Euro-BioImaging
Preparatory Phase II Project

D5.2 Technical framework set up of EuBI online user access portal with the most central functions

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Abstract

Work Package 5 is developing the *Web Access Portal* (WAP), a dynamic web service that will be the virtual access point to all Euro-BioImaging (EuBI) research infrastructure services.

The technical framework is now set up both for the current "interim" version of the WAP, as well as for the future development of the "full" WAP features. The most central features have not only been implemented, but the "interim" WAP is already running and in active use, and has proven successful in handling tens of EuBI user applications. The launch of a functional portal more than a year ahead of the planned schedule, has enabled EuBI to enter its Interim Operation and service its users already, long before the EuBI ERIC will be established.

In addition to the main WAP development, the WP5 team together with the Hub Candidates Finland, Italy and EMBL, has developed the detailed EuBI access workflow, streamlined the vocabulary and organization of the EuBI technology portfolio and in close collaboration with the 29 Node Candidates, developed detailed content and services for the WAP, such as video material. The WP5 lead partner also runs the Helpdesk for the "interim" WAP, to continuously optimize the online access procedure for developing the WAP, based on real user access.

After extensive tests of different technical solutions, discussions and negotiations, WP5 has recommended that long-term WAP development would be done in collaboration with *Instruct* and their *ARIA* portal, enabling more cost-efficient development of advanced online services to EuBI users and staff. A unique agreement has been reached with Instruct, allowing EuBI to run and develop its own instance of the ARIA platform, with full access to the source code. The EuBI Executive Project Management has recently accepted this recommendation.

Overall, Deliverable 5.2 has been successfully completed, and although slightly delayed, it delivers much more than what was originally planned for this stage of the project.

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1. Introduction

The EuBI Preparatory Phase II (PP II) Work Package 5 (WP5) is developing the Web Access Portal (WAP), which is the virtual entry point to the Euro-BioImaging (EuBI) research infrastructure services. The WAP will by a dynamic web service that will include a wide range of tools for instance for the entire user access procedure, training management, quality assurance, new technology identification and management, external and internal communication, statistics and feedback collection for infrastructure development. The WAP will also be the entry gateway to all other EuBI online resources, such as the Image Data Resource (IDR, previously called Image Data Repository) developed by PP II WP6, and training and e-learning features developed by WP7.

After the beginning of PPII, WP5 has incorporated two significant changes in its planned workflow: the development of an early "interim" version of the WAP, to enable Interim Operation of Euro-BioImaging before the EuBI ERIC is established, and the decision to collaborate with the ARIA portal of Instruct, the European infrastructure for structural biology. Neither one of these aspects was foreseen when the original project plan was written, but they are both significant in ensuring the success of EuBI, and they make WP5 more efficient and capable of delivering more than what was originally planned. These changes cause small discrepancies between the original WP5 deliverable descriptions and their actual content, but the main objectives of WP5 remain unchanged.
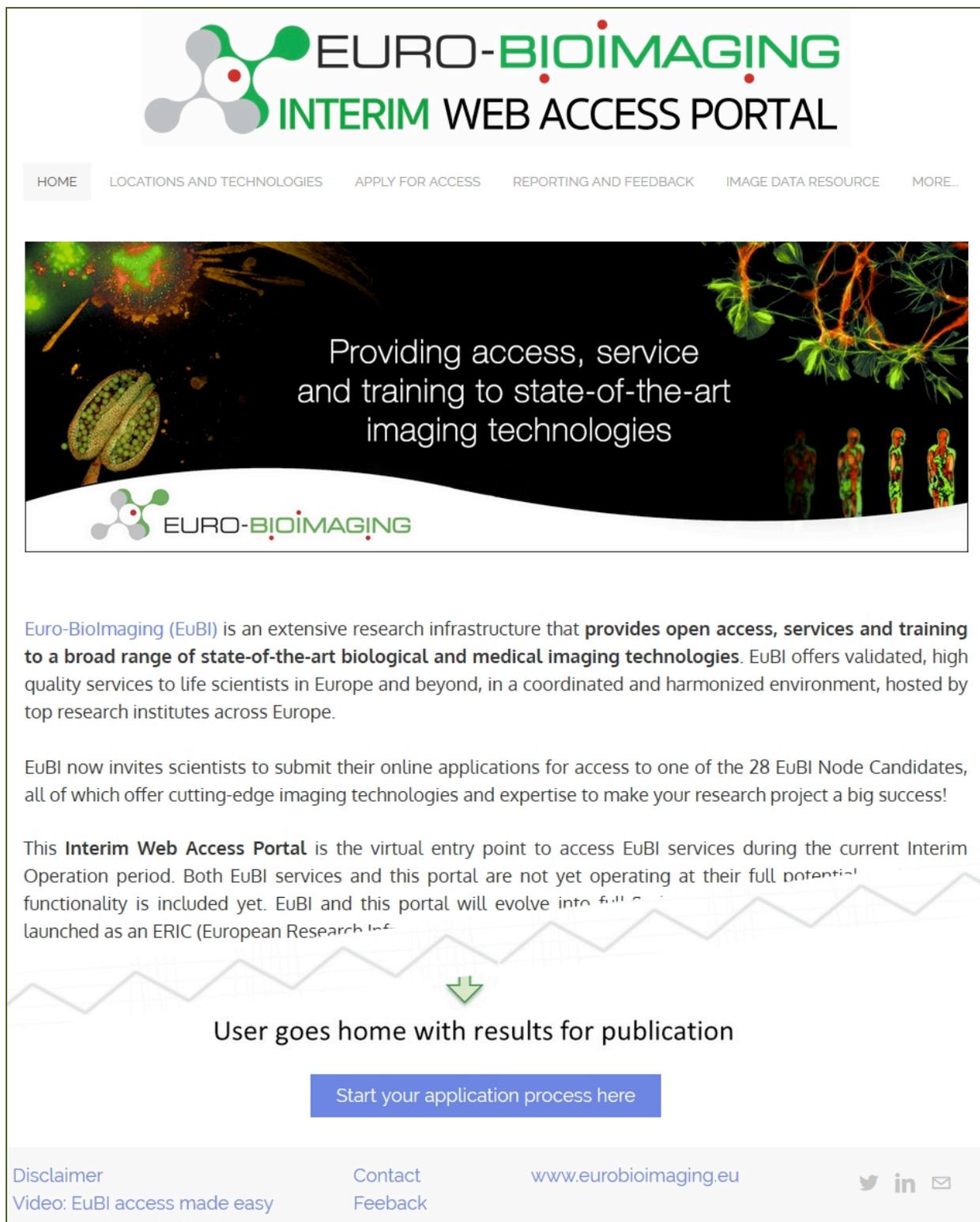
This deliverable has been slightly delayed, because in addition to completing work on the "interim" version of the WAP, WP5 wanted the technical backbone to be well defined and accepted by the EuBI Executive Project Management also for the future development of the WAP, before completing this deliverable. WP5 originally never intended to publically launch a functional EuBI portal before the end of PPII, but now a functional portal was launched already 5 months into the project. This interim release of the WAP has turned out to be very successful, and it has made it possible for EuBI to offer a full set of open access imaging services already for several months, well before the completion of PPII and the initiation of the EuBI ERIC. Hence, despite the delay of this particular deliverable, WP5 overall is significantly ahead of schedule in terms of its main task: offering researchers across Europe access to EuBI services.

2. Interim Web Access Portal in operation

The "interim" version of the WAP, which was described in Deliverable 5.1, was completed and launched in May 2016. This was a major milestone for the EuBI infrastructure, because it enabled EuBI to start Interim Operation and open the doors of 28 Node Candidates to researchers.

The "interim" WAP (https://www.eurobioimaging-interim.eu/) was developed with simpler technical solutions and only the most central functions, which are summarized in Table 1. This enabled the quick launch of the portal. Figures 1 and 2 illustrate the user interface. The WAP has already been used to successfully process approximately 35 user applications, 70% of which

have already been accepted for physical access. This is a rather good achievement for EuBI, considering that the EuBI ERIC has not been established yet. Through these user projects the WAP has also been immediately put to the test, and all its features and the associated database and tools have been proven functional.

Figure 1. Home page of the currently operational version of the WAP ("interim" WAP).

In addition to technical development work, WP5 has spent a significant amount of resources defining an access workflow for the whole user access procedure, so that it works smoothly and can be easily operated by users, reviewers, Node Candidates and the three Hub Candidates. Another major "extra" undertaking for WP5 has been streamlining the EuBI imaging technology portfolio (defined by the PPI consortium, 2010-2014) and the terminology related to it, so that the EuBI imaging services can be described, applied for and reviewed, in a consistent and well defined manner, in both biological and medical imaging. Concurrently, WP5 has requested and updated the online information provided by each of the 28 Node Candidates, so that it is in line with the structure and terminology of the EuBI technology portfolio.
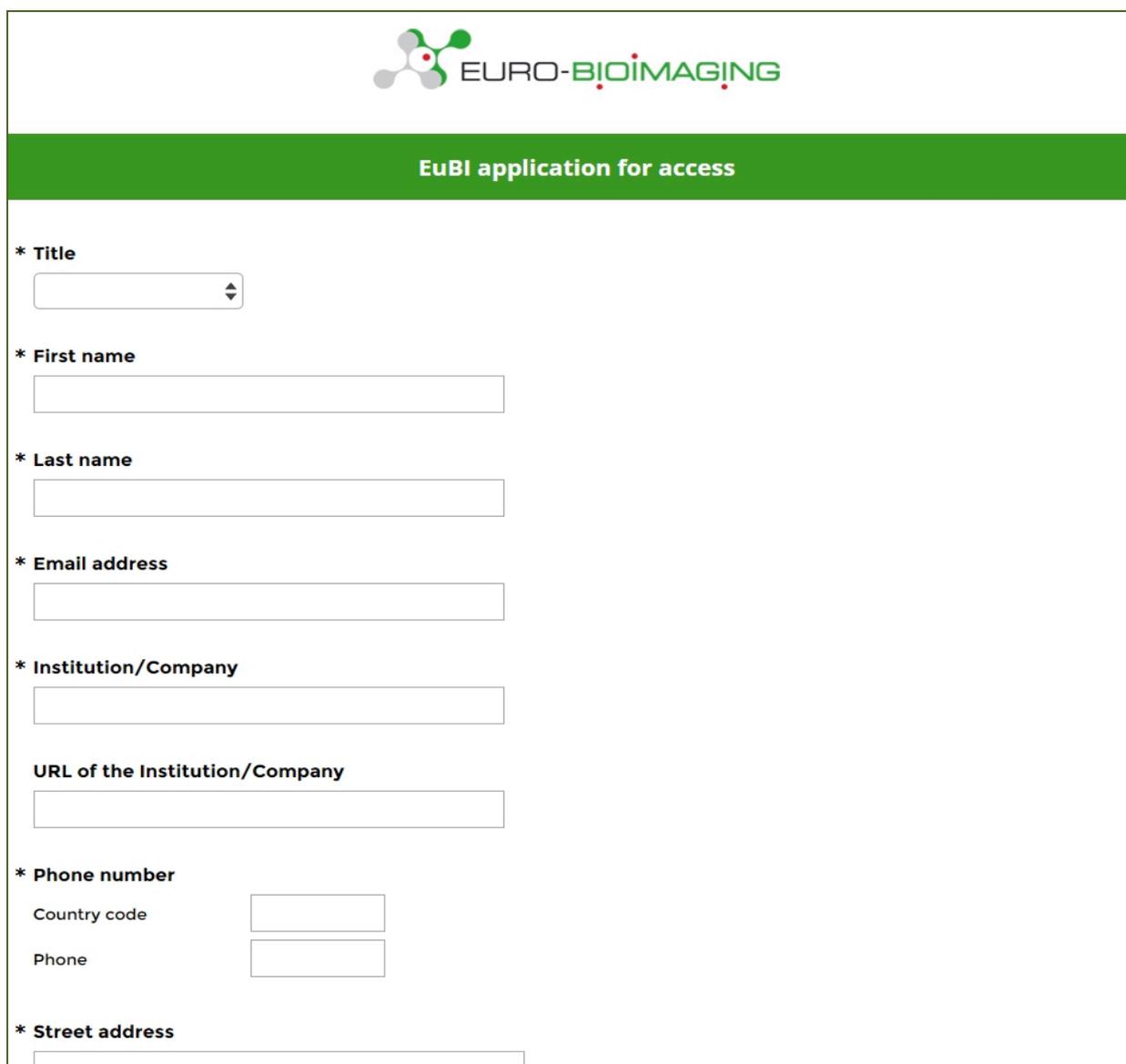
Figure 2. An example of the many online forms of the "interim" WAP. These forms are used for instance to submit applications, to review them, to give feedback and to report new technologies.

WP5 has also produced a lot of material to help users in applying, such as info-graphics, instructions and a video "Euro-BioImaging access made easy". WP5 also runs an EuBI WAP Helpdesk, which takes care of for instance relaying EuBI Interim Operation communications and notifications between users, Node Candidates, Reviewer Candidates and Hub Candidates (Finland, EMBL and Italy).

The "interim" WAP has been developed in close collaboration with the EuBI Node Candidates and especially the three EuBI Hub Candidates, who are elemental in operating the WAP backbone. WP5 acknowledges the valuable contributions of all partners in this work.

Home
    • General information
    • Video: Euro-BioImaging access made easy

Locations and technologies
    • Node Candidate presentations by country and technology
    • Technologies
    • Search engine

Apply for access

Reporting and feedback
    • Users
    • Node Candidates
    • Reviewer Candidates

Image Data Resource
Review of applications
New technology reporting

Document gallery
    • All online forms
    • Technical guidelines

Disclaimer
Feedback
Contact

Table 1. The most central features of the currently operational version of the WAP ("interim" WAP).

3. Deciding on Web Access Portal long-term technical solutions

Experiences obtained from running the "Interim" WAP have provided valuable information for the further development of the WAP, and continue to do so on a daily basis. Through these experiences, the requirements for the WAP have constantly grown and become more complex. This is rather typical in bioimage informatics projects and other projects of this type, and WP5 has adopted a policy to try not to limit functionality or services, but to instead try to find solutions that would enable full service provision without compromising the overall timeline of

the project. This policy means that developing all of the desired WAP functionality from scratch as initially foreseen and indicated in D5.1, would not be possible with the resources and time available. WP5 undergoes constant discussions and evaluations with different information technology experts from different countries, and also these discussions have recently indicated that developing all of the WAP functionality from scratch would require a large team working for much longer than the PP II duration. Since the launch of the "interim" WAP, WP5 has therefore had finding suitable long-term technical solutions for the WAP as a major focus. In practice, possible solutions could be divided into two categories: collaborating with another research infrastructure or project, or contracting an existing commercial solution.

The criteria set for the technical solutions are outlined in Table 2, and WP5 looked at numerous different options, many in great detail, through test usage periods and detailed evaluations with the projects or companies in question. Table 3 presents a summary of the options considered. The evaluations were discussed in detail at various stages with the three Hub Candidates (Finland, EMBL and Italy), as well as several experts and collaborators for instance in Turku, the Finnish Center for Scientific computing, