

Appendix J to Annex A

Part A - MAP – Software Design Document

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1 Executive summary

1.1 Purpose of the Document

This document provides a description of the technical approach for the implementation of the Maritime Application Portal (MAP).

Within this document one can find a description of the system architecture and suggestions for 4 integration scenarios (and its pre-requisites) with other EMSA applications, taking into consideration that Liferay is the “preferred” middleware for developing web portals at EMSA and there is already a common identity management supported through Oracle’s IdM suite.

The provided integration scenarios were designed taking in consideration the several applications that EMSA has, their characteristics and constraints.

Besides that, the analysis and recommendation found in this document follows EMSA’s guidelines regarding the MAP design and implementation. Therefore MAP should respect and not interfere with the default Liferay applications behavior, functionalities and configuration process, and such its implementation impacts should be minimal or inexistent.

1.2 Organization of the Document

The document is organized as follows:

Chapter 1 explains the objectives of this document and presents an overview of its contents.

Chapter 2 provides a top-level view of the MAP system architecture and its components. It also provides a description of “As Is” IdM integration with Liferay portal.

Chapter 3 describes the implementation approach for the MAP portal regarding the layout approved and the configuration steps needed.

Chapter 4 presents the integration scenarios between EMSA applications and the MAP portal and related conclusions.

1.3 MAP implementation approach

With MAP portal, EMSA has the goal to provide his users with a single entry point for their services which is ergonomically and functionally enhanced, compared to the current diverse technical landscape. This uniformity will improve usability, user-friendliness and promote the corporate image of EMSA.

The single entry point through MAP portal will enable an authenticated user to have access to a private *User Page*, where EMSA maritime applications components and options are exposed dynamically, according to the user profile that is logged on. By exposing the components and options through MAP, a common identity, consistency and coherence is achieved.

This approach is fully reusable when, in the near future, EMSA chooses to group maritime applications components and options under a concept of services, instead the one used currently which is by maritime application.

Authentication is delegated to the horizontal EMSA IdM platform currently in use which allows single-sign-on capabilities across the maritime applications, MAP portal included.

Whenever a request to a private page is done and the user credentials are not yet defined the MAP will redirect the user to the portal login page. By logging in the MAP portal this user will be automatically logged in every system of EMSA that he has access to, using the single-sign-on capabilities of IdM. Naturally, when signing off the MAP portal, this user will also be signed off of every system of EMSA using the same single-sign-on capabilities of IdM.

Within the MAP portal two distinct behaviors are supported regarding EMSA maritime applications: the *default* and the *custom*.

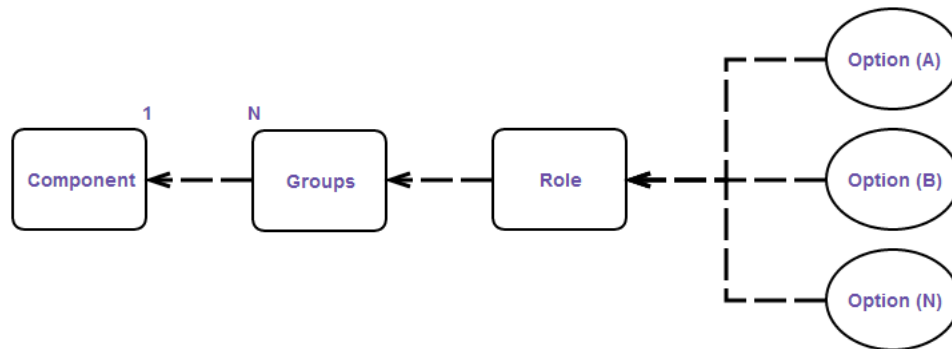


Figure 1 - Default behavior Liferay parametrization

For the default application behavior one particular *Role* can give access to one or many application options for a particular *User Group* that belongs to a *Component*. From Liferay perspective the *Component* is a *Site* and the *Option* is a *Page* of type *Portlet*.

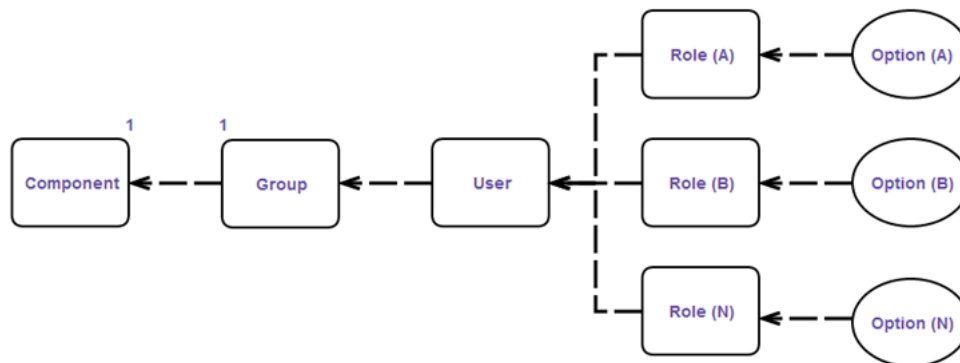


Figure 2 - Custom behavior Liferay parametrization

For the custom application behavior access to application options is managed through direct associations between *Role* and *Page*. For the *User* to be granted access to the application options it is necessary to have as many *Roles* as *Options* that he will have access to (1 to 1 association). The *User* is assigned to a particular *User Group* that belongs to a *Component*. From Liferay perspective the *Component* is a *Site* and the *Option* is a *Page* of type *URL*.

1.4 MAP integration approach scenarios

The described scenarios are diverse and cover different integration strategies such as:

- Maintain the “As Is” integration framework;
- Adjust the IdM user management console to support management of application options;
- Centralize the user management console on Liferay portal;
- Manage the application options by invoking Liferay web services.

Scenario 1 – Maintain the “As Is” integration framework

Under this scenario the short term priority is given to the progressive stabilization and increased exploration of the IdM platform over EMSA technical landscape, this way avoiding additional developments on the platform and reassigning investment effort to other business areas.

Under this scenario it is recognized that the existing drawbacks related to the application options management are not severe enough that justify developing a new integration framework to solve the issue. The MAP portal can be manually configured to support the components and options for both the default and custom maritime application behaviors.

Scenario 2 – Adjust the IdM user management console to support management of application options

Under this scenario the short term priority is to expand the functionalities of IdM user management console to allow a more dynamic management of the application options of the custom behavior maritime applications.

This console would be changed so that it could support the custom behavior application options management. With this upgrade a centralized management could be done here solving the current issue of the need to make the configuration on two different applications based on a two-step process.

Scenario 3 – Centralize the user management console on Liferay portal

Under this scenario the short term priority is to centralize the user management console on Liferay portal taking advantage of the User Interface capabilities and using IdM only as an SSO platform.

By taking advantage of the portal User Interface it is possible to develop a unique portlet where in one step the user personal data can be inputted and access to components and options can be defined.

Scenario 4 – Manage the application options by invoking Liferay web services

Under this scenario the short term priority is to address the current limited application options management maintaining as much as possible the current architecture and minimizing EMSA budget effort.

To solve the custom behavior application option management constraint that IdM presents and to avoid changing both IdM and Liferay, the custom behavior application can invoke Liferay web services to parameterize these automatically whenever changes occur at application level.

The scenarios were then plotted against **Effort** and **Integration** axis as can be seen on *Figure 3* below.

