invoicing for Annual Hosting Fee on a quarterly basis.

ATP document will be sent to customer 15 business days prior to ATP execution. Customer will have 5 business days to review and approve it. Any additional test scenarios to be added to the ATP should be communicated to Gemalto two weeks prior to the ATP execution.

3.2.2. Hosted Services

Once the platform has been fully integrated with the Algar Telecom network and acceptance testing has been successfully completed, the platform will be considered commercially launched and Gemalto will provide the following hosting and operation services:

Hosting and Operation Services include:

- Maintenance Services
- Monitoring Services
- Backup, Archiving and Recovery Services
- HTML Reporting GUI
- SaaS GUI availability to ease inter-action between customer and operating team

3.2.3. Training

To guarantee seamless service delivery Algar Telecom agrees to train its key users in operations accordingly to training scope defined.

Included in this offer is one of the following 1 day workshop according to Algar Telecom *needs :*

Option A : SOAP API Workshop

Option B : OTA overview and campaign management for SaaS GUI

Workshops are available for a group of maximum 8 participants, handouts included at Algar Telecom site.

3.2.4. Provisioning

Once the platform has been commercially launched, the customer will be able to provide batch files in order to provision card instances and profiles. Gemalto team will provision the platform with the given files. The provisioning of card instances batch file is done one time every month.

The card profile has to follow the ESPML format specification document to be delivered by Gemalto. The provisioning of card profile is done on demand by the customer with a pricing defined below in this document.

3.2.5. Activation Services

3.2.5.1. Definition

The SOAP API is designed to be accessed by the operator's subscriber management system to manage day-to-day subscriber life-cycle (MSISDN / IMSI / ICCID association). Performing this integration ensures a good provisioning of the OTA Manager.

The SOAP API allows the following operations:

- Change Card
- Change MSISDN
- Suspend Subscription
- Resume Subscription
- Cancel Subscription
- Assign MSISDN
- GetSubscriptionInformation
- Activate Subscription

Subscription pre-provisioning is performed through batch load .
Usually only the IMSI is provisioned at this stage. MSISDN and IMPU are not yet defined for the subscription.

At a later stage, provisioning and activation are performed through SOAP API between the activation module and Algar Telecom Subscription Management System.

They are performed at the same time using Assign MSISDN command

- provisions subscription identifiers (MSISDN, MIN, IMPU) in Advanced OTA and
- submits OTA commands to be performed when the card contacts the platform at first switch on.

3.2.6. Campaign Services

3.2.6.1. Definition

Upon creation of a campaign request on the Gemalto Advanced OTA Saas interface, with complete elements submission and after validation by Gemalto team, the campain will start within 2 calendar weeks.

Campaigns are defined by a defined set of services to be applied to UICCs. When a campaign could be performed indifferently by a bearer or another, the customer can choose the option to choose the bearer using the OTA SaaS interface. Gemalto will try to use the most appropriate bearer for the campaign.

The list of available services are describerd below:

SMS File update services (Remote File Management)

2G RFM	3G RFM
Update SPN Update PLMN Update SMSP Update LP Update FDN	Update PLMNwAct Update OPLMNwAct Update FPLMN Update SMSP Update SDN

SMS RAM Services

Application audit services
Audit Java Instance Presence Audit Java Package Presence

HTTP File update services (Remote File Management)

USIM Https/TCP LTE with templates	USIM Https/TCP LTE without templates
Update PLMNwAct Update OPLMNwAct Update FPLMNwAct Update SMSP Update HPLMNwAct Update ACC Update UST Update MSPL Update MLPL	Update MSISDN Update ACC Update IMPU

HTTP RAM Services

Https/TCP LTE RAM services with templates
Load file management services
Download application
Download Load File
Delete single load file
Application management services
Create application
Delete application
Lock application
Unlock application

3.2.6.2. Limitations

Custom services will not be supported by SaaS platform.

3.2.7. Reporting

The solution comes along with standard reports, allowing to follow the state of the UICCs and the services rendered

3.3. External components

3.3.1. UICCs profile and security

A set of card libraries implementing secure communication according to 3GPPTS 23.048 with standard javacard SIM and (U)SIM cards is implemented.

Advanced OTA includes a 23.048/03.48 interoperable library, which addresses Java (U)SIM cards from any card vendor, even in case of slight difference between card vendors' implementation. This library is compliant to latest release of the standard, 3GPP TS 31.115 and 31.116 R6 / ETSI TS 102.225 and TS 102.226 R6.

RFM and RAM services have been successfully tested with Java cards from the major actors of SIM market such as G&D, OCS, Sagem-Orga.

In order to achieve secure communication between the (U)SIM card and the OTA platform, cards shall be personalized in order to allow remote operations over the air and specific access rights and cryptographic keys shall be defined before delivering them to subscribers. The characteristics of each card including cryptographic keys are then provisioned in the OTA platform.

UICC for HTTP

The delivery of the solutions requires the end user's UICC to be compliant with Release 8 UICC, Global Platform 2.2 card specifications and RAM over HTTP specifications. The UICC should also be populated with a number of applications to support the HTTP related use cases

- Gemalto Polling applet
- Network Access Applications: USIM, CSIM and ISIM (active or inactive)
- NAA refresh
- Support of OTA / HTTP,
- Device Detection Engine
- DNS resolver

Other UICCs supported include those compatible with the 23.048/03.48 interoperable library, which addresses Java (U)SIM cards from any card vendor, even in case of slight difference between card vendors' implementation. This library is compliant to latest release of the standard, 3GPP TS 31.115 and 31.116 R6 / ETSI TS 102.225 and TS 102.226 R6.

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3.3.2. Integration with Algar Telecom's infrastructure

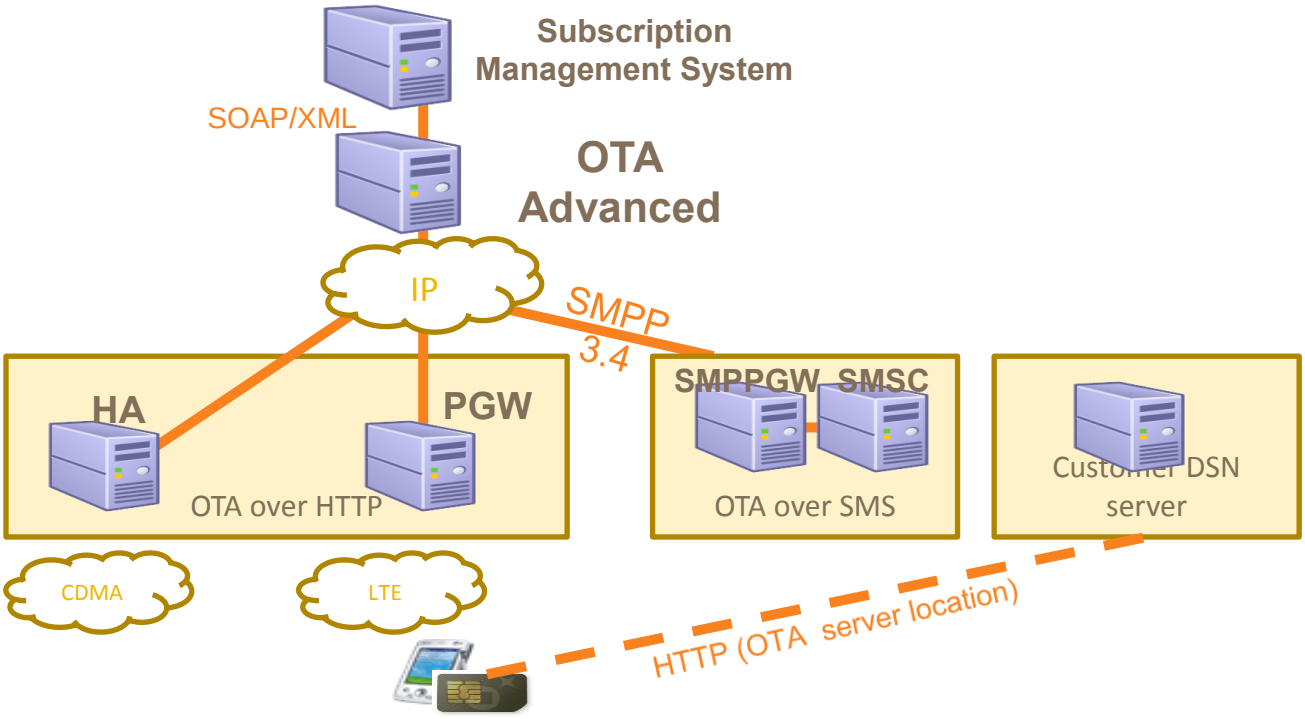
Gemalto *LinqUs OTA Advanced SaaS solution* will be integrated into the Algar Telecom*'s* infrastructure; it is mandatory that Algar Telecom*'s* guarantees this entire infrastructure availability and connectivity during the project setup as well as production phase.

