4helix+

Empowering the 4 helix of MED maritime clusters through an open source/knowledge sharing and community based approach in favour of MED blue growth

D.3.3.1
4helix+ CYBER SPACE
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Abstract

List of Content:

Introduction

Brief Description and goals of the 4helix+ project

4helix+ aims at strengthening and reinvigorating the transnational innovation process of blue economy clusters within the eight involved MED maritime regions, by supporting their innovation capacity and creative culture.

The focus is on both traditional blue sectors, such as fisheries, shipbuilding, coastal and marine tourism, and emerging ones i.e. aquaculture, blue biotechnologies and green shipbuilding. The project offers coaching and funding to blue sector MSMEs and START-UPs wishing to revolutionize their processes, products or services, and to improve their competitive strategies through knowledge sharing and innovation.

A key role in this path is played by Cultural and Creative Industries (CCIs): by providing their expertise to companies as knowledge providers, in combination with 'new innovation agents' (fab-labs, makerspaces, etc.), CCIs shall trigger creativity and innovation in both traditional and emerging blue economy sectors.

4helix+ also intends to favor the embedding of the project concepts and processes into regional and national RIS3 strategies, as well as into other relevant regional plans and programmes within the eight involved MED regions and beyond.

The 4helix+'s partnership is made of 10 partners from 7 countries (Italy, Greece, Croatia, Spain, Portugal, Albania, France). More analytically, the partners are:

- Lead Partner:
    o SVIM – Sviluppo Marche S.r.l. (IT)

- Partners:
    o University of Camerino (IT)
    o Central European Initiative (IT)
    o Thessaloniki Chamber of Commerce and Industry (GR)

o Croatian Chamber of Economy – Zadar County Chamber (HR)
o Official Chamber of Commerce, Industry and Shipping of Seville (ES)
o XXI Dinamic Network (PT)
o Albanian Development Fund (AL)
o Barcelona Official Chamber of Commerce, Industry, Services and Navigation (ES)
o Chamber of Commerce and Industry Marseille Provence (FR)

- Associated Partners:
  o Innovation and Development Agency of Andalusia – IDEA (ES)
  o Development Agency of Thessaloniki S.a. – ANETH (GR)
  o Croatian Maritime Industry Competitiveness Cluster (HR)
  o Vertigo Lab, Think and do tank in Environmental Economics (FR)
  o Association of Mediterranean Chambers of Commerce (ES)
  o Make it Marseille (FR)

The main goals of the project are the following:
✓ Strengthen transnational activity of regional innovation clusters for development of smart and sustainable growth in the Mediterranean area;
✓ Support trans-sectoral and cross-border cooperation between innovative maritime clusters and within their respective regional quadruple helix of influence, stimulating also social innovation;
✓ Foster creative innovation in MSMEs and START-UPs operating in MED maritime industry through innovation voucher scheme;
✓ Provide coaching on creative innovation to maritime sectors' MSMEs and START-UPs;
✓ Offer €480.000 funding to selected companies for implementing creative innovation;
✓ Promote expertise of CCIs and 'new innovation agents' in transnational context;
✓ Transfer and embed innovative concepts, tools and processes tested by the project into regional strategies and policies for smart specialization (RIS3) and into national strategies and plans within the MED area and beyond.

1. CYBER SPACE Description and Function

The Cyberspace is a large web application that has supported the 4Helix+ project throughout its entire lifecycle. It is composed of various functionalities that were incrementally added in order to support various project activities such as:

(i)   the expression of interest for Knowledge Providers (KPs);
(ii)   the development of KPs and MSMEs gallery;
(iii)   the calls for the 8 boot camps' travel fiches;
(iv)   the call for travel fiches for the Transnational Brokerage Event in Zadar;
(v)   KPs and MSMEs matching activities;
(vi)   the call for innovation Vouchers;
(vii)   the call for the European Patent;
(viii) Transferring corner.

In the following we explain how the Cyberspace supported some of the aforementioned activities.

The Cyberspace has implemented two main galleries that are the Knowledge Providers (KPs) and the Micro, Small and Medium Enterprises MSMEs) galleries. The former displays all the knowledge providers that have been approved by a Pilot Project Partner (PPP) while the letter all the MSMEs that have been approved by a PPP.

The Cyberspace successfully handled various calls that are

- Expression of Interest for empanelment of Knowledge Providers
- Calls for travel fiches for KPs willing to participate in the 8 Blue Boot Camps
- Call for travel fiches for KPs and blue MSMEs willing to participate in the Transnational Brokerage Event in Zadar
- Call for Innovation Vouchers
- Call for blue MSMEs – Voucher beneficiaries willing to apply for a European Patent

The cyberspace provides an advanced matchmaking environment to encourage KP and MSME collaborations. The matchmaking engine uses innovative information retrieval techniques to create an efficient indexing of the MSMSs and KPs information. The KPs and MSMEs indexing will allow the discovery of KPs and MSMEs with common interests. Matching can be used to favour project collaborations and voucher submissions. The matchmaking also allows moderators (in the

following also referred to as matchmakers) to animate the interaction between matching KPs and MSMEs. The matchmaking is also a content management system (CMS) which allows the generation of web sites for meeting events. These events can include matching KPs and MSMEs for face-to-face discussions on topics of interest. The matchmaker can create web sites for meeting events by adding the text related to the following pages:

> home;
> an agenda;
> the location;
> the participants.