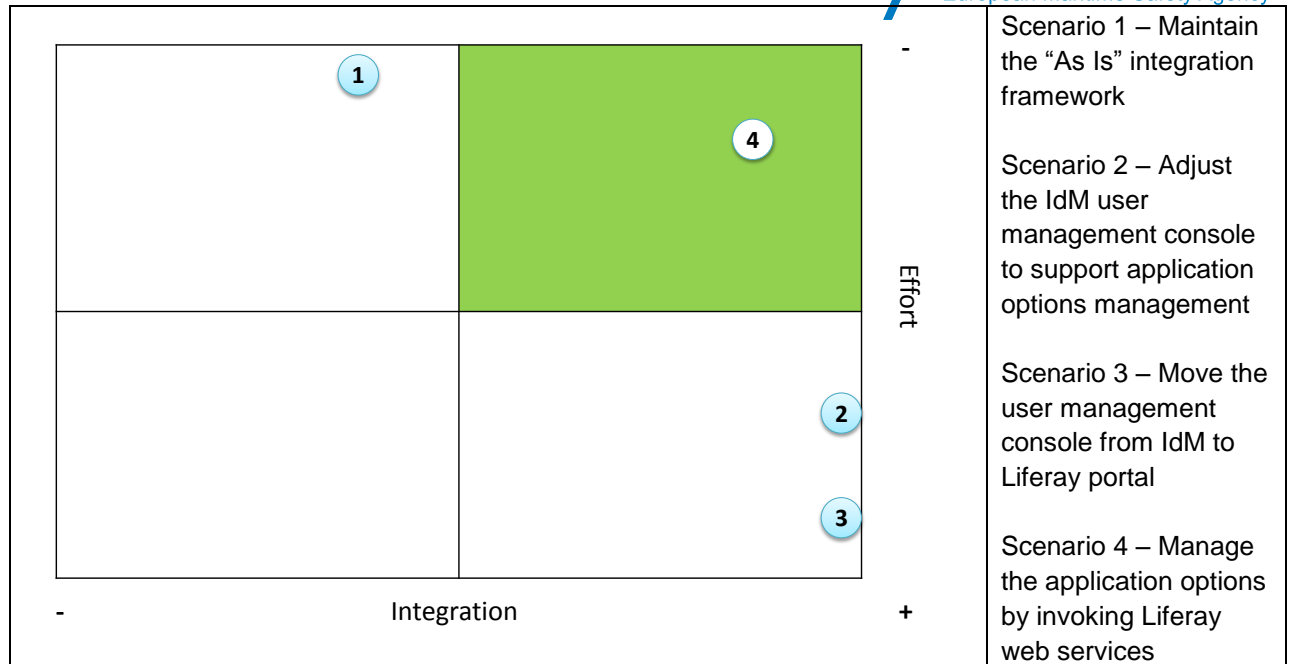


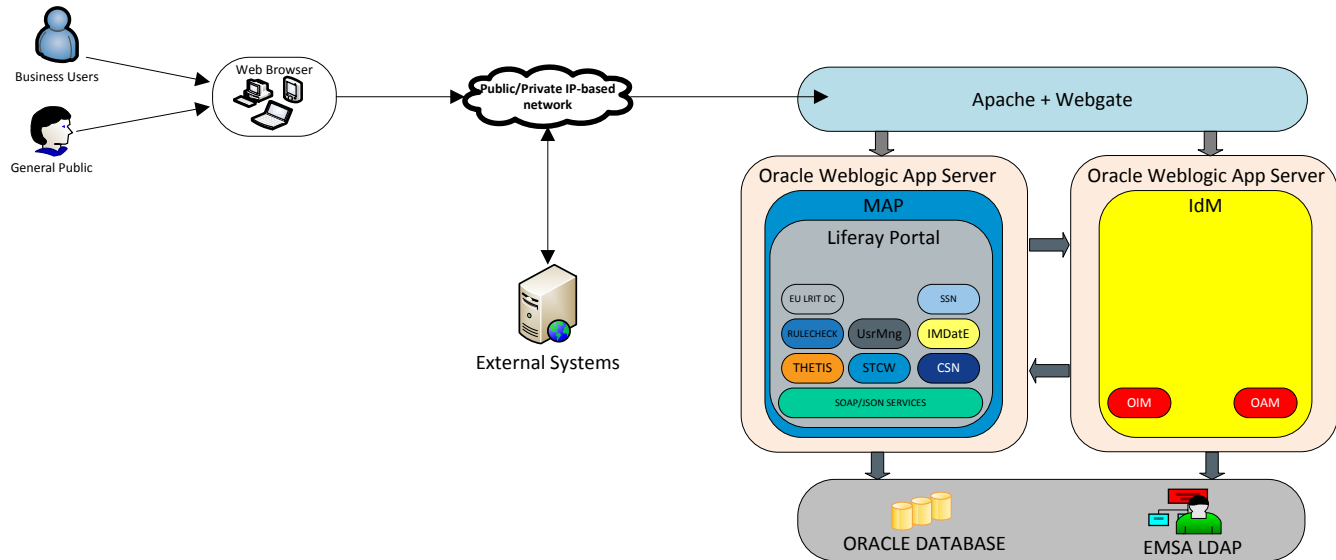
Figure 3 - Scenarios relationship between integration and effort levels

The **Effort** axis measures the High (signal as '+'), Medium or Low (signal as '-') level that EMSA will need to commit in order to implement the scenario. The **Integration** axis measures the High (signal as '+'), Medium or Low (signal as '-') level of integration between EMSA applications that will be achieved by implementing the scenario.

The best scenarios are those that fit to the top right quadrant (highlighted with green color), which demands a low level of development effort and provides high integration between EMSA applications. Taking into consideration a balanced compromise between level of integration and effort needed the recommended scenario is number 4. This is a scenario that centers mostly on EMSA architecture reutilization, reducing custom developments to the minimum necessary and limited to the applications that need them.

2 Conceptual architecture overview

The following picture shows high-level system architecture to MAP application



The MAP system is composed of a portal application deployed into a distributed server application.

The server application is a clustered Oracle Weblogic Application Server hosting the portal and all components developed for the portal.

The server application uses a persistence layer of Oracle database repositories for portal data as well as for media data.

The following topics describe the core system components:

Web Browser

Human users access MAP using a web-browser which provides a unique web interface. It is composed of HTML, CSS Javascript and images in a Web 2.0 environment.

Apache+Webgate

A single access point to all EMSA applications. Here a distinction is made between public requests and private ones, through verification that the accessing user is already authenticated or not.

Portal

Liferay Portal is the component that interfaces with human end-users, whether they are internal EMSA users, or external, having private or public access to any EMSA application.

The portal must provide users any type of access in line with the multiple features of EMSA applications according to user access permissions. With an ergonomic, aesthetically pleasing design, this portal will be the single entry point to all users that want to access any EMSA maritime application or services.

MAP will expose, through Liferay, SOAP/JSON Services to provide other applications the default Liferay functionalities as well as customized ones using Liferay Service Builder.

Identity Management

Identity Management functionalities will be available in MAP portal either by direct access or through links, and user authentication accessing the portal will be made through Access Management. Please refer to topic 2.1 “As Is” IdM integration with Liferay portal for a fully and comprehensive description of the existing integration between the two solutions, as well as its weakness and strengths.

Later in this document under chapter 4 *MAP integration approach* the various “To Be” scenarios at EMSAs disposal are described for the integration of the new MAP portal, IdM and the remaining EMSA maritime applications.

Data Repositories

Oracle Database is the software tool proposed for satisfying the storage requirement. It will be used for Liferay Portal as well as for media gallery repository.

LDAP

The LDAP server hosts and organizes the data for user authentication and authorisation. Working side by side with the Oracle Access Management and its access policies, the LDAP acts as the repository for user and services credentials for accessing EMSA resources.

2.1 “As Is” IdM integration with Liferay portal

The Oracle IdM is EMSA's enterprise identity management system designed to manage user access privileges across all of the organization's resources, throughout the entire identity management lifecycle.

EMSA is using IdM to have a centralized user management console for all EMSA maritime applications. The IdM was customized to EMSA user management and application management needs with the goal of having only one place where the information is kept and updated, and simultaneously, have it automatically replicated to the maritime application or applications to which the user being managed will interact with.

The following table briefly describes the logical data that IdM manages.

| IdM logical data | Description |
|-------------------------------|---|
| User personal data | The personal data that IdM user management console holds regarding users is: <ul style="list-style-type: none">• User Id;• First / Middle / Last Name;• Email;• Password / Password confirmation;• Authority type;• Country;• Organization. |
| Application components | In IdM the EMSA administrator is able to select one or more maritime application roles that the user will have access to. Typically this information maps directly to Liferay user groups |

When IdM replicates the user and access data over to EMSA maritime applications, it does so by following an established set of rules. These rules enable IdM to automatically parameterize the Liferay portal without human intervention besides the one that is done on IdM user management console.

These mapping rules must be configured in advance on Liferay portal either manually or automatically by invoking Liferay Services. The rules outlines the Liferay structure to the IdM data that is inputted on the user management console and enables the automatic parameterization described.

This parameterization typically is done once. In case in the near future changes to the user groups are needed this parameterization must be changed and involve manual effort.

Presently the IdM does not support components parameterization (custom behavior). The mapping rules and configuration procedure described on this document is available on EMSA Testing environment.

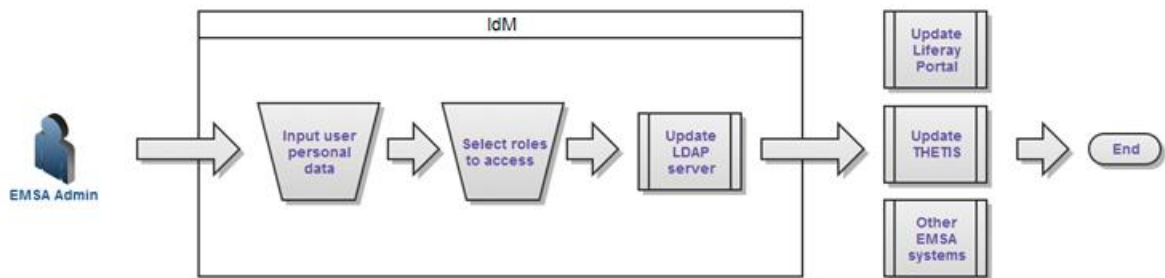
The following table describes the mapping rules that are in place in EMSA to support IdM replication procedure with Liferay portal.

| EMSA maritime applications | Liferay structure | | | | |
|--|--|--|--|---|--|
| | Site ¹ | Page | Role | User | User Group |
| Default behavior | On Liferay there is a <i>Site</i> configured for every maritime application | IdM does not manage Liferay pages, this management is done manually in Liferay | <p>The role controls the access to the page and is associated to one or several user groups.</p> <p>IdM does not manage Liferay roles, this management is done manually in Liferay</p> | <p>The user in Liferay is created based on the data retrieved on the IdM user management console;</p> <p>On IdM the EMSA admin or other dully certified user chooses the user group that the new user will be assigned to</p> | The user group is used to manage access at option level |
| Custom behavior (Testing environment) | On Liferay there is a <i>Site</i> configured for every application component | The same as above | The same as above | The same as above | The user group is used to manage access at component level |

¹ Since Liferay version 6, what was called *Community* changed its name to *Site* although the functionality and concept are the same. In this document it is used the more actual term *Site* when referring to Community.

2.1.1 EMSA maritime applications default behavior

The picture below describes briefly the current maintenance procedure taken on IdM to configure a new user for an application with the default behavior.



Typically the application administrator (or any other user with the right IdM privileges) accesses the user management console and navigates to the user creation page.

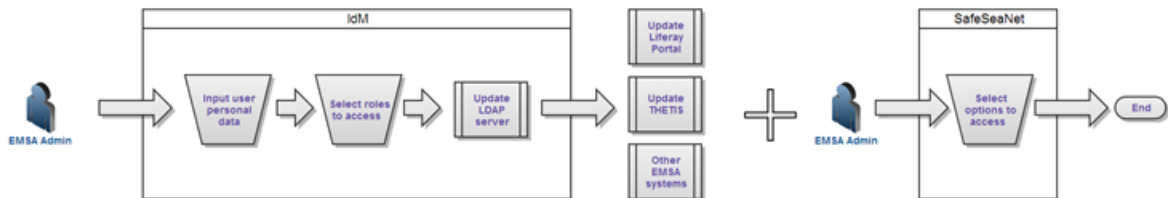
Within this page the administrator is able to input the user personal data and choose which roles the user will have access to. Once this data is saved the IdM will automatically update the LDAP server.

If LDAP is updated successfully IdM will then begin an asynchronous process to replicate the new data to the remaining EMSA applications within its landscape (e.g. Liferay portal, THETIS, and others): configure the new user and add him to the user group or groups that the administrator selected on the IdM user management console.

2.1.2 EMSA maritime applications custom behavior

The maintenance procedure for the maritime applications with custom behavior described here is currently available only on EMSA Test environment but is a good example of the possibilities that IdM platform offers.

The procedure is slightly different from those with the default behavior as shown in the picture below.



In this case the maintenance procedure is a two-step process in which the EMSA administrator starts in the IdM system and finishes it in the maritime application, i.e. SSN.

Typically the application administrator with the right IdM privileges accesses the user management console and navigates to the user creation page. Within this page the administrator is able to input the user personal data and choose which components the user will have access to. This last configuration is specific to custom behavior applications, as the default behavior what is configured is the access to the application options.

Once this data is saved the IdM will automatically update the LDAP server. If LDAP is updated successfully IdM will then begin an asynchronous process to replicate the new data to the remaining EMSA applications within its landscape (e.g. Liferay portal, THETIS, and others): configure the new user and add him to the user group or groups that the administrator selected on the IdM user management console.

The second step in this process is also specific to the custom behavior application. The EMSA administrator with the right SSN privileges must manually access the administration console and chooses which options the user will have access to.

3 MAP implementation approach

This chapter describes the implementation approach for the MAP portal regarding the approved layout during WP1 project phase.

Within the chapter the following topics will be addressed:

- How the authentication process will be implemented and integrated with EMSA IdM;
- How the theme and layout will be configured to support the portal pages design;
- How and where EMSA administrators will be able to configure the components / options concept described in the tender;
- How will Liferay support permissions, rules and user groups for each EMSA applications inside the MAP portal.

Lastly, a requirements matrix closes the chapter resuming, for each requirement listed on the tender, how it can be addressed by the contractor of MAP Phase 2 Tender.

3.1 Authentication process

Authentication is delegated to the horizontal EMSA IdM platform currently in use which allows single-sign-on capabilities across the maritime applications, MAP portal included.

Whenever a request to a private page is done and the user credentials are not yet defined the MAP will redirect the user to the portal login page which will be customized to have the layout defined in the WP1 project phase.

By logging in the MAP portal this user will be automatically logged in every system of EMSA that he has access to, using the single-sign-on capabilities of IdM. Naturally, when signing off the MAP portal, this user will also be signed off of every system of EMSA using the same single-sign-on capabilities of IdM.

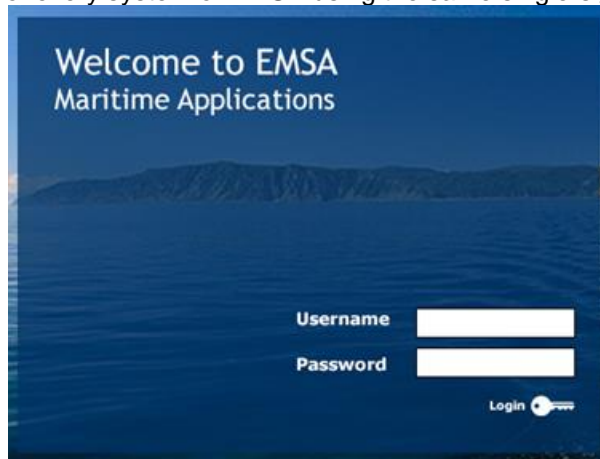


Figure 4 - MAP portal user login form

Despite the layout customization this portlet will also be technically customized to be integrated with IdM using its API to request user authentication based on the data that the user will input in the portal login form. This integration is already available on the Testing environment and can be reused during the development of the MAP portal.

IdM will process this form data and will invoke the Liferay login process differently accordingly to the success or not of the credentials validation. User interaction will be made only through MAP UI which means a coherent and single entry point to EMSA users.

Upon valid authentication the user is redirected to the MAP private user page loaded with only the options that his user profile was configured to have access to.

3.2 MAP portal theme

The design approved on the previous WP1 project task will be implemented as standard portal theme following the specifications described on the GID (Graphical Interface Design) document.

The layout of MAP is based on a square matrix, which means that modules (areas) have a minimum size of 120x120 pixels. The portal will have a standard 1024x768px in size, but it can easily be grown or shrink proportionally by applying multiples of the 120px squares.

The portal theme can be configured to have variations of background images so that the portal administrator can only use images pre-approved by EMSA communication office.

Due to the relative large size of the background image theme, in order to minimize traffic between the browser and the server, the images should use JPEG format with compression. Besides that, a copy of those image files should be deployed to the Apache Webgate. Whenever changes are made to the portal theme the new or updated images have to be copied again to the Apache Webgate.

3.3 Homepage

There are 4 primary elements in the MAP portal homepage:

- Login;
- Services/Portals;
- Links;
- Public Alerts.

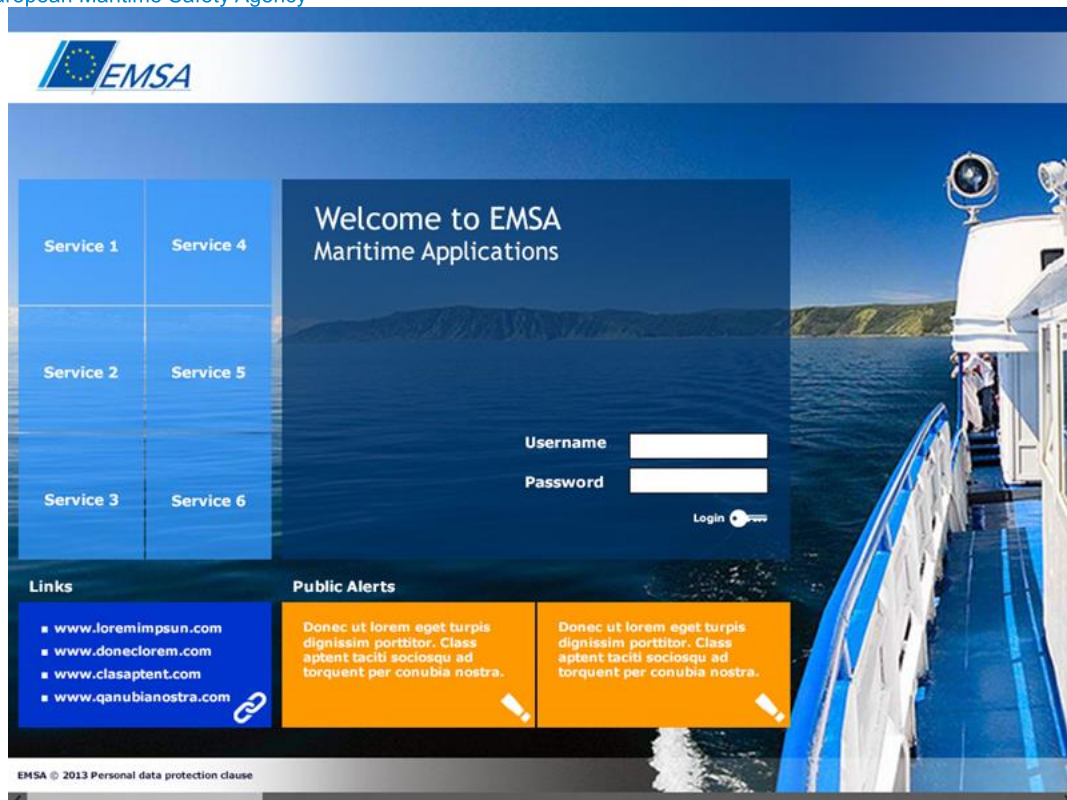


Figure 5 - MAP portal homepage

Portlet Login

As described on chapter 3.1 *Authentication process* the portlet login will be customized to be integrated with IdM. This integration is already available on the Test environment and can be reused on the development project phase of the MAP portal.

This portlet has a dual functionality. If the user is still not logged in, the form is shown as can be seen on *Figure 5*. As soon as the user is logged on the form is replaced with the standard message that Liferay uses and the logoff button. As an example the message used can be something like “You are signed in as <user name>”.

Service / Portals

The Service / Portals area will be a Liferay web content with a structure and template associated, so that 6 links can be configured as specified in the design. If more links are needed the structure can be changed so that the area of each link is divided proportionally. As an example if EMSA needs 12 links, every link area would be divided in two.

Links

Like the previous *Service / Portals* the *Links* area will be a Liferay web content with a structure and template associated.

Public Alerts

The *Public Alerts* will use the *Alerts portlet* customized to the portal theme.

3.4 User private page

After user authentication on MAP portal, the *User private page* is loaded which is composed of 4 default modules (areas): *Applications Options*, *EMSA Announcements*, *Portal Portlets* and the *Top Menu*.

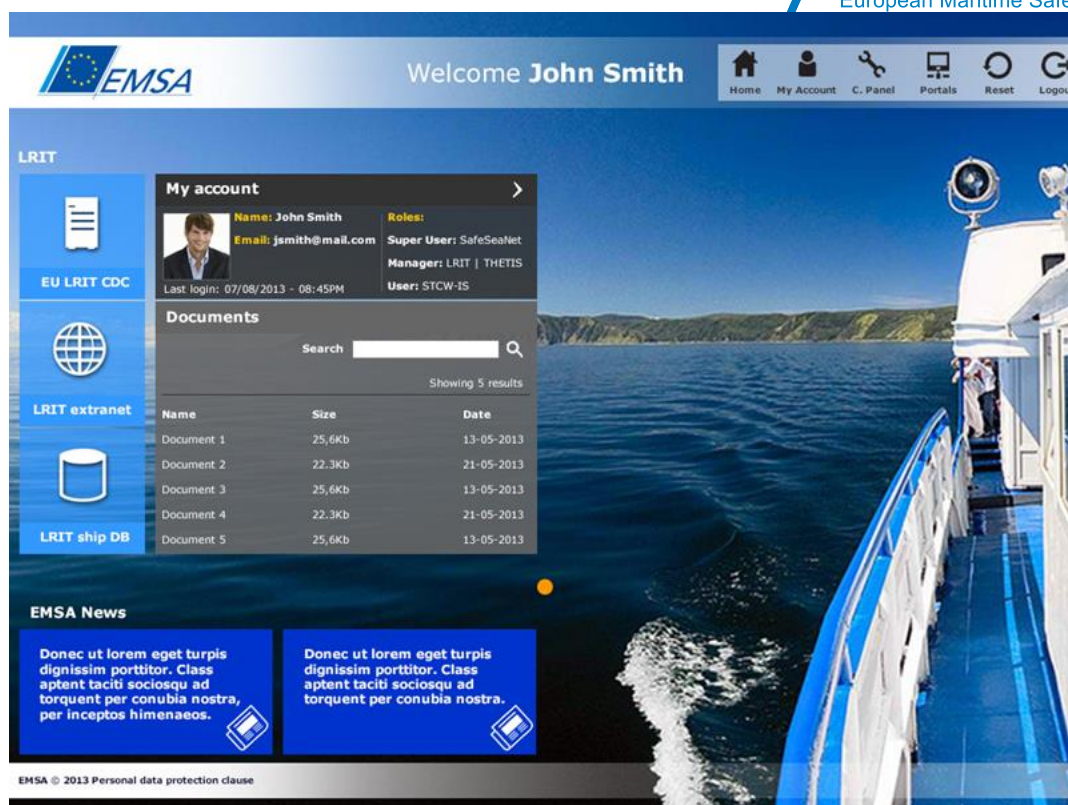


Figure 6 - MAP portal User private page

Top Menu

The *Top Menu* will provide navigation in the platform with easy access to some important features. In order to keep them available along the platform they are placed in the top of the page, and will replace the portal *Dockbar*.

This module provides a menu with direct access to some useful areas in the MAP portal:

- Home, access to the homepage is provided by clicking directly in the Home button;
- My Account, link to the My Account portlet loaded with common user data available on IdM. To change this data (it is read-only on the MAP portal) this portlet will have a link to a page inside IdM where changes to this data can be made;
- Control Panel, link to Liferay Control Panel, which is available or not depending on the user's access level;
- Portals (with a sub menu to the various EMSA Portals and its application options), restricted according to the user's access level;
- Reset, by clicking on this link the standard page layout is again applied to this user's private page, resetting any changes that were previously made;
- Logout from the private portal area and through IdM from any system that the user is logged in is provided by clicking in this button.

EMSA Announcements

The *Announcements* portlet will support this module, and will be customized to the approved design.

Portal Portlets

The *My Account* module requires a custom portlet to be fully supported. The portlet *Documents and Media* can be used to support the *Documents* module, and will be customized to the approved design.

Applications Options

A new portlet will be developed based on the logic of the existing portlet *My Sites* in order to support this module and follow the matrix specified on the WP1 GID document. To enable the configuration of colors

and icons the portlet can have a configuration screen where the portal admin can chose for every site its color and for every application option its icon, achieving what is defined on the WP1 GID document.

Scroll bar

Below the main screen area, small orange and white dots show the user how many more pages are available to scroll. This module requires a custom portlet to be fully supported, which by default will be attached to the portal theme to the correct position as shown on the WP1 GID document.

3.5 Components / Options configuration

The components and options configuration on Liferay will enable exposing the maritime applications on the MAP portal with a common entry point.

From the portal perspective the application *Components* will be configured as a site, and the application *Options* as a portal page.

The table below outlines, as an example, some of the components and options to set in Liferay following the approach that will be implemented on MAP portal.

| MAP | Component | Option |
|------------------|----------------------|--|
| Liferay | Site | Page |
| Default behavior | STCW, THETIS, etc. | Criteria (STCW), BI Reports (THETIS), etc. |
| Custom behavior | SSN GI, SSN BB, etc. | Vessel Tracking, Vessels, etc. |

3.6 Roles and user groups

Before presenting the approach that will be followed on MAP portal regarding *Roles* and *User Groups* a brief introduction to Liferay's interpretation of these concepts is made.

User Group

In Liferay a *User Group* allows the portal administrator to create groups of users that traverse the organizations hierarchy. They can be used to create arbitrary groupings of users who don't necessarily share an obvious hierarchical attribute, and can be assigned to multiple user groups.

User Groups are most often used to achieve one of the following goals:

- To simplify the assignment of several roles to a group of users;
- To simplify membership to one or more sites by specifying a group of users;
- To provide predefined public or private pages to the users who belong to the user group.

Roles

Roles are used to define access to a particular function or functions (ex: portlet applications) within the portal, according to a particular scope. As an example, a role named INSPECTOR is likely to have access definitions relevant to the specific options delegated to it. Users who are placed in this role will inherit these permissions

Roles can be scoped by portal, site or organization. The differences between the three types of roles can be described as follows:

- Regular role: Access is defined at the portal level and applied to the full portal;
- Site role: Access is defined at the portal level and applied to one specific site;
- Organization role: Access is defined at the portal level and applied to one specific organization.

MAP portal Roles and User Groups approach

Within the MAP portal two distinct behaviors are supported regarding EMSA maritime applications: the *default* and the *custom*.

While in the *default* behavior users that belong to the same user group have access to the same application options, on the custom behavior two different users can belong to the same group and have access to distinct application options. Therefore a slightly different approach is necessary when parameterization of *Roles* and *User Groups* are made on MAP portal, as depicted below.

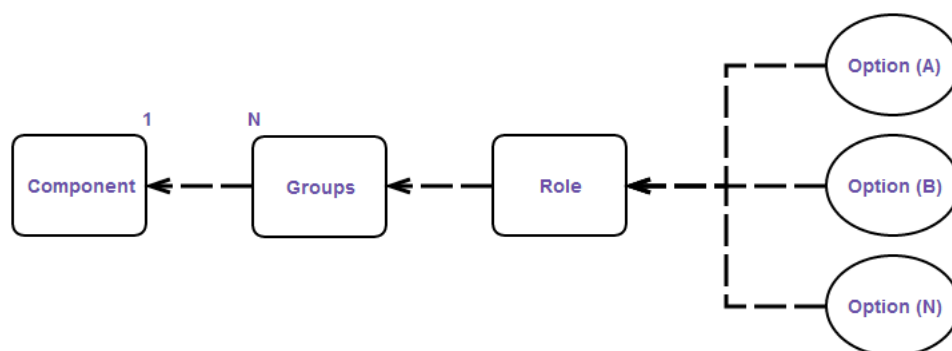


Figure 7 - Default behavior Liferay parametrization

For the default application behavior one particular *Role* can give access to one or many application options for a particular *User Group* that belongs to a *Component*. From Liferay perspective the *Component* is a *Site* and the *Option* is a *Page of type Portlet*.

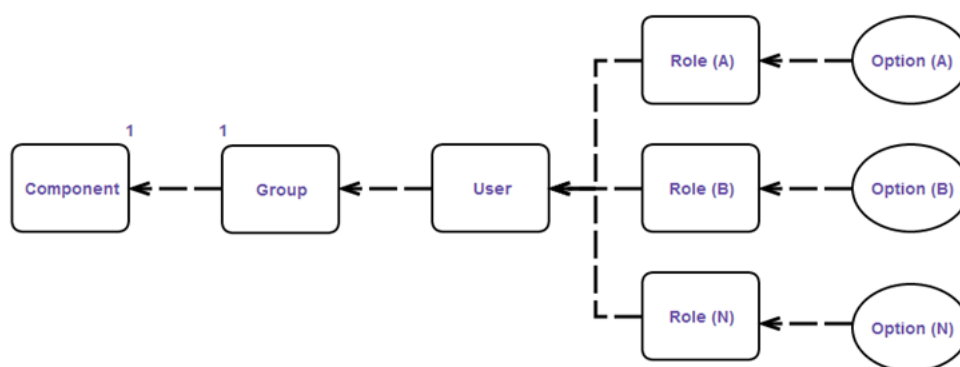


Figure 8 - Custom behavior Liferay parametrization

For the custom application behavior access to application options is managed through direct associations between *Role* and *Page*. For the User to be granted access to the application options it is necessary to have as many Roles as Options that he will have access to (1 to 1 association). The *User* is assigned to a particular *User Group* that belongs to a *Component*. From Liferay perspective the *Component* is a *Site* and the *Option* is a *Page of type URL*.

In this behavior the *Role* has to be assigned directly to the portal *User*, whilst in the default behavior the Role is associated to the *User Group*.

3.7 Requirements matrix

| Requirement | Implementation approach |
|-------------|---|
| MAP_GEN_1 | MAP will be a fully configurable portal application, supported by a Liferay Portal framework. MAP Portal development will support both Liferay versions that EMSA uses. |
| MAP_GEN_2 | WP1 design followed what is requested by EMSA, namely: |

| Requirement | Implementation approach |
|------------------|--|
| | <ul style="list-style-type: none"> • <u>System blocks</u>; • <u>Interfaces for external blocks</u>; • <u>Configuration block</u> definition and implementation; • <u>SSN application modification</u> for using MAP common entry point. |
| MAP_GEN_3 | <p>To achieve what is requested by EMSA, the following technical solutions for the User private home page can be used:</p> <ul style="list-style-type: none"> • The use of Liferay objects to provide functionalities like Wiki, FAQ and similar; • The use of iFrames to have external sites embedded on the MAP system; • The use of hyperlinks using appropriately designed function buttons for functionalities related to the user account and / or private personal page. |
| MAP_GEN_4 | <p>The map site overview was used as guidance when working on the specification document. The graphical design enables the flexibility of choosing which blocks will be embedded in the page or implemented as distinct pages.</p> |
| MAP_GEN_5 | <p>Specification followed the goal to exploit the most of Liferay functionalities when implementing the MAP system.</p> |
| MAP_FU_1 | <p>By exploiting the full potentiality of Liferay functionalities, EMSA will have a portal graphic design which is object driven and easily customizable. With MAP, EMSA will have a centralized entry point with a coherent and common user interface. Most users that use EMSA systems have little technical background, therefore having a friendly and usable system is important.</p> |
| MAP_FU_2 | <p>MAP system will be acting as common front-end. The portal homepage will act as both the welcome page and the goodbye page depending on the current user context. The <i>My account portlet</i> will enable user to consult on MAP portal relevant information of his profile. A link on this portlet will redirect the user to a page inside IdM where changes to this data, password included, can be made.</p> <p>On MAP system, IdM will be the authentication provider for EMSA application users between MAP and other systems when private pages are being requested. Utilities / services not currently accessible through IdM can be configured as components.</p> <p>By using Liferay functionalities (out-of-the-box) it is possible on the home page to have textual warnings, photos, images and other kinds of content, announcements etc.</p> |
| MAP_FU_3 | <p>The portal homepage will be implemented to have a login form embedded while the change/forgot password functionality is made available through link to a specific page inside IdM. Other functionalities of this page (public sites and news, other sites and general functions) will also be embedded objects.</p> <p>The service module will be configurable through a structure.</p> |
| MAP_FU_4 | <p>The portal homepage will again be used as the landing page whenever a previously authenticated user logs out from MAP, any Private Functionality or Maritime Application.</p> |
| MAP_FU_5 | <p>A structure can be configured allowing for dynamic management of these links from the Control Panel of Liferay. Access to this functionality will be limited only to a specific administration role.</p> |
| MAP_FU_6 | <p>Similar to the above requirement, a structure can be configured to allow for dynamic management of these links from the Control Panel. Access to this functionality will be limited only to a specific administration role.</p> |
| MAP_FU_7 | <p>Liferay news and announcements have out-of-the-box functionalities to show news</p> |

Requirement Implementation approach

| | |
|------------------|---|
| | <p>and announcements to certain groups of users and will be reused to support this requirement.</p> <p>Despite this it is necessary to customize both portlets in order to have this content organized by topics and importance grades with different look and feel.</p> <p>Liferay should be parameterized to limit access in the Control Panel to the configuration functionality to users on the security levels described in this requirement.</p> <p>The customized portlet will support the status and can be shown as banners accordingly to importance. Low important announcements will be available through link to a different page.</p> |
| MAP_FU_8 | <p>To support the generic functions it should be used Liferay out-of-the-box functionalities Wiki, FAQ, Document and Image library; for disclaimers and agreements it is necessary to configure specific structures to allow for dynamic management of this content.</p> <p>The management of the generic functions will be limited to a specific administration role, and the lifecycle functionalities available can be extended if Liferay default functionality is not sufficient for EMSA needs.</p> |
| MAP_FU_9 | <p>This requirement will be achieved through a login form embedded into the portal homepage integrated with EMSA Identity Management system.</p> <p>Regarding the options Change Password and Forgot Password, is made available through link to a specific page inside IdM from MAP portal itself.</p> |
| MAP_FU_10 | <p>The user private home page will be parameterized as specified on WP1 GID document.</p> <p>The user can configure it's private page to his personal preferences although the portal will limit the customizations available in order to keep the page's look and feel as expected by the MAP design standards.</p> <p>It is possible to have functional blocks that are mandatory to exist on this page and that the user can not remove. This behavior is possible to be configured on the page template and can be used for the "Maritime Application Navigation" or others that EMSA intends to have.</p> <p>For news and announcements, these portlets can be setup to dynamically collapse (minimized) when no new content is available to show.</p> <p>The rest of the blocks identified in figure 3 of EMSA tender will be on MAP portal as embedded objects which can be minimized / collapsed.</p> <p>It is possible for users to have the possibility to revert to the default User Home Page configuration when necessary.</p> |
| MAP_FU_11 | <p>To support the generic functions it should be used Liferay out-of-the-box functionalities Wiki, FAQ, Document and Image library. Access to these functionalities will be limited to a specific administration role.</p> <p>The generic functions available can be extended if Liferay default functionality is not sufficient for EMSA needs.</p> |
| MAP_FU_12 | <p>A custom portlet should be developed to manage the user account data as</p> |

| Requirement | Implementation approach |
|-------------------|--|
| | described in this requirement. |
| MAP_FU_13 | <p>Liferay news and announcements have out-of-the-box functionalities to show news and announcements to certain groups of users and will be reused to support this requirement.</p> <p>Despite this it is necessary to customize both portlets in order to have this content organized by topics and importance grades with different look and feel.</p> <p>Liferay should be parameterized for managing this functionality from the Private Home Page accordingly to the security levels described in this requirement.</p> |
| MAP_FU_14 | For this requirement the portlet <i>EMSA pages</i> (My Sites portlet) can be rewritten to have the functionality desired. |
| MAP_FU_15 | Like as above. |
| MAP_CONF_1 | The IdM already fully support this requirement and therefore the groups configuration requested will not be parameterized on MAP portal. |
| MAP_CONF_2 | The out-of-the-box Liferay control panel will enable administrators (regarding the profiles that EMSA mention in the tender) to choose which options (considered as a pair of Page + Role) are available. Besides this, each option has itself a configuration menu to individually configure the embedding behavior of the option. |
| MAP_CONF_3 | The configuration page will have the functionality to configure user access option by option and also application by application. |
| MAP_CONF_4 | <p>The configuration page that is going to be developed for MAP system will follow what is described in this requirement.</p> <p>The complexity of functions that EMSA asks to have will necessarily demand to have a specific portlet or portlets that will be available from Control Panel.</p> |
| MAP_CONF_5 | Liferay provides an interface on JSON / SOAP services. This interface should be extended with the custom portlets functionalities that will be developed under MAP Phase 2 Tender. The contractor should use Liferay Service Builder to achieve this extension. |
| MAP_CONF_6 | <p>The portlet specification has support for help functionality. This specification can be used to support help in the custom portlets that will be developed for the configuration functionality.</p> <p>The functionality will be available on the Control Panel of MAP portal.</p> |
| MAP_CONF_7 | <p>This request is similar to others describing announcements requirements, like the MAP_FU_7 and MAP_FU_13. The portlet will be customized to support what is described and maintaining as much as possible the functionalities that Liferay brings out-of-the-box. If the customization level is very complex it may be better to have a new portlet that is based on the original announcement portlet than to have an hybrid one that can be complex to maintain.</p> <p>Regarding the scheduling of interventions, Liferay calendar can be parameterized to have this data, and the portlet <i>Event Display</i> to have it shown on the user home page or similar.</p> |

4 MAP integration approach

This chapter describes the 4 integration scenarios between MAP and EMSA maritime applications.

The described scenarios are diverse and cover different integration strategies such as:

- Maintain the “As Is” integration framework;
- Adjust the IdM user management console to support management of application options;
- Centralize the user management console on Liferay portal;
- Manage the application options by invoking Liferay web services.

The chapter closes with a qualitative assessment of the 4 scenarios and an implementation recommendation under the MAP portal project scope.

4.1 MAP integration approach scenarios

As briefly described on the chapter 2.1 “As Is” IdM integration with Liferay portal the current integration between Liferay portal and IdM is characterized by:

- The IdM is the central application where user information is kept and updated, and simultaneously, have it automatically replicated to the maritime application or applications to which the user being managed will interact with;
- The IdM follows an established set of rules which enables IdM to automatically parameterize the Liferay portal without additional human intervention besides the one that is done on IdM user management console;
- Default application behavior is supported on IdM through the replication rules of *Site* which represents an maritime application and *User Group* which manages access at option level;
- Custom default behavior is still not supported but a possible approach is available in EMSA Testing environment where a *Site* represents an application component and the *User Group* manages access at component level.

The following table presents an assessment of the current *Strengths* and *Weakness* that the “As Is” integration is characterized by and provides a mental background for the “To Be” scenarios regarding the MAP integration approaches that are described in the following pages.

| Weakness |
|--|
| IdM management console lacks out-of-the-box a place where SafeSeaNet options management can be done, which requires a two-step approach when configuring a new user: first on IdM input the basic data and then on SSN to manage application options. |
| Every time that new user groups or new options are added at maritime application level, IdM must be customized in order to reflect those new configuration options at the user management console, as each new application functionality (or option) may have different needs in terms of data, security model, etc. |
| Paris MoU group integration is a good example of custom needs which cannot be done without specific tailoring and manual intervention. |

Strengths

Centralized user management console for all EMSA maritime applications

Solution fitted to the needs of EMSA at user management and applications access management level

4.1.1 Scenario 1 – Maintain the “As Is” integration framework

Under this scenario the short term priority is given to the progressive stabilization and increased exploration of the IdM platform over the entire EMSA technical landscape.

The current architecture is kept meaning that:

- For default behavior maritime applications both user creation and user association to one or several user groups is done on IdM user management console;
- For custom behavior maritime applications a two-step configuration procedure is needed, first on IdM to create the user and the association to one or several user groups, and then on SSN to manage access to application options;
- Additional developments on IdM and Liferay are avoided.

Under this scenario it is recognized that the existing drawbacks related to the application options management are not severe enough that justify developing a new integration framework to solve the issue. The MAP portal can be manually configured to support the components and options for both the default and custom maritime application behaviors as described on chapter 3 *MAP implementation approach*.

In this scenario when a new user is added in SSN, or a new option is added / removed for the user it is necessary to configure on Liferay the user association to the options that he is supposed to have access to. In this scenario a three-step configuration would be necessary:

- First on IdM, to create the user and choose components;
- Second on SSN to give access to options to the new user;
- Third, to do the same configuration at option level on Liferay MAP portal.

| Scenario rational | |
|---|--|
| Under this scenario the short term priority is given to the progressive stabilization and increased exploration of the IdM platform over EMSA technical landscape, this way avoiding additional developments on the platform and reassigning investment effort to other business areas. | |
| Advantage | Disadvantage |
| <ul style="list-style-type: none"> • Reuse the current IdM user management console that provides a very acceptable set of functionalities; • The only scenario where no additional investment is needed. | <ul style="list-style-type: none"> • The two-step application options access configuration is maintained “As Is” and a third step is added to replicate the option access configuration on MAP portal (for SSN usage only). |

4.1.2 Scenario 2 – Adjust the IdM user management console to support application options management

Under this scenario the short term priority is to expand the functionalities of IdM user management console so that a more comprehensive user management can be achieved for the custom behavior maritime applications.

This console would be changed so that it could support the custom behavior application options management. With this upgrade an effective and centralized management could be done here solving the current issue of the need to make the configuration on two different applications based on a two-step process.

The user management process for the default behavior maritime applications would be the same.

| Scenario rational | |
|--|---|
| Under this scenario the short term priority is to expand the functionalities of IdM user management console to allow a more dynamic management of the application options of the custom behavior maritime applications | |
| Advantage | Disadvantage |
| <ul style="list-style-type: none"> • Centralize the remaining user management configuration steps on the application where it is already done; • Solve the issue of the two-step configuration procedure needed for the custom behavior maritime applications. | <ul style="list-style-type: none"> • This approach requires IdM to have a parameterization update whenever a new option or component is defined at SSN level. This approach implies a more stable SSN component and option definition; • This scenario implies that IdM shall be expanded in functionality to support the custom behavior applications and this change requires: <ul style="list-style-type: none"> ○ The development of a new synchronization mechanism between IdM and all maritime applications for every parameter integrated into IdM; ○ The removal of functionalities from the different maritime applications; ○ Extensive testing of the new procedure on every application at EMSA landscape. |

4.1.3 Scenario 3 – Move the user management console from IdM to Liferay portal

Under this scenario the short term priority is to centralize the user management console on Liferay portal.

By taking advantage of the portal *User Interface* it is possible to develop a unique portlet where in one step the user personal data can be inputted and access to components and options can be defined.

Once this GUI is implemented, it will be possible to manage components and options, meaning that:

- For the default behavior, when a component is added the correspondent *User Group* and *Role* will be added automatically to Liferay; if a new option is added a new *Page* will be created automatically;
- For the custom behavior, when a component is added the correspondent *User Group* will be added automatically to Liferay; if a new option is added a new *Page* and *Role* will be created automatically;

With this approach and to avoid the two-step configuration of the custom behavior applications, an interface between Liferay and SSN using web services would be developed in order to export the definition of the new components and options managed on the MAP portal.

Under MAP the new development would be centered only on:

- Data input forms on MAP portal to manage user data, components and options access;
- Exporting to IdM the user data gathered on MAP portal;

- The export to SSN of the new components and options defined at the portal level.

In this scenario the current replication process that IdM handles will be used to replicate the new user data that Liferay exported to IdM, reusing the present implementation.

| Scenario rational | |
|--|--|
| Under this scenario the short term priority is to centralize the user management console on Liferay portal taking advantage of the User Interface capabilities and using IdM only as an SSO platform | |
| Advantage | Disadvantage |
| <ul style="list-style-type: none"> • Solve the issue of the two-step configuration procedure needed for the custom behavior maritime applications; • Exploit the more advanced User Interface functionalities that Liferay provides regarding user management when compared to what IdM has. | <ul style="list-style-type: none"> • Replicates what will be in the future the functionalities of the common management console; • User management from applications not running on MAP would have to be centralized on it. • Implies the development of a complete set of functionalities that already exists and is currently in use at EMSA, to address a specific issue. This change requires: <ul style="list-style-type: none"> ○ The development of a new synchronization mechanism between Liferay and all maritime applications for every parameter integrated into Liferay; ○ The removal of functionalities from the different maritime applications; ○ The re-implementation of all of the provisioning processes; ○ Extensive testing of the new procedure on every application at EMSA landscape; extensive testing of all IdM processes and integrations. |

4.1.4 Scenario 4 – Manage the application options by invoking Liferay web services

Under this scenario the short term priority is to address the current limited application options management maintaining as much as possible the technical landscape and minimizing EMSA investment effort.

To solve the custom behavior application option management constraint that IdM presents (SSN autonomy changes without need of manual IdM configuration) and to avoid changing both IdM and Liferay, the custom behavior application can invoke Liferay web services to parameterize these automatically whenever changes occur at SSN.

This way the management of this information is centralized on SSN and enables a better degree of autonomy when compared to the scenario 2 where this configuration would be centralized on IdM and changes would be made manually to IdM whenever new options would be necessary to add to IdM parameterization.

Scenario rational

Under this scenario the short term priority is to address the current limited application options management maintaining as much as possible the current architecture and minimizing EMSA budget effort

| Advantage | Disadvantage |
|--|---|
| <ul style="list-style-type: none"> • Solve the issue of the lack of custom behavior autonomy when compared to scenario 2; • Enable an external automatic MAP portal parameterization of the options when compared to scenario 1; • Less investment needed when compared to scenario 2 and 3; • The vast majority of EMSA maritime applications will not be affected. | <ul style="list-style-type: none"> • Requires an interface development between the custom behavior application and MAP portal; • The two-step parameterization procedure remains valid, as on IdM the user and component access is defined, while on SSN the options access is defined. |

4.2 Map integration approach recommendation and conclusions

The *Figure 9* shown below plots the identified integration scenarios against Effort and Integration axis.

The **Effort** axis measures the High (signal as '+'), Medium or Low (signal as '-') level that EMSA will need to commit in order to implement the scenario. The **Integration** axis measures the High (signal as '+'), Medium or Low (signal as '-') level of integration between EMSA applications that will be achieved by implementing the scenario.

The best scenarios are those that fit to the top right quadrant (highlighted with green color), which demands a low level of development effort and provides high integration between EMSA applications.

Under this assessment and taking into account a balanced compromise between level of integration and effort needed the recommended scenario is number 4. This is a scenario that centers mostly on EMSA architecture reutilization, reducing custom developments to the minimum necessary and limited to the applications that need them.

For scenario 4, and in order to obtain an automated options management system, it is suggested that EMSA implement, for application that present a custom behavior level (i.e SafeSeaNet) an interface to invoke the Liferay WSDL in order to automatically generate the configuration that it requires. Please refer to chapter 5 *Annex I* - for a description of the web services that can be invoked to parameterize this information on Liferay.

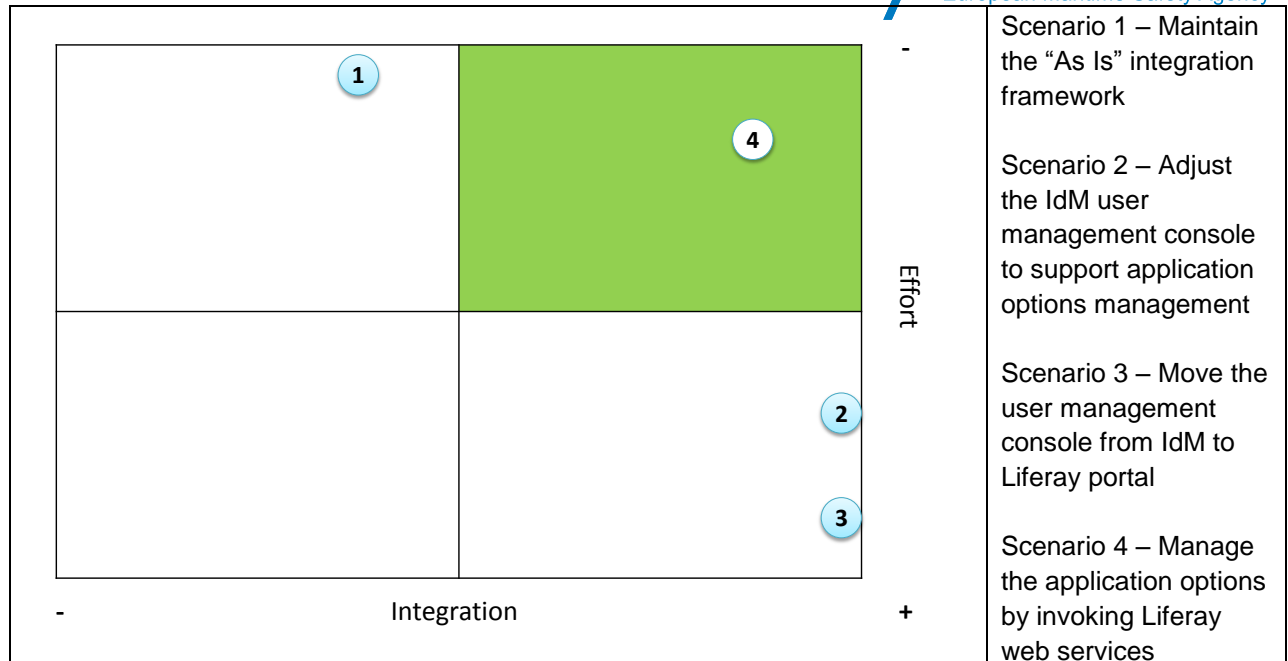


Figure 9 - Scenarios relationship between integration and effort levels

Regarding scenario 1 it is assumed that the existing drawbacks related to the application options management are not severe enough to justify developing a new integration framework to solve the issue. Therefore under this assumption on scenario 1, to avoid the development of new functionalities, a three step process is needed for the configuration of the custom behavior application options:

- The current two-step approach involving IdM to create the user and choose components to which he has access and on SSN to give that user access to options;
- On MAP portal the third step involving replication of the same configuration at option level that were made on SSN.

The remaining scenarios 2 and 3 presents two technical alternatives to achieve a full compliance of EMSA integration requirements, but at the expense of a significant increase of development effort that would be needed to implement either scenarios, when compared to scenarios 4 and 1.

Scenario 3 is the most effort demanding mainly because it implies developing a complete set of functionalities at user, component and option management on the MAP portal to address the specific issue that option management of custom behavior applications is not managed on IdM.

Under this scenario and in order to comply with the centralized user management requirement, that would also imply the centralization on MAP of the user management from EMSA applications that are not running on Liferay.

Scenario 2 suggests a different approach to the one described on scenario 3. In scenario 2 it would be IdM that would be changed to support the requested option management of custom behavior applications. With this upgrade an effective and centralized management could be done here solving the current issue of the configuration being done on two different applications on a two-step process.

This scenario however requires a more stable SSN component and option definition, mainly because changes on component or option definition requires parameterization changes on IdM that have to be done manually. This means less degree of autonomy when comparing to the remaining scenarios.

Considering the MAP project scope and objectives pertaining a unified and coherent entry point, and simultaneously to have minimum development time effort and reusing as much as possible of Liferay's functionalities, the scenario that is considered the most adequate to achieve these goals is scenario 4.

5 Annex I - Liferay WSDL for managing options

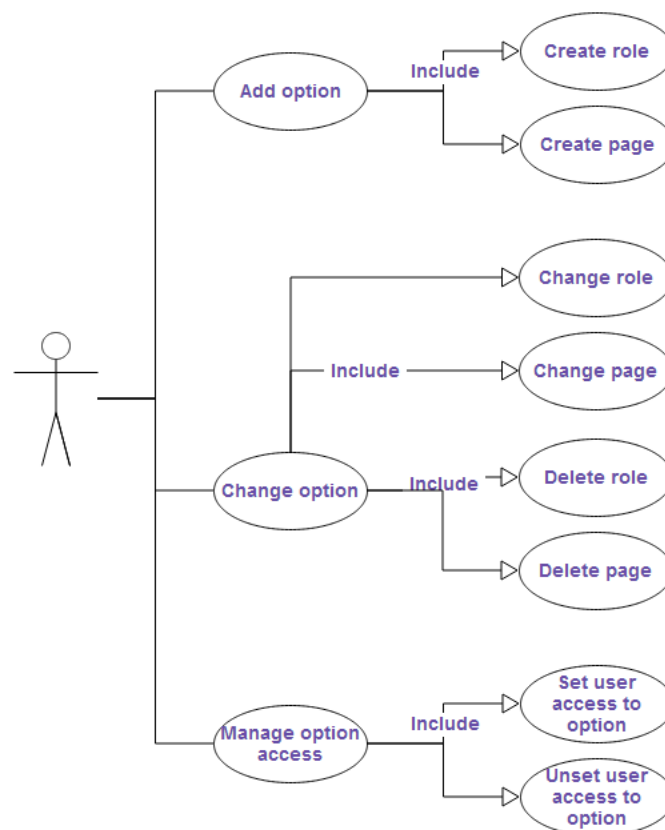
The manual configuration process described on *Annex II - Liferay User Management GUI* can be done automatically by externally invoking the Liferay WSDL. For this purpose a brief identification of the use cases follows and description of the Liferay web services that will support them.

The purpose of this annex is to present implementation guidelines that the contractor of MAP Phase 2 may use in order to implement integration between the custom behavior application and Liferay.

These guidelines present a possible methodology in terms of implementation of scenario 4, and in no way should be considered as imposing a limitation on the contractor of MAP Phase 2 in the selection of the best technical approach to achieve the integration intended.

More detailed information regarding the web services listed in this document can be checked directly on Liferay portal through the following URLs:

- Liferay 5.2.3 SP5: <http://<portal URL>/tunnel-web/axis?wsdl>
- Liferay 6.1 GA2: <http://<portal URL>/api/axis?wsdl>



Add option use case

As previously described the action of creating an option implies on Liferay the configuration of a pair (page, role).

To add an option to Liferay the following steps should be implemented:

1. Create the role using *add-role* web service;
2. Create the page with type URL using *add-layout* web service;
3. Configure the page so that only the role that was created will have access to it:
 - a. Remove from the page the *Site Member* role permissions of *Add discussion*,

- Customize*, and *View* using *unset-role-permissions* web service;
 - b. Add to the page the role created with *View* permission using *set-role-permission* web service;
 - 4. Add to the role created the user or users that will be granted access to the option created:
 - a. Search the user id on Liferay using *get-user-id-by-email-address* or *get-user-id-by-screen-name* web service; for this to work it is mandatory that email or screen name must be unique within the portal;
 - b. Join the user to the role using *add-user-roles* web service.

Change option use case

Changing options on Liferay is possible through two different methods:

- Delete the option
 - Delete first the role that is related to the option using *delete-role* web service;
 - Delete the page that is related to the option using *delete-layout* web service;
- Update the option
 - To add more users to the option use *add-user-roles* web service;
 - To change the page data (e.g. title, description, etc.) or to change its parent page use *update-layout* or *update-parent-layout-id* respectively.

Manage option access use case

Giving or removing user access to a specific option is achievable using the following methods:

- Give access to the option
 - Join the user to the role using *add-user-roles* web service;
- Remove access to the option
 - Delete the user from the role using *unset-user-roles* web service;

Other Liferay web services that can be useful are listed next:

Liferay Web services available for users' manipulation:

- add-user-roles
- unset-user-roles
- get-user-id-by-email-address
- get-user-id-by-screen-name

Liferay Web services available for roles' manipulation:

- add-role
- delete-role
- get-role

Liferay Web services available for pages' manipulation:

- add-layout
- delete-layout
- get-layouts
- update-layout
- update-parent-layout-id

5.1 Examples of options configuration on MAP portal

Following the characterization of the use cases, a more detailed description of the web services that supports them is now explained.

Add Option

getGroup() to get the site

com.liferay.portal.service.GroupServiceUtil#getGroup

Returns the group with the name.

companyId long

the primary key of the company

name java.lang.String

the group's name

addRole() to add a new role - use for example (sitename_optionname) in the name of the role

com.liferay.portal.service.RoleServiceUtil#addRole

Adds a role. The user is reindexed after role is added.

name java.lang.String

the role's name

titleMap java.util.Map

the role's localized titles (optionally null)

descriptionMap java.util.Map

the role's localized descriptions (optionally null)

type int

the role's type (optionally 0)

addLayout() to add a new page - use for example (optionname) in the name of the page, private page, type url

com.liferay.portal.service.LayoutServiceUtil#addLayout

Adds a layout with empty maps for descriptions, keywords, and titles , and a names map containing a mapping for the default locale as its only entry. This method handles the creation of the layout including its resources, metadata, and internal data structures. It is not necessary to make subsequent calls to any methods to setup default groups, resources, ... etc.

groupId long

the primary key of the group

privateLayout boolean

whether the layout is private to the group

parentLayoutId long

the primary key of the parent layout (optionally {@link

com.liferay.portal.model.LayoutConstants#DEFAULT_PARENT_LAYOUT_ID})

name java.lang.String

Map the layout's locales and localized names

title java.lang.String

Map the layout's locales and localized titles

description java.lang.String
Map the layout's locales and localized descriptions

type java.lang.String
the layout's type (optionally {@link com.liferay.portal.model.LayoutConstants#TYPE_PORTLET}). The possible types can be found in {@link com.liferay.portal.model.LayoutConstants}.

hidden boolean
whether the layout is hidden

friendlyURL java.lang.String
the layout's friendly URL (optionally {@link com.liferay.portal.util.PropsValues#DEFAULT_USER_PRIVATE_LAYOUT_FRIENDLY_URL} or {@link com.liferay.portal.util.PropsValues#DEFAULT_USER_PUBLIC_LAYOUT_FRIENDLY_URL}). The default values can be overridden in portal-ext.properties by specifying new values for the corresponding properties defined in {@link com.liferay.portal.util.PropsValues}. To see how the URL is normalized when accessed see {@link com.liferay.portal.kernel.util.FriendlyURLNormalizerUtil#normalize(String)}.

serviceContext com.liferay.portal.service.ServiceContext
the service context. Must set the universally unique identifier (UUID) for the layout. Can specify the creation date, modification date and the expando bridge attributes for the layout. For layouts that belong to a layout set prototype, an attribute named 'layoutUpdateable' can be used to specify whether site administrators can modify this page within their site.

addResourcePermission (1 to 1) - The permission to view the page is given to the role created before, so the relation between the role and page is one to one, thus forming the application option

com.liferay.portal.service.ResourcePermissionServiceUtil#addResourcePermission

Grants the role permission at the scope to perform the action on resources of the type. Existing actions are retained. This method cannot be used to grant individual scope permissions, but is only intended for adding permissions at the company, group, and group-template scopes. For example, this method could be used to grant a company scope permission to edit message board posts. If company scope permission is granted to resources that the role already had group scope permissions to, the group scope permissions are deleted. Likewise, if group scope permission is granted to resources that the role already had company scope permissions to, the company scope permissions are deleted. Be aware that this latter behavior can result in an overall reduction in permissions for the role. Depending on the scope, the value of primaryKey will have different meanings.

groupId long
the primary key of the group

companyId long
the primary key of the company

name java.lang.String
the resource's name, which can be either a class name or a portlet ID

scope int
the scope. This method only supports company, group, and group-template scope.

primKey java.lang.String
the primary key

roleId long
the primary key of the role

actionId java.lang.String
the action ID

Assign User Option

getRole() - to get the role - use for example (sitename_optionname) to obtain the role of an option

com.liferay.portal.service.RoleServiceUtil#getRole

Returns the role with the name in the company. The method searches the system roles map first for default roles. If a role with the name is not found, then the method will query the database.

companyId long
the primary key of the company

name java.lang.String
the role's name

search() - or if you want all roles (options)

com.liferay.portal.service.GroupServiceUtil#search

Returns a name ordered range of all the site groups and organization groups that match the name and description, optionally including the user's inherited organization groups and user groups. System and staged groups are not included. Useful when paginating results. Returns a maximum of end - start instances. Start and End are not primary keys, they are indexes in the result set. Thus, 0 refers to the first result in the set. Setting both start and end to {@link com.liferay.portal.kernel.dao.orm.QueryUtil#ALL_POS} will return the full result set.

companyId long
the primary key of the company

name java.lang.String
the group's name (optionally null)

description java.lang.String
the group's description (optionally null)

params class java.lang.String[]
the finder params (optionally null). To include the user's inherited organizations and user groups in the search, add entries having "usersGroups" and "inherit" as keys mapped to the user's ID.

start int
the lower bound of the range of groups to return

end int
the upper bound of the range of groups to return (not inclusive)

getUserByScreenName() - to get the user to assign an option
com.liferay.portal.service.UserServiceUtil#getUserByScreenName
Returns the user with the screen name.

companyId long
the primary key of the user's company

screenName java.lang.String
the user's screen name

Roles.addUserRoles(userId, roleIds) - to assign the roles(options) to a user
com.liferay.portal.service.RoleServiceUtil#addUserRoles
Adds the roles to the user. The user is reindexed after the roles are added.

userId long
the primary key of the user

roleIds long[]
the primary keys of the roles

5.2 Implementation recommendations to the application contractor

- Initial configuration of options
 - The initial configuration of options in Liferay will be done manually, using Liferay Control Panel. With its friendly user interface it is possible to create very easily the Sites, Pages and Roles necessities to the implementation of MAP;
- Custom behavior users assignment on MAP portal
 - MAP will use the configuration already created in IdM and Liferay. If a user from the custom or default behavior already exists in IdM and in Liferay the only task required is to give the user access to the options that he should have access to.

5.3 WSDL schemas

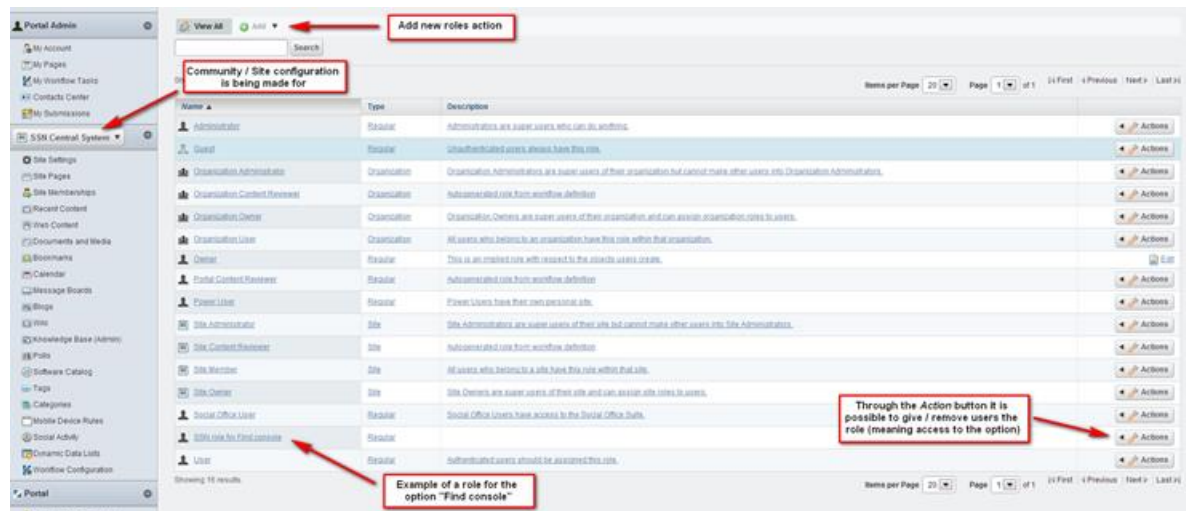
Attached to this document please find the wsdl schemas files for the following services:

- Group service: file Portal_GroupService.xml;
- Layout service: file Portal_LayoutService.xml;
- Permissions and resource service: file Portal_ResourcePermissionService.xml;
- Role service: file Portal_RoleService.xml;
- User service: file Portal_UserService.xml.

6 Annex II - Liferay User Management GUI

The manual configuration of the custom behavior application options and their association to users (to control access to) can be made using Liferay control panel functionalities avoiding extra development effort.

To configure the role for a particular option the administrator can use *Control Panel > Portal > Role* (see picture below with an example)



Next, configuration of the options follows. With that goal the administrator can use *Control Panel > SSN Component name > Site Pages > Private pages* (see picture below with an example) and create one page for every option available. The page type should be *URL*.

By clicking on *Permissions* button, it is possible to configure the one role that will give access to the functionality (page), highlighted on the picture below.

As this configuration process, if done manually, can be very time consuming it is possible for the custom behavior application to use Liferay WSDL to invoke its services in order to automatically generate the configuration that requires. Please refer to 5 Annex I - for a more detailed description.

European Maritime Safety Agency

Praça Europa 4
1249-206 Lisbon, Portugal
Tel +351 21 1209 200
Fax +351 21 1209 210
emsa.europa.eu