LinqUs OTA Advanced is interfaced with Algar Telecom's following equipments:

- Subscription Management System
- Wireless data network gateways (only for HTTP)
- SMS gateway
- DNS customer's server (only for HTTP)

DNS server (only for HTTP)

The DNS server used is the one of the customer, the customer has to define the FQDN (Fully Qualifed Domain Name)



Pre-Provisioning configuration

Customer name should provide project contacts for integrating with

- Packet Data Gateway integration (only for HTTP)
- SMS-C Integration

And to perform

- Masterkey OTA provision
- Cards, Profile and application initial provisioning

3.4. Out of Scope

Anything that has not been described in this offer is not included, such as but not limited to:

Item	Out of scope details
	Integration with Algar Telecom reporting tools or Data Mining treatments for our logs, monitoring tool, Billing system if any

Project Setup	Migration of current OTA platform of the Algar Telecom to the SaaS AOTA platform offer, this will be part of a separate offer.
	The development of specific features not covered by the product described in this document
	Integration with OSS System: Standard operational and usage logs will be considered at this stage. Gemalto has not quoted the integration of Central Platform Management system such as HP Openview.
	New UICC-initiated scenarios such as “triggered by the user” (menu, change of device, etc.), “network events” (i.e. roaming), or other events different from a timer event.
	Additional card testing from other (U)SIM card vendors with committed support from concerned card manufacturer, this has to be quoted by GGS for any card vendors integration
	Native cards are not in the scope of this project.
	DNS Resolution Hosted services at Gemalto is not in the scope of the project, the DSN used is always the one of the customer.
	Additional handset testing, including new firmware version beyond the initial set up
	Translation of web interfaces from English to any other language
	The development of specific integration other than the ones listed above
	UICC customization or other applet development
	Translation if any for documentation
Services	Development workload or customization of any API’s listed within supplied documentation
	Additional specific training not described in this document. Any GSM or GP standard is not included in the training services, and could be done in a separate offer.
	Advanced handset support update services

3.5. Project plan/milestones and deliverables

Project timeframe will be of 10 weeks with a T0 (starting date) defined and agreed by both parties after Purchase Order reception by Gemalto; this duration is bound to customer responsibilities. Many integration points with the customer environment could be necessary:

1) in case SMS channel is used an integration with SMSC is necessary,
2) for HTTP channel, the DNS customer server is used and need to have some initialization on this server to be done by customer.
3) if provisioning API are used, a VPN connection has to be build between customer environment and gemalto datacenter and an integration with customer server is necessary

3.5.1. Project Schedule/Milestones

Project milestones	**Completion Date**
M1 - PO Received	T0
M2 - Kick-off Meeting done remotely using a conference call	T0+1 week
M3 - AOTA available and provide documentation to Wireless Operator	T0+2 week
M4 – Connection with customer infrastructure (VPN, SMS-C, DNS)	T0+4 weeks
M5 - Preliminary ATP ready	T0+4 weeks
M6 - Integration and Testing Complete	T0+8 weeks

M7 - Pre-Acceptance Testing performed by Gemalto Completed	T0+9 weeks
M8 - Final Acceptance Testing performed by Gemalto and Algar Telecom	T0+10 weeks
M9 - Algar Telecom : Ready to go Live	T0+11 weeks

3.5.2. Algar Telecom Deliverables/Responsibilities

Item		Deliverables from Algar Telecom	Details and comments
1	Access	Connection parameters and permissions	
2	SIM Cards	UICCs	UICC must be available before the OTA IT testing phase.
3	VPN	VPN connectivity	VPN tunnel must be available before the integration phase so the OTA platform can access the Wireless Operator LTE network and SMSC server
4	SMSC	Necessary SMSC parameters to configure the AOTA SMSC driver gateway	At M4 defined in the section above: project milestones, a close integration work has to be done between Algar Telecom SMSC administrator and gemalto project team to connection both server AOTA and SMSC ans insure that it is correctly working.
5	DNS server	Algar Telecom DNS server has to configured with the correct FQDN	For HTTP usage, The DNS servers must be updated and ready before the testing phase
6	Provisioning/Billing system	Provisioning flow through billing system	Subscriber information (ICCID, keys etc.) shall be provisioned by the Algar Telecom backend.
7	Cellular Network	LTE network shall be available for OTA IP testing	LTE network must be available before the OTA IP testing phase
8	Handsets	LTE Devices	Devices needs to be available before the OTA IP testing phase
9	Resources	Project Manager	A single entry point, like a project manager or project coordinator, needs to be identified before the project start
10	Resources	Network Engineers	Resources for network troubleshooting.

3.5.3. Gemalto Deliverables/ Responsibilities

Gemalto will provide the following deliverables:

Item		Deliverables from Gemalto	Details
1	Kick-Off Meeting	Architecture and Call Flows	*All interaction points between Algar Telecom environment and gemalto solution will submitted to the customer to prepare all necessary connectivities.*
2	SOAP-API workshop	SOAP-API Documentation	1 day workshop
3	Validation review	OTA Working in hosting center, ATP	Acceptance Test Plan (ATP)
4	Customer acceptance review	Test Results	Result Test Plan corresponding to the ATP defined.

3.5.4. Scope, Schedule Changes

Any change to the mutually agreed project scope and/or schedule shall be mutually agreed by both parties, and documented via completed, signed Change Order form.

4. THE OFFER –DEVICE MANAGER CENTER (DMC)

This sections lists all the features proposed to Algar Telecom in terms of **baseline** (cannot be unbundled from the offer), **options** and **exclusions**.

4.1. Device Detection

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
RQ-01	**Web Customer Care**	Allow Algar Telecom's Help Desk agents to efficiently support subscribers, thanks to an intuitive web based interface, to: • display their current device model and characteristics • list history of their devices and configurations • display manual configuration instructions • request new settings on their devices	**B**
RQ-05	**Web Self Care**	Allow the subscriber to manually request its device configuration from a web browser. It can be integrated to the Algar Telecom's corporate web portal via an <iframe> element. The security is provided via a onetime PIN code previously sent by DM-Center in a SMS that the end-user must enter prior to be granted access to the self-care web pages. Web Self Care will support Portuguese language.	**O**
RQ-07	**SMS Self Care**	Allow the subscriber to manually request its device configuration by sending to the Algar Telecom's assigned short code a SMS … • … either empty: all provisioned configurations are sent back to the subscriber (can be configured with 1 char only to be considered as "empty" to support devices not accepting completely empty SMS) • … or containing a keyword (e.g. "WAP", "MMS", "STREAMING", "ALL" …) to specify the requested configuration type. Alias keywords can be configured to customize the feature to the ALGAR TELECOM's needs • … or containing "Yes/No" to support opt in mode of automatic detection and configuration The device model being automatically detected, DM-Detect component is a mandatory prerequisite to this feature (either MAP checkIMEI, or Diameter ECR, or HLR trigger, or SIM tracking applet).	**B**
RQ-20	**SIM applet trigger**	An automatic detection mechanisms implemented by G&D TSD Wiblet on wib cards applet easily installed on Algar Telecom's SIM cards sends a binary SMS to DM-Center when the SIM is inserted into a new device. The support of G&D TSD Wiblet on wib cards can be added by customization based on Algar Telecom's specification (see **CU-20**).	**B**

4.2. Device Identification

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
ID-01	**Device Library**	The Device Library stores 100,000+ devices references from 1,200+ manufacturers with 500+ attributes: • Brand and model • Device category (smartphone, tablet …) • OS name • Network type (3G, LTE) • Frequency bands • Device OTA support • WAP support and version • MMS support • NFC support • Screen size and resolution • Audio type • Video streaming • … etc. The library content is used to automatically identify and configure the device. It is also used to display device characteristics at the web interface, to analyze the Algar Telecom' device base and to export target lists of subscribers filtered as per selected characteristics. To allow Algar Telecom benefits from newly introduced devices, the device library is updated at regular intervals directly by Gemalto Support without Algar Telecom involvement required. The update frequency depends on the maintenance contract, selected by Algar Telecom.	**B**
ID-02	**Manual configuration guidelines**	Increase data service usage for devices not supporting device OTA settings, by providing manual instructions to guide end-users configuring data services on their device. Manual guidelines are displayed at the Customer Care and End-User Self Care web interfaces. They are selected based on the subscriber device model and in English only. End-users can then follow the instructions to configure data services, either themselves or under Customer Care guidance. New manual guidelines are made available upon library update.	**B**