The cyberspace automatically generates the following web pages: home.php, agenda.php, location.php and partecipants.php. These pages are automatically generated from the event id and contain the gallery of KPs and MSMEs that will participate to the event. Web site generation has been successfully used for the bootcamps and the brokerage. The sites that have been generated are available at the following link: https://4helix.unicam.it/kp_fiches.php .

The cyberspace supports the interaction between KPs and MSMEs. KPs and MSMEs can see the participants of bootcamps or Zadar brokerage and decide to join the on line discussion with them or join the event.

The Transferring Corner platform, is a Web platform that has been developed in the context of the European 4helix+ project ("Project co-financed by the European Regional Development Fund"). This allows users to upload and view multimedia content, in addition to the possibility of using communication tools.

Access to the web portal is restricted to the 4helix+ users, thanks to an authentication system that uses the credentials provided by the system administrator.

Specifically, the Platform is characterized by two main services: (i) "**Transferring Events**" and (ii) "**Webinars**".

The "Transferring Events" service consists of a Web page with a dynamic and modular structure that allows the administrator and users with write permissions to insert different multimedia materials in a simple and user-friendly way, thanks to the ability to upload content directly in the platform, also via drag and drop.

The platform allows you to upload any type of multimedia content, up to 500mb in size for each file, such as:

- videos in mp4, swf and flv format;
- audio in mp3, aac, wma and ra format;
- word processor in docx, doc, odt, pdf format;
- documents spreadsheet in xlsx, xls, csv, sxc format;
- presentation documents in pptx, ppt, odp format.

It is also possible to add content of any website, thanks to the "URL" module that allows you to add links to any website (e.g. Youtube, Google, Wikipedia).

In addition to the possibility of inserting multimedia content, it is also possible to insert additional modules that allow users to communicate with each other in synchronous and asynchronous mode. More precisely, there is the possibility of integrating the following communication tools:

- Chat, which gives the possibility of communicating in a synchronous mode between users; the module also includes session saving and conversation history;
- Forum, which gives the possibility of asynchronous communication, which provides in addition to the opening of new topics and to reply to topics, also the possibility of attaching documents in the reply.
- Wiki, a tool that allows the possibility of creating documents thanks to collaborative writing amongst users; the module also allows tracking of all changes made by users and their history, with the possibility of restoring previous versions.

It is also possible to insert other tools such as: Polls, labels, images, questionnaires, quizzes, web pages.

The "Webinars" service consists of a new web page that allows authenticated users to access virtual classrooms in live streaming. Webinar means a live event made available through the web, which allows multiple users, even in different physical locations, to connect at the same time to participate in a seminar, a conference, an interactive lesson, a training course divided into more sessions, a workshop.

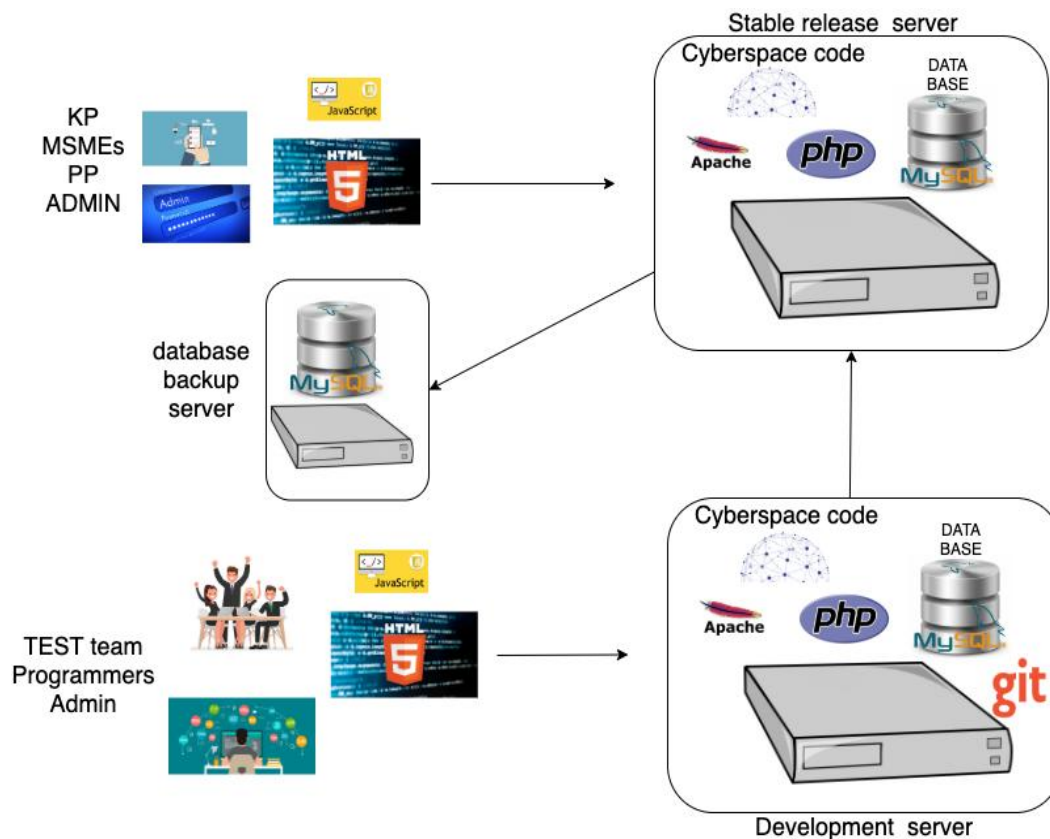# 2. Implementation details

Figure 1 Cyberspace architecture

Figure 1 shows the architecture of the Cyberspace and its main users. The Cyberspace is composed of almost 100 dynamic Web pages that are programmed by using PHP on the server side. This is a popular general-purpose scripting language that is especially suited for Web development. A mysql database is used to store data (e.g., KP and SME data, voucher applications and so on). The Cyberspace uses the Apache Web server which is running on a Linux operating system. Git is used as a distributed version control system. The Web content is presented by using HTML 5 and Javascript is used on the client side in order to check forms and other client side errors. A development copy of the Cyberspace is hosted on a development server (see Figure 1). All new Cyberspace functionalities are implemented by our team of programmers that add them into the development copy. A test team will test the new functionalities before releasing them into the stable release server. This is the Cyberspace version that is used by KPs, MSMEs and PPs. It gets the new functionalities of the development release only when they are fully tested. A further server is used in order to backup the database of the stable release Cyberspace copy (see Figure 1).

2.1 Software development

Software development methodology based on the **incremental build model** has been used to develop the Cyberspace software. More precisely, the Cyberspace has been designed, implemented and tested incrementally (at each time a new functionality was added) until the final software was completed. Our development combined the elements of the waterfall model with the iterative philosophy of prototyping. Each functionality (e.g., gallery, voucher call, EoI and travel fiches) has been built separately and delivered to the customers when completed. This allowed us to use the Cyberspace and avoids a long development time. The incremental philosophy is also used in the agile process model. At each iteration we always performed the needed tests. Software that is built by using an incremental building model is easy to test and debug because smaller changes are done at each iteration. This allows for more focused and rigorous testing of any element of the Web application.

2.1.1 Testing

Any functionality that we were incrementally added into the Cyberspace went through several tests. Regression tests (if needed) were performed any time a new functionality was added. After the functionality was completely tested it was copied from the development server to the stable release one.

An initial test aims at ensuring that the new added functionality was working correctly. More precisely, for any new Web page that was built our team of programmers tested all links, the database connection, forms used for submitting and/or getting info from the user, all client-side and server-side code. In order to reduce bugs all input forms had to be non-empty, and have a maximum amount of characters. All data from input forms were sanitised in order to avoid attacks to the system. Our team of programmers made sure that the results of a new functionality were the expected ones. This was done by providing different data input for multiple times. After the team of programmers performed this first level test, a second level test would be performed by a secondary team. This was composed by our Ph.D. students and the Project Pilot partners. We asked the second level team to play the role of KPs, MSMEs and PP for testing the Cyberspace. The secondary level team also provided feedback on the usability of the Cyberspace. All the functionalities were tested by using different browsers and different types of devices with different operating systems (e.g., mobile phones with Android and tablets with iOS).

For instance the first Cyberspace functionality that was added is the Expression of Interest for empanelment of Knowledge Providers and the gallery. To this ending the KP and PP reserved areas were implemented. The functionality to update KP info was added in the KP reserved areas and the approve functionality was added to the PP reserved area. Once approved, the KPs would

populate the Gallery. These functionalities were first tested by our programmers and finally tested by our test teams which include the Project Partners. After the functionality was completely tested it was copied from the development server to the stable release one.

We performed various penetration tests on the Cyberspace in order to ensure its security. This was done by using automated tools and by recruiting a team of security experts that were performing attacks. Finally various error log files are constantly analysed in order to detect Cyberspace bugs.

To date no functionality bug was ever reported by the secondary level testing team and by KP and MSMEs users on the release copy. All the bugs reported were mainly typos on the Web pages. Some minor user interface problems (e.g., the visualisation of some figures) were also reported. For what concerns usability after first and second level team gave their feedback we provided also a support center (via email) for KPs and MSMEs. For the KPs and MSMEs registration the Cyberspace managed over 314 registrations. No usability issues were reported. Our support center received around 10 requests of support all concerning the upload of PDF files. Some KPs and MSMEs did not notice there was a maximum allowed size on the uploaded PDFs. For what concerns travel fiches and call for brokerage event in Zadar no usability issue was reported and no email was received. The call for innovation voucher was performed by 84 companies that successfully submitted their projects. We received very few emails from MSMEs that experienced session problems. It was clarified that this was consequence of Web pages left too long open. In this case the connection expired and the user had to log in again.

Project Partners

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