4.3. Device Configurations

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
CF-01	**Device OTA protocols**	DM-Center selects the device OTA protocol supported by the device from its knowledge database and builds settings specific to each device brand, model and supported capabilities. Supported device Over The Air (OTA) protocols: • OMA-CP 1.0, 1.1 • Nokia/Ericsson OTA protocols 4.5 to 7.1 • Nokia Smart Messaging 3.0	**B**
CF-02	**Core data services settings 2G/3G based**	Configuration of core data services over GPRS/EDGE/HSDPA bearer: • WAP • WEB • MMS The WAP and WEB settings sending rule is configurable to optimize the actual settings sent depending on the WAP version supported by the device. Both WAP and WEB settings are not sent. Instead, for devices supporting WAPv1, WAP setting is sent whereas for devices supporting WAPv2, WEB setting is sent.	**B**
CF-03	**Core data services settings WLAN based**	Configuration of core data services over Wireless LAN (Wi-Fi) bearer: • WAP • WEB • MMS The WAP and WEB settings sending rule is configurable to optimize the actual settings sent depending on the WAP version supported by the device. Both WAP and WEB settings are not sent. Instead, for devices supporting WAPv1, WAP setting is sent whereas for devices supporting WAPv2, WEB setting is sent.	**B**
CF-09	**iOS configuration**	Support dynamic generation of customized iOS profiles deposited on an iOS configuration server and which URL is sent to the device in a text SMS and clickable to trigger its download. Once downloaded on the device this iOS profile configures the data services and, if option configured, is removed from the iOS configurations server (optionally, removal can also occur if not downloaded after a configurable period of time). Configurable data services are: Email settings for incoming, outgoing mail servers and user account Note that Apple prohibits device OTA configuration of MMS. MMS configuration is allowed via USB only. Download requires mandatory access to data network therefore this process does not replace the very first device activation that is exclusively handled by Apple on its activation servers.	**O**
CF-10	**Single Shot Provisioning**	Enhance the end-user experience by concatenating several device OTA settings into a single long SMS for devices supporting this feature. This is the default behavior when DM-Center identifies a device supporting this feature. When not supported by the device, each setting is sent within a separate SMS (multi shot provisioning).	**B**

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
CF-11	**IMSI signing**	Enhance the end-user experience when IMSI is known and IMSI signing is supported by the device: DM-Center signs the settings with the end-user IMSI allowing their authentication by the device without requesting the end-user to enter a PIN code. In case IMSI signing is not supported by the device, DM-Center signs the settings with a randomly generated user PIN, sent in the pre-configuration SMS to the end-user who will need to enter it to apply the received settings. DM-Center has 3 configurable security modes, automatic being the default one: • automatic — 1 single security mode is used, IMSI signing or user PIN, depending on the device support • manual — user PIN always used even if the device supports IMSI signing • dual — IMSI signing and user PIN are simultaneously used when the device supports IMSI signing Note: a device not supporting IMSI signing results in user PIN being used in the above 3 security modes.	**B**
CF-12	**Re-configuration on expiry date**	Eliminates the risks of configuration obsolescence by forcing a device reconfiguration even if no change is detected. The device configuration is refreshed at regular configurable intervals upon network event reception. By the same token allows a progressive reconfiguration of devices whose end-users have factory reset or wrongly configured or if their devices had been configured on another operator network at one point in time. Available only with the DM-Detect component and MAP checkIMEI or Diameter ECR trigger.	**B**
CF-13	**Device swap control**	Prevent repeating unnecessary settings sending when the end-user changes from device A to device B, then reverts to device A. No configurations are sent to device A in this case. The activation of a dedicated history module is mandatory to track the last N identified devices (N is configurable but recommended not to go beyond 5 due to the heavy load generated on the platform when activated).	**B**
CF-14	**Progressive launch mode**	Avoid clogging Algar Telecom's network at launch of Gemalto DM-Center by controlling the percentage of configurations sent upon reception of automatic triggers, still storing all attaching subscribers' devices for comprehensive reporting.	**B**
CF-15	**Shared devices**	Prevent repeating sending settings to the same device within a configurable period duration (default 90 days) when the device is repeatedly detected as associated to different MSISDNs/IMSIs because shared between different end-users. Note: a period duration configured to zero days means that, as soon as configured once, a device will never be reconfigured.	**B**
CF-16	**Preconfigured devices**	Permanently block sending settings to a list of pre-provisioned devices as already preconfigured by the manufacturer upon Algar Telecom's request.	**B**
CF-30	**Welcome SMS**	Increase the odds of a successful configuration by informing the end-user of forthcoming settings SMS. The welcome SMS is followed by device OTA configurations SMS and provides instructions on how to apply them on the device. The welcome SMS can be configured to be either sent in the subscriber preferred language or repeated in multiple languages. Either feature **Error! Reference source not found.** or feature **Error! Reference source not found.** is compulsory to activate the preferred language option.	**B**

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
CF-31	**Post configuration SMS**	Improve the end-user experience by sending a text SMS with configuration related information. This post configuration SMS immediately follows the last device OTA settings SMS. The post configuration SMS is global to the whole DM-Center platform therefore is the same for all subscribers, independent of their profile and preferred language.	**B**
CF-40	**Grey market devices**	Increase data usage and associated revenue by identifying illegal devices (i.e. not registered to-GSM Association) and attempting configuring them with generic default settings to optimize the odds of properly configuring those devices.	**B**
CF-60	**Mass campaign manager**	Support marketing operations with Over-The-Air devices configuration campaigns for a group of subscribers previously targeted by their device characteristics. End-user experience is protected by scheduling campaigns at specific days of the week and time of the day to minimize end-user annoyance (night hours and week-end are avoided). One campaign is active at a time and applies the first configured settings of each selected type. Once complete, the campaign is marked as inactive and will remain visible as such in DMC to keep history. Campaigns are provisioned with lists of up to 40K MSISDN that can be imported from an external system or generated by the DM-Center export subscribers function (see **AN-02**).	**B**

4.4. Configurations Delivery

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
SN-01	**Legacy SMS-C interface**	Interface with Algar Telecom's SMS Centre to send device OTA settings SMS with the following features: • Support of SMPP versions 3.3 and 3.4 • Configure connections either unidirectional (dedicated to receiving self care SMS or sending device OTA SMS) or multidirectional • Support of SMS distribution over 2 SMPP links per SMSC (2 SMSC maximum)	**B**
SN-02	**Embedded SMS-C**	Each device OTA configuration requires 2 to 3 SMS to transport the OMA-CP commands to provision the device. A complete configuration set can require 10 SMS or more for WAP, WE, pre-configuration message … This module allows DM-Center not to rely on Algar Telecom's SMS Centre to achieve sufficient throughput and to efficiently provision a large subscriber's base. With Gemalto's embedded SMS Centre, the configuration SMS sent by DM-Center no longer load Algar Telecom's SMS Centre. The provisioning operations are performed faster without impacting the legacy SMS traffic.	**O**

4.5. Subscribers Interactions

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
SB-10	**Information SMS**	Take the opportunity of new subscribers being detected or existing subscribers changing their devices to send them an information message. The same information SMS is sent to all subscribers, whether they have an OTA device or a non-OTA or non-data device. The information SMS is sent in the subscriber preferred language (mandatory subscriber profiling option required). In the absence of a provisioned subscriber preferred language, one default language is selected.	**O**

4.6. Device Analysis

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
AN-01	**Marketing Analysis**	Provides data mining tools to generate detailed statistics about the devices installed base and their capabilities: • Distribution of brands and models in the network • Device categories (smartphone, tablet …) • OS names • Network type (2G, 3G, LTE) • Frequency bands • WAP and WAP display category • MMS support • Instant-messaging support • Push to talk support • SyncML support (Backup & Restore) • Client Provisioning and Device Management support • Java support and version • Adaptive multi-rate codec • Audio and ringtone support • Video and streaming support • Display characteristics (monochrome/color, number of colors, width, height) • Integrated camera • Picture format support	**B**
AN-02	**Export subscribers**	Allow extracting subscriber from DM-Center database according to specific filtering criteria (brand, model, device category, OS name, device OTA support, WAP, MMS, 3G, LTE …). Exported file format is CSV containing a configurable list of fields (MSISDN, IMSI, IMEI, brand, model, device category, OS name …). In addition to be manually requested via DM-Center user interface, this feature can be automated to generate reports at regular intervals (see **CU-A0**).	**B**

4.7. Application Programming Interfaces

This section describes all web services provided by Gemalto DM-Center and that can be called by Algar Telecom's nodes.

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
AP-01	**Request settings**	Web service to query DM-Center with either MSISDN or IMSI to send selected settings to the device subscriber.	**B**
AP-02	**IMEI retrieval**	Web service to query DM-Center with either MSISDN or IMSI and retrieve the IMEI of a device associated to the subscriber.	**B**
AP-03	**Device OTA capability retrieval**	Web service to query DM-Center with either MSISDN or IMSI to retrieve the device associated to the subscriber with the associated device OTA configurability status.	**B**
AP-04	**UAProf location retrieval**	Web service to query DM-Center with either MSISDN or IMSI to retrieve the device associated to the subscriber with the manufacturer User Agent Profile URL.	**B**
AP-06	**Triplet history retrieval**	Web service to recover changes history data for one triplet (IMEI, IMSI and MSISDN). This web service can be queried for any one of the triplet components (IMEI, IMSI and MSISDN) or 2 or 3 of them. DM-Center will return the change events history stored in its database, including timestamp and event localization information (MSC GT).	**B**
AP-07	**MSISDN retrieval**	Web service to query DM-Center with IMSI to retrieve the MSISDN.	**B**

4.8. Operations, Administration & Maintenance

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
OM-01	**Accounts Management**	Web based DM-Center OA&M utilities are easily integrated with Algar Telecom's corporate Intranet to allow: • Creating DM-Center administrator accounts (or EIR and DM-Insights if deployed in stand-alone) • Granting DM-Center, EIR, DM-Detect and DM-Insights functions access rights to administrator accounts Best user experience is guaranteed with web browsers Internet Explorer (version 9 minimum) and Firefox (version 10 minimum).	**B**
OM-02	**Settings Administration**	Configure device OTA settings parameters such as APN and prepare different variants of such settings to be further associated to subscriber profiles.	**B**
OM-03	**Profiles Administration**	Define profiling rules to differentiate categories of subscribers and assign each category specific device OTA settings amongst the ones previously prepared. Profiles subscribers categories rules that can be configured are: • List of MSISDN or IMSI • Ranges of MSISDN or IMSI, defined by prefixes • Device model • SPN (Subscriber Profile Name). Available only when HLR trigger is selected as SPN is conveyed only within MAP UDCD. Devices configuration blacklisting rules can be defined for a given category of subscribers by assigning no device OTA settings at all. Profile criteria rules can be imported by customized scripts (see **CU-M3**).	**B**
OM-04	**Subscribers Management**	Web based DM-Center OA&M utilities to: • List all subscribers provisioned in DM-Center • Display the subscriber's current device and its characteristics • Display devices and configurations history • Display device OTA configurations delivery status • Register a subscriber to device OTA settings black list MSISDN prefix is pre-filled in as per MNO numbering plan. MNO numbering plan size is validated.	**B**
OM-05	**Import subscribers**	Bulk provisioning of a CSV list of subscribers in Gemalto DM-Center database to support migration from former Device Management solutions. A CSV template can be downloaded to provide format guidelines.	**B**
OM-06	**Device Library change request**	Request addition of new device or modification of existing device in the library (require mail service to be configured in DM-Center).	**B**
OM-20	**Device Configuration statistics**	Provides daily, monthly and customizable date range statistics: • Rate of device configuration requests received, device OTA configurations sent, SMS sent … • Distribution of settings kinds (WAP, MMSC …), request origins (customer care, end-user SMS self care, DM-Detect SS7 and Diameter …) Various specific reports can be configured (see **CU-MA**).	**B**

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
OM-21	**Device Management monitoring**	Near real-time display of the last hour and the last 24 hour traffic (with 10 minutes delay): • MSC counters of the traffic exchanged with ALGAR TELECOM's network MSCs (MAP checkIMEI received, errors …) • User counters for the traffic forwarded to the DM-Detect component (local subscribers, visiting subscribers …) • EIR counters of the traffic with the legacy ALGAR TELECOM's EIR (MAP checkIMEI forwarded, errors …)	**B**
OM-22	**EIR monitoring**	Display traffic in near real-time (with 10 minutes delay): • IMEI blocked (not compliant to GSMA, detected as black …)	**B**
OM-23	**Platform monitoring**	Display platform resources usage in near real-time (with 10 minutes delay): • Platform resources utilization rate (CPU, RAM, Storage …)	**B**
OM-24	**Subscribers license monitoring**	Allow anticipating needs for capacity upgrades by monitoring the current DM-Center licensing elements consumption.	**B**
OM-25	**Alarms & supervision**	Ease of supervision is provided by alarms conveyed either as SNMP traps (SNMP option must be installed) or as email (email service must be configured). Alarms are generated when significant events occur (platform health risk, service degradation, EIR grey list entry hit …).	**B**

4.9. Algar Telecom's Network Integration

This section details all integration points with Algar Telecom's network and describes specific features developed upon Algar Telecom's specifications.

REFERENCE	FEATURE	DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
CU-06	**WEB Self Care localization**	See **RQ-05**. Translation of the self-care interface to one Algar Telecom's language.	**B**
CU-20	**SIM applet trigger customization**	See **RQ-20**. Customization based on Algar Telecom's specification of the decoding of the unencrypted binary SMS received from a G&D TSD wiblet on a WIB SIM card.	**O**
CU-30	**Enhanced MAP checkIMEI customization**	Customization of the enhanced MAP checkIMEI format for a MSC vendor variant not supported yet.	**E**
CU-31	**HLR MAP trigger customization**	Live tests will be conducted once platform is deployed to determine if decoder adjustments are necessary to be done. Depending on the observed HLR SW version, customization of the DM-Detect MAP UDCD decoder may be required therefore necessary effort is provisioned.	**E**
CU-40	**HLR UDP trigger customization**	Customization based on Algar Telecom's's specification of configuration requests format received from one Algar Telecom's's network node.	**E**
CU-41	**Web service trigger customization**	Customization based on Algar Telecom's's specifications of DM-Center web services, XML/SOAP based, to trigger configurations sending request from Algar Telecom's's network nodes.	**E**
CU-A0	**Export subscribers configuration**	See **AN-02**. Allows extracting subscriber from Gemalto DM-Center database according to specific filtering criteria (brand, model, device category, OS name, device OTA support, WAP, MMS, 3G, LTE ...). Exported file format is CSV containing a configurable list of fields (MSISDN, IMSI, IMEI, brand, model, device category, OS name ...).	**B**
CU-C1	**Nationwide EIR connector customization**	Customization of the nationwide EIR connector.	**E**
CU-M3	**Profile Management Provisioning customization**	See **OM-03**. Customization of profile criteria rules bulk import scripts.	**E**
CU-MA	**Device Management reporting customization**	See **OM-20**. Customization and configuration of reports specific to Algar Telecom's.	**E**

4.10. Platform architecture

The Gemalto platform architecture is organized in 4 layers:

- **Signaling Layer** where Front End Processors (FEP) nodes represent the entry point for communications with core network modes and devices. Dispatch network triggers events to the

Back-End Processors. Send configuration SMS directly to the devices when the embedded SMS-C option is installed

- **Application Layer** where Back End Processors (BEP) nodes process the DM-Center business and service logic workflow
- **Database Layer** where SQL nodes run the engine to access DM-Center databases
- **DMZ Layer** is an optional layer where web nodes process Internet queries beyond a firewall protecting DM-Center from penetration attempts. If option not selected, the Internet queries are then processed from the Application Layer where the web processes are therefore hosted.

The rationale of the architecture is to provide High Availability solution without any SPOF (Single Point of Failure) with duplication of nodes running in each layer. The module split across several clusters of servers will allow having an upgradeable platform with respect to new features implantation and increased number of subscribers.
A LAN private to the Gemalto platform ensure communication between layers as well as synchronization between replicated nodes within each layer. This LAN is gigabit Ethernet based and built with replicated level 2 switches.
Gemalto configurations embed a database engine and integrate third-party software products for providing network signaling, management and backup operations.

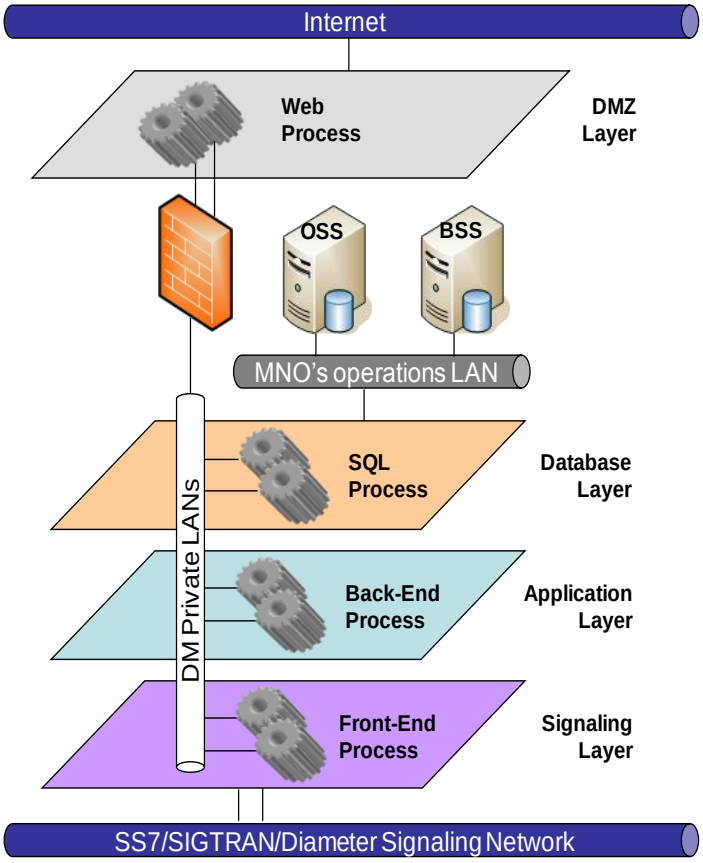


Figure 2 - Gemalto distributed architecture

4.11. Delivery Services

The setup of the Gemalto DM-Center will be performed by DM-Center experts in integration and validation. They will work under the guidance of a dedicated project manager appointed at the start of the project. The delivery will comply with the Gemalto's specific milestones as specified in the project plan; each milestone will be followed by a report provided by the project manager.

The project will also be subjected to a quality audit from Gemalto's Quality Insurance Officers and satisfaction survey will be led at the end of the project.

Making full benefit of its experience in delivering numerous projects, Gemalto has set a governance organization supervising all projects deliveries and composed of senior management:

- Head of the Delivery Team, whose the appointed Project Manager reports to
- Director of Operation whose the Head of the Delivery Team reports to
- VP of Core Network and Roaming Gemalto organization whose the Director of Operation reports to

4.12. Project documentation

The integration project will start by a study phase, which main objective is to define a final scope within a set of project documents:

- **Project Management Plan (PMP)**: this document describes the project implementation process and schedule. Shared with Algar Telecom.
- **Scope of Work (SoW)**: this document is a detailed and exhaustive synthesis of all the delivered features. Shared and approved by Algar Telecom.
- **Acceptance Tests Plan (ATP)**: this document describes the plan to run the tests for the acceptance as well as the tests scenarios. Shared, approved by Algar Telecom and followed during the acceptance.
- **Customer Network Information (CNI**): this document lists all information required from Algar Telecom to configure DM-Center for its integration to Algar Telecom's network. Shared and filled in by Algar.

4.13. High level project plan

Typical time frame for standard projects without customization is 12 weeks from the project start to service launch. Please note that two weeks are required, once the PO is received, to allocate resources for the project, including a Gemalto Project Manager dedicated to this project whose name will be communicated to Algar Telecom's prior to the project kick-off meeting. This project manager will then assigns dedicated resources for all steps of the delivery and communicate names to Algar Telecom's on an ad-hoc basis.
The detailed schedule will be compiled in the Project Management Plan (PMP) written by Gemalto project manager and submitted to the customer for acceptance at the start of the project. The planning can be influenced by the level of customization requested and if Algar Telecom's's deliverables are delayed. Gemalto reserves the right to modify the planning accordingly.
Following milestones are defined:

Date	Action / Milestone
T0	**Purchase Order reception** from Customer *Service Delivery Project ready for kick off*
2 weeks	**Project preparation** to nominate a dedicated project manager, allocate resources and prepare the project documentation.

Date	Action / Milestone
T1 = T0 + 2 weeks	**Project Kick Off** meeting held with Customer. Gemalto will provide PMP, SoW, CNI and ATP for approval and present them during the meeting. Algar Telecom's commits to: • Unique entry point identified (Operator Project Manager) • Resources availability for test (devices and SIM cards) • Resources availability for VPN establishment & network integration (WEB, SMS-C, MSC/MME, HLR/HSS, SGSN, CRM …) • Customizations specifications shared • Service Level Agreement reviewed and accepted *Service Delivery Project ready for service integration*
8(+n) weeks	**Service customization** of the Device Management solution (total duration may exceed by n weeks the standard 8 weeks delay depending on customization requested). **Service installation and configuration** of the Device Management solution into Customer's network infrastructure. **Data migration** of the previous Device Management solution replaced by Gemalto DM-Center (optional phase confirmed during kick-off meeting).
T2 = T0 + 10(+n) weeks	*Service Customized (if required) Configuration completed and Data fully migrated (if required).* *Ready for Acceptance*
2 week	**Acceptance** of Device Management solution as per Acceptance Test Plan.
T3 = T0 + 12(+n) weeks	*Functional Acceptance Completed* *Service Level Agreement Signature* *Ready for Production Validation*
4 weeks	**Production Validation**
T4 = T0 + 16(+n) weeks	*Device Management Production Validation completed, ready for Commercial Launch*

Customization requires zero week additional delay (to be confirmed when specifications are approved by Algar Telecom's).

4.14. Deliverables

To make our project successful all parties involved have to contribute with relevant activities and deliverables.

4.14.1. Gemalto deliverables

Gemalto provides deliverables to ensure that the final solution will fit initial requirements. Each deliverable is meant for different purposes.

List of deliverables (document, software …)	Purpose	When
SLA	Approval	With a proposal
PMP (Project Management Plan)	Approval	T1
SoW (Scope of Work)	Approval	T1
CNI (Customer Network I*nformation)*	Testing	T1
ATP (Acceptance Test Procedure)	Approval/Testing	T1
Test data loaded	Information	T2 at the latest

User guide	Information	T3
Reporting GUI access data	Testing	T2
Gemalto test report	Approval	T4

4.14.2. Algar Telecom deliverables

Algar Telecom is expected to provide deliverables to ensure that the project is executed as per its initial plan. Each deliverable is meant for different purposes.

List of deliverables (document, software …)	Purpose	When
VPN request form	Approval	T1 (KOM)
SLA approved	Information	T1
PMP approved	Information	5 days after T1
SoW approved	Approval	5 days after T1
CNI filled in and returned	Information	5 days after T1
ATP approved	Approval	5 days after T1
Customizations specifications (if required)	Approval	5 days after T1
2 SMS-C connections	Approval/Testing	Before T3
2 VPN connections (one for MSISDN provisioning and one for SMS-C traffic or combined into one)	Information	Before T3
Up to 2 SIM profiles definitions (prepaid, postpaid)	Testing	Before T2
Test SIM card (minimum 1 per profile)	Testing	Before T2
Provisioning enabled	Approval	Latest at T3
Acceptance certificate signed		T4

Customer resources are not addressed as “deliverables”, so please read the section 4.13 High level project plan for more information on resources needed.

4.15. Installation and Configuration

The installation and configuration tasks are broken down in:

- **Overall Project Management:**
  - Task follow up and project management in general
  - MPP, ATP, CNI, SoW
  - KOM, weekly, reports, ATP supervision
  - Hardware order and management
  - Licenses order and management
- **Study:**
  - Technical Documents review
- **Project documents realization:**
  - CRS (SoW) & SDD (SIP)
  - Transfer from Project to Support
- **Customer Meetings**
  - ATP execution
- **HW, system and licenses**
  - Unpack, Inventory and BOM Verification

- HW and equipment Installation and switches
- OS installation
- SS7/SIGTRAN installation and license
- Database engine
- Clusterware
- SIGTRAN physical connectivity
- SS7/SIGTRAN configuration
- Optional Diameter configuration
- Optional SS7 cards installation

- **Algar Telecom <> Gemalto VPN:**
  - setup & testing

- **Interfacing**
  - Customer SMS-C
  - Optional IN, GUI
  - NTP/SNMP

- **S/W installation and testing**
  - EIR - Proxy/Forward/Dummy
  - ADD ADC
  - (Optional embedded SMSC)
  - DMC BO/FO
  - SMSC BO
  - Web services APIs
  - Testing and Internal ATP
  - IMEI tracker applet

4.16. Data Migration

In case a previous DM solution was being used by Algar Telecom, prior to acceptance, relevant data are migrated onto Gemalto DM-Center being deployed.

Gemalto will provide Algar Telecom's with the format of the data to be imported into DM-Center. Algar Telecom's is responsible to provide the data to migrate in the agreed format.
Relevant data to import:

- subscribers triplet (MSISDN, IMSI, IMEI)
- DM-Center user list and role amongst 3 possible: administration, marketing, customer care

4.17. Acceptance

The aim of the acceptance is to check that the solution delivered by Gemalto is compliant with the Scope of Work (SoW) previously validated by Algar Telecom's. The acceptance will be performed by Gemalto and Algar Telecom's according to test cases defined in the Acceptance Tests Plan (ATP).

Both the SoW and the ATP documents will be written at the start of the project, as soon as awarded to Gemalto. The high-level ATP content is structured as per the following and covers between 150 and 250 tests scenarios depending on the options selected by Algar Telecom:

A – AUTHENTICATION
1: HOMEPAGE AND LOGIN
B – DMC CONFIGURATION
1: ACCEPTANCE TESTS FOR « AUTHORISED USERS »
2: ACCEPTANCE TESTS FOR « NETWORK CONFIGURATION »
3: ACCEPTANCE TESTS FOR « DEVICE REPOSITORY UPDATE »
4: ACCEPTANCE TESTS FOR « MSISDN/IMEI DATABASE »
5: ACCEPTANCE TESTS FOR « BULK »
C – CUSTOMER MANAGEMENT
1: ACCEPTANCE TESTS FOR « SUBSCRIBER CONFIGURATION »
2: ACCEPTANCE TESTS FOR « IMPORT SUBSCRIBER DATABASE »
3: ACCEPTANCE TESTS FOR « HISTORY »
D – MARKETING ANALYSIS
1: ACCEPTANCE TESTS FOR « VIEW DEVICE ANALYSIS »
E – MONITOR
1: ACCEPTANCE TESTS FOR « STATISTICS »
2: ACCEPTANCE TESTS FOR « CPU PERFORMANCE MONITORING »
3: ACCEPTANCE TESTS FOR « MEMORY PERFORMANCE MONITORING »
4: ACCEPTANCE TESTS FOR « SS7/MSU PERFORMANCE MONITORING »
F – SUBSCRIBER SELF-PROVISIONING WEB PAGES
1: ACCEPTANCE TESTS FOR « SUBSCRIBER SELF-PROVISIONING LOGIN »
2: ACCEPTANCE TESTS FOR « SUBSCRIBER SELF-PROVISIONING REQUEST »
G – SUBSCRIBER SELF-PROVISIONING SMS FRONT-END
1: ACCEPTANCE TESTS FOR « SUBSCRIBER SMS HANDSET REQUEST »
2: ACCEPTANCE TESTS FOR « SUBSCRIBER SELF-PROVISIONING SMS SETTINGS »
H – AUTOMATIC DEVICE DETECTION
1: ACCEPTANCE TESTS FOR « ADD CONFIGURATION »
2: ACCEPTANCE TESTS FOR « IMEI TRACKER »
3: ACCEPTANCE TESTS FOR « SS7 ADD »
4: ACCEPTANCE TESTS FOR « Diameter ADD »
I – EMBEDDED SMS-CENTER

For the test scenarios covering devices detection and configuration, a list of ten (10) device models will be mutually agreed upon in the two (2) weeks following the kick-off meeting. Each test scenario will be conducted with a single device model and the same device model may be used across several test scenarios.

4.18. Quality System

The Gemalto DM-Center Quality system, albeit not certified yet, is inspired by ISO 9001 & CMM and progressively aligns on the Gemalto corporate system (CMMI L3).

In order to respect both Algar Telecom's requirements and desired quality level, Gemalto proposes to apply the following guidelines for each main project milestone:

- **Start of the project**: After the purchase order reception, a Kick-Off meeting is scheduled in order to introduce both the Gemalto and the customer project teams, summarizing the solution context and the understanding of the project.
- **Study phase**: During the project study phase, the following steps will define the project process:
  - PMP writing for explaining the whole project process by giving all the details on project implementation (detailed schedule, updated project execution plan…)
  - PMP submission & approval
  - SoW writing for summarizing all Algar Telecom's requirements
  - SoW submission & approval

- ATP writing for describing all Algar Telecom's requirements test cases
- ATP submission & approval
- CNI sending to Algar Telecom to collect its network characteristics
- CNI filled in and returned to Gemalto

- **Implementation/Integration/Validation phase**: After development (if relevant) and integration, testing of the whole solution in order to check that the complete solution is implemented as described in SOW. At the end of acceptance tests, the acceptance should be approved by Algar Telecom.

4.18.1. Modification/Change request management

Any change in the project scope (design change, input data change, contractual change …) specified after the Scope of Work (SoW) approval will be managed by the project manager and will be subjected to an impact assessment.

This technical and financial analysis will be provided to Algar Telecom for approval of the changes. Both Algar Telecom and Gemalto will have to accept the modification and the related impacts before launching the corresponding developments.

4.18.2. Anomaly management

During acceptance phase, a deviation between the agreed SoW and the solution may be noticed.
According to the anomalies type, corrections can be performed as follows:

- **Minor**: The anomaly is not disturbing the behavior of the solution. Corrections could or could not be included in the future release of software (mutually agreed upon Algar Telecom's and Gemalto).
- **Major**: The anomaly is impacting the behavior of the solution. Corrections can either be included in the next practical software release or be planned before next acceptance phase (upon Algar Telecom's decision).
- **Blocking**: The anomaly is impacting the behavior of the solution. This kind of anomaly blocks the progress of the acceptance phase. Corrections have to be planned before next acceptance phase.

4.19. Training

Gemalto's high-quality training courses are designed to help the operator speed up time-to-market, and maximize value from Device Management.
Dedicated trainers work closely with Gemalto analysts, R&D and development teams to continually update their market and technical product knowledge, to ensure that seminar delegates get the most from their Gemalto training experience.

To guarantee optimal usage, operations and administration of Gemalto Device Management products building the solution, Algar Telecom will be requested to have its key operational users trained. Training scope is defined at project delivery stage as well as along the product lifetime in order to maintain personnel skills at appropriate level.

Training Certificates are systematically delivered to students who complete each training course as well as course handouts referred to as "Training Materials". All of the sessions are held in English, training documents are in English.

Training courses are not included within present offer and shall be proposed separately upon request of Algar Telecom.

4.20. Warranty for DMC

This warranty period duration is one (1) year and allows Algar Telecom to:

- Have access to the Gemalto online ticketing system
- Get fixes applied in case of bug

No other services is included (e.g.: phone assistance, remote assistance…) during this period. The warranty is due to start consecutively after Acceptance Tests period.

4.21. Support & Maintenance for DMC– SLA

4.21.1. Device Library update service

The Device Library currently contains 100,000+ devices references and is constantly completed by Gemalto at an average of 9,000 new references per year. In addition, Algar Telecom can request Gemalto to enter specific models in the repository.
Depending on the selected service level agreement, Algar Telecom can benefit from regular updates.

REFERENCE		DESCRIPTION	BASELINE (B) OPTION (O) EXCLUDED (E)
PLATINUM		Updates frequency: FORTNIGHTLY Number of automatic new terminals per update: UNLIMITED Number of customer specific new terminals: 10 PER MONTH	**E**
GOLD		Updates frequency: MONTHLY Number of automatic new terminals per update: UNLIMITED Number of customer specific new terminals: 10 PER MONTH	**B**
SILVER		Updates frequency: QUATERLY Number of automatic new terminals per update: UNLIMITED Number of customer specific new terminals: 25 PER YEAR	**E**
BRONZE		Updates frequency: YEARLY Number of automatic new terminals per update: UNLIMITED Number of customer specific new terminals: 20 PER YEAR	**E**

5. OTA AND DMC FEATURES AND USE-CASES:

5.1. OTA:

5.1.1. Description:

OTA enables a Network Operator to introduce new SIM services or to modify the contents of SIM cards in a rapid and cost-effective way.

OTA is based on client/server architecture where at one end there is an operator back-end system (customer care, billing system, application server ...) and at the other end there is a SIM card.

The operator's back-end system sends service requests to an OTA Gateway which transforms the requests into Short Messages and sends them onto a Short Message Service Centre (SMSC) which transmits them to one or several SIM cards in the field.

Thus, Over-The-Air (OTA) is a technology that updates and changes data in the SIM card without having to reissue it. Indeed, the end user can receive special messages from the operator, download or activate new services on his telephone, and much more ..., without having to return to a retail outlet.

In order to implement OTA technology, the following components are needed:

- A back end system to send requests
- An OTA Gateway to process the requests in an understandable format to the SIM card
- An SMSC to send requests through the wireless network
- A bearer to transport the request: today it is the SMS bearer
- Mobile equipment to receive the request and transmit it to the SIM card
- A SIM card to receive and execute the request
- Back end System

The back end system can be anything from a customer care operator to a billing system, a content provider or a subscriber web interface. The provisioning system has to be connected to the mobile network (either per LAN or via the Internet). Service requests contain the service requested (activate, deactivate, load, modify ...), the subscriber targeted and the data to perform the service. The back end system then sends out service requests to the OTA gateway.

The OTA Gateway receives Service-Requests through a Gateway API that will indicate the actual card to modify/update/activate. In fact, inside the OTA Gateway there is a card database that indicates for each card, the SIM vendor (Gemalto, Schlumberger, DeLaRue ...), the card's identification number, the IMSI and the MSISDN.

The second step is to format the service request into a message that can be understood by the recipient SIM card. To achieve this, the OTA Gateway has a set of libraries that contain the formats to use for each brand of SIM cards. The OTA Gateway then formats the message differently depending on the recipient card.

The third step consists in sending a formatted message to the SMSC using the right set of parameters as described in GSM 03.48. Then the OTA Gateway issues as many SMS as required to fulfill the Service-Request. In this step the OTA Gateway is also responsible for the integrity and security of the process.

SMSC

Services center for short messages (SMS) exchanged between the management system of these messages (OTA Gateway) and the cellular network. A message consisting of a maximum of 160 alphanumeric character can be sent to or from a Mobile Phone. If the Mobile Phone is powered off or has left the coverage area, the message is stored and offered back to the subscriber when the mobile is powered on or has reentered the coverage area of the network.

The communication between the SIM card and the OTA Gateway can be done by SMS exchange and in this case named the SMS channel.

Has to be phase 2+ in the GSM standard. Mobile Phone has all the required features for handling a part or all of standardized GSM services. Regarding OTA services, the Mobile Phone has to be Sim Tool Kit compliant.

Smart card provides secure user authentication and is mainly used in GSM standard as Subscriber Identification Module (SIM cards). The SIM is the major component of the GSM market paving the way to value-added services. SIM cards now offer new menus, prerecorded numbers for speed

dialing, and the ability to send pre formatted short messages (SMS) to query a database or secure transactions.

5.1.2. Features:

Gemalto Linqus OTA Platform is capable to address most common features required for such platform in the telecom market

- To request an update OTA either for MSISDN or for MSISDN group.
- To support a retry when a download is interrupted.
- To store and display the user interface the last transaction with the timestamp and result code for each OTA transaction.
- To post and show the status of a successful download an update package.
- To provide all required security mechanisms
- Scheduling Mechanisms:
  - Support a separate scheduler functionality to allow add / modify / delete scheduled jobs.
  - functionality to allow one or more events can be scheduled on the same day and time.
  - Support the display of schedulers and current events in a row.
  - Functionality to cancel any priority scheduler for, or not, running a scheduler.
  - Feature set based retries on errors and exceptions specific while running a scheduler.
  - Delete satisfactorily processed devices a process retry attempt.
  - Functionality to create schedulers templates
  - etc

Gemalto Linqus OTA Platform also provides an intuitive User Interface that allows Algar Telecom to manage the campaigns and extract all reports and statistics. The Graphical User Interface also permits Algar Operations Team to schedule, pause, resume, stop, cancel, restart and retry campaigns very easily.

Gemalto sultion can also be triggered through an API that easy the connection of the platform to Algar Telecom's own systems and execute campaigns either in batch or in in unitary mode (by event).

5.1.3. Most Common Use Cases:

OTA platform is most commonly used for:

- SIM Card Profile management through:
  - RAM Campaigns: for sim card management. Disable, enable, delete and add new applets
  - RFM Campaigns: disable, enable and change applet configurations.
  - PLMN Campaigns: for roaming partners management and maximize roaming agreements by using packages more efficiently according to subscribers usage.
  - SIM Card reset: some of the actions performed by MNOs might require the SIM Card to be reset and such action can be done via OTA platform.(example of MNOs that suspend subscribers whose data plan has reached limit levels and, in order to allow the end user to attach to the data network, a reset is required in the SIM Card)

5.1.4. Advanced OTA (OTA HTTP):

Advanced OTA manages and delivers connectivity to all devices and secure elements with utmost efficiency, whatever the channel (SMS, HTTP or both) or network technology. This enhanced solution enables mobile operators to benefit from the rapid HTTP world on any channel. It opens up a new realm of services that deliver use cases such as NFC, M2M, Multimedia, and Network offload.

The solution will deliver excellent:
• Reliability – for mission-critical application and subscription management
• Security – for the open IP world
• Success rate – on UICCs or devices with polling mechanisms automatic update
• Performance – with intelligent mass management of dynamic updates

Benefits for end-users:
• Faster access to content and applications thanks to higher bandwidth
• Seamless activation of new services
• Access to trustworthy services

Benefits for operators:
• A high performance platform: High success rate and availability enabling carrier grade SLA
• Scalable and future-proof platform: Flexible deployments and service evolution
• A convenient platform : Ease of use, intuitive and smart
• Addressing multiple devices and secure elements: With the most efficent channel (SMS, HTTPs)
• Opening up to various services: NFC, M2M, Mobile TV,…
• Providing security for sensitive uses: With the highest levels of security

Take this opportunity to discover all the advantages of HTTP and speed delivered by higher bandwidth with the most experienced and recognized player in advanced connectivity.

Gemalto is leading the way in worldwide commercial LTE deployments helping operators such as NTT DOCOMO in Japan and Verizon Wireless in the US deploy new value-added services using ultra-high-speed data access and IP connectivity.

Gemalto's LTE solutions include LTE Full-IP Over-The-Air platform, which allows instant activation of end-user's subscriptions, user rights management and secure delivery of a reliable data connection over their LTE network.

Gemalto has won several awards at the LTE World Summit including:
• In 2011: two Informa LTE Awards "Best contribution to LTE standards", "Best enabling technology" and one 4G World Award
• In 2012: two Informa LTE Awards "Best contribution to R&D for LTE" and "most innovative LTE application/service"
• In 2013: one Informa LTE Award "Gemalto wins "Best LTE Security Product" Award

5.2. Device Manager Center:

5.2.1. Features:

The industry's largest device repository: The DM Library service is at the heart of our DM Center.
Gemalto DM-C Solution provides operators with:

- ✓ A knowledge database with more than 100,000 identified devices, including smartphones, tablets,M2M devices, etc.
- ✓ Monthly deliveries with hot upgrades to keep the solution up to date with the latest model releases (currently around 3,000 new devices annually).
- ✓ Automatic Device Detection & Configuration: Thanks to its exclusive library, DM Center will detect, identify and configure mobile devices in the Operator's network
- ✓ Marketing Analysis: Gemalto provides reports based on more than 500 device capabilities, giving a clear view of the current installed base. An advanced Campaign Manager allows the operator to segment the subscriber base and launch efficiently new Value Added Services.
- ✓ Grey Market Knowledge: Grey-market devices are counterfeit products like fake smartphones, white-box cell phones, stolen devices, SIM boxes, etc. Our DM Center tags such devices and supports their generic configuration remotely to enable their access to the Operator's network services.

Automatic LTE Device Detection
The Gemalto Device Manager brings an unparalleled device library containing more than 100,000 references expanded with thousands new models each year. These frequent updates allow operators to accelerate the LTE uptake.

Personalized data-focused mobile campaigns
Operators can target the right subscribers to push LTE devices adoption campaigns and quickly modernize the subscriber devices, as well as promote LTE plans for owners of 4G-capable phones. The Gemalto Device Manager can also send loyalty offers to multi-SIM users to ensure they use the operator subscription for data.

Enhanced Quality of Experience

Operators can collect information on data network quality from the users' phone to prioritize network improvements and offer subscribers the best data usage experience to retain them.

Benefits for end-users:

- Gemalto's DM Center ensures subscribers enjoy a smooth and simple transition to a new device Subscribers can easily reach all the operator valueadde services and enjoy all their device and network capabilities.
- In the case of a device misconfiguration, the end user can either solve the issue through the self-care interfaces or enjoy fast and efficient customer care.

Benefits for Operators

- Save the support cost significantly on configuration issues. Gemalto's DM Center automatically identifies the device, avoids subscriber manipulations and ensures parameters are remotely updated, even sending multiples configurations at once.
- Increase the revenue considerably thanks to properly configured devices and to accurate device capabilities analysis. Gemalto's solution helps operators promote appropriate services to the right end users, improving VAS uptake.

Self-Care and Customer-Care Interfaces:
Gemalto's Device Manager Center provides a Self-care interface that can be easily integrate to existing Algar's portal as well as translate to Portuguese. The Look and Feel of it can also be branded according to the Algar's logos.

5.2.2. Most Common Use Cases:

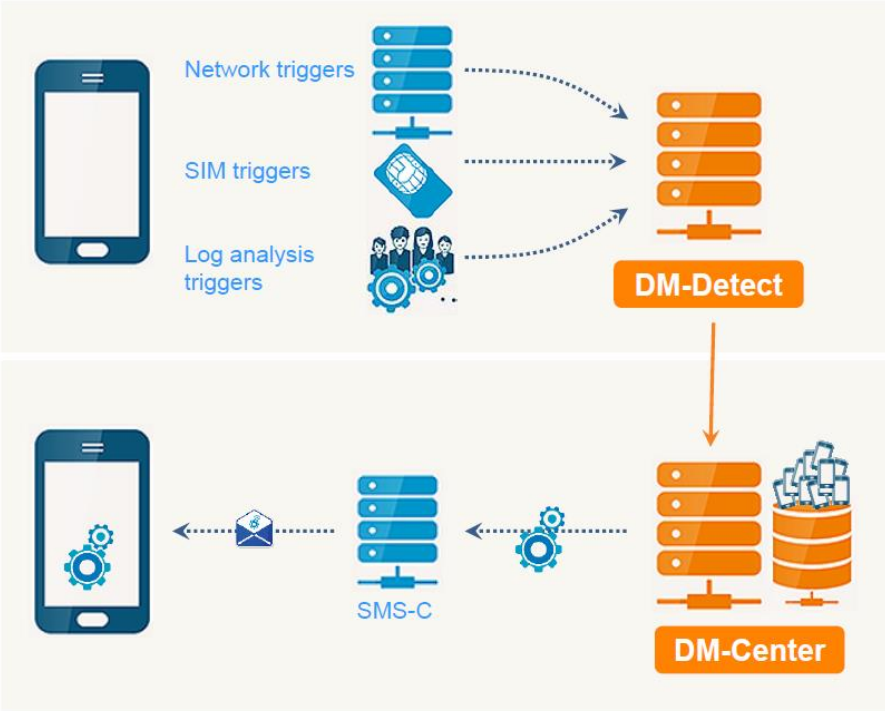
Device Manager Center is most commonly used for:

- Automatic configuration of devices at the moment when the subscribers connects to the network
- software/firmware installation and/or update
- remote problems diagnostics
- increase efficiency on remote solution of issues
- reductions of call center time to support end users
- segmentation of database of subscribers based on used devices
- APN correction (details in the section 5.2.2.1)

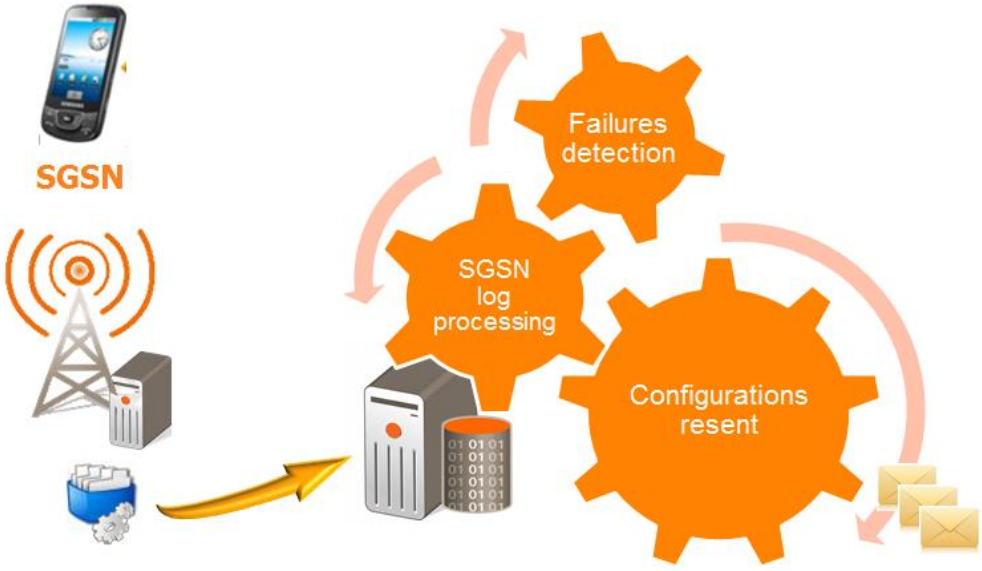
Gemalto is always trying to bring new businesses to MNO's that acquire its solutions and, one of the use cases that are potentialized by Device manager solution is the User Integrity project where Gemalto informs other service providers like banks about SIM card exchange that could be an indication of fraud. This kind of business generates new revenue flows to MNOs that can profit from Gemalto's experiences and credibility on the secutiry environment.

5.2.2.1. APN Correction:

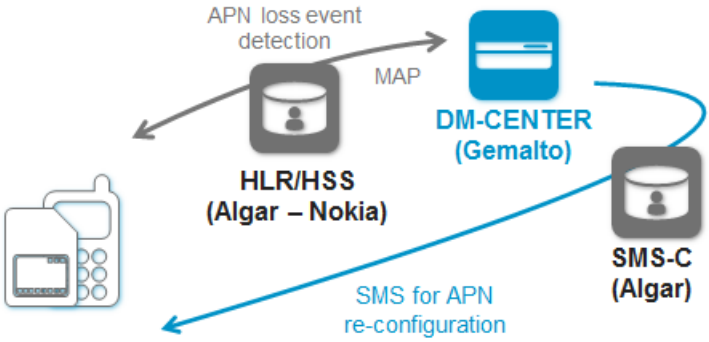
Firstly, it is important to emphasize that Gemalto's Device Manager Center Solution is composed by 2 core systems. One of them is called DM-Detect and it is fulle dedicated to detect events in the MNO network and use them as triggers to perform an unique action through DM-Center. Such events can be originated thoughr log parsering, CDR parsering, SIM card trigger or through network mechanisms.



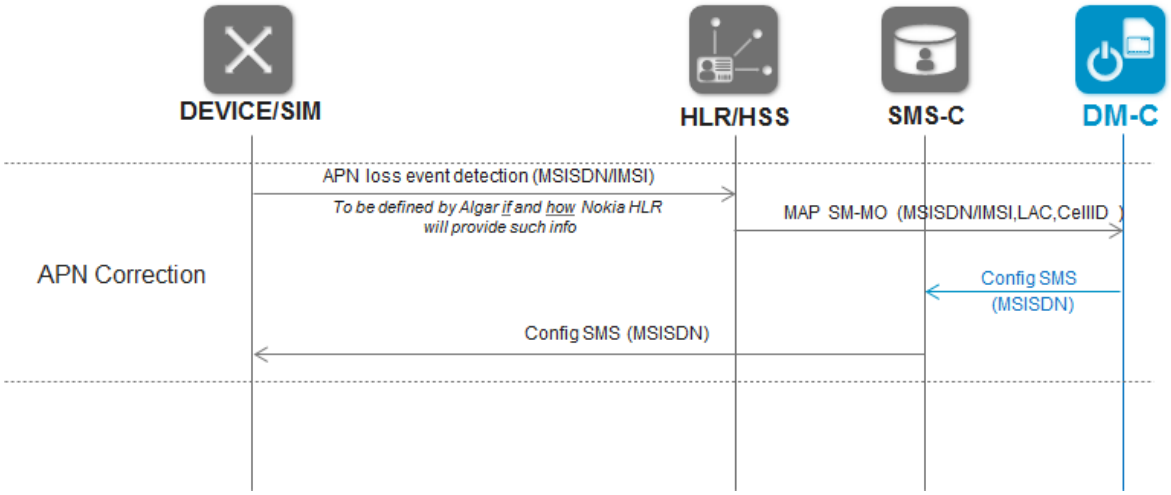
Gemalto standard approach for APN correction is linked to GGSN and SGSN cdr parsering. Device Manager Center is capable to integrate to the existing GGSN/SGSN components of Algar Telecom and use APN loss detection as trigger to push the configuration to the devices and correct APN configuration.



Device Manager Center is also able to interact with HLR/HSS systems via SS7 protocols and use any specified event linked to APN loss detection as a trigger to update end-users devices with the correct APN configuration.



The flow below illustrates the proposed mechanism to detect APN loss and correct APN configuration automatically but it may be adapated during project execution time according to components' specificities:

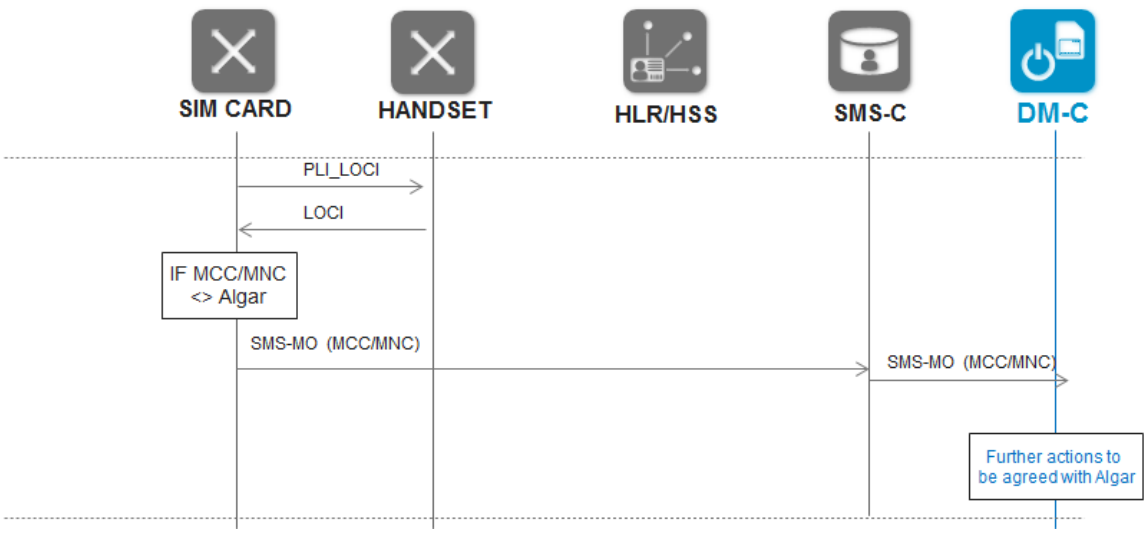


Gemalto also sees another possibility to detect users in roaming that is an applet to be installed in the SIM Card that will send the command "Provide Location Info" to the handset and get the following informations:

- MCC/MNC
- CellID
- LOCI

The applet can be used to detect users in roaming and lets Algar to take further actions

- Proposed flow (to be adjusted during integration phase)



As part of this RFP, Gemalto proposes the 2 alternatives to correct APN misconfigurations and let's Algar Telecom to choose the best or more convenient option:

OPTION1:

Gemalto will integrate to Algar's HLR/HSS Systems either via SMS or via SS7 and Gemalto will also include in the project the creation of a SIM Card applet that is capable to detect MCC/MNC change to map subscribers in roaming for no additional price.

OPTION2:

Gemalto will integrate to Algar's GGSN/SGSN via CDR parsering and Gemalto will also include in the project the creation of a SIM Card applet that is capable to detect MCC/MNC change to map subscribers in roaming for no additional price.

6. CONCLUSION

Gemalto is fully committed with customers, which can be confirmed every day, in delivering high quality products and services to the market. We hope this proposal fits your needs and once again we put ourselves at your entire disposal for doubts or any further clarification needed.

Bruno Magna Solution Sales	Meire Siqueira Account Manager

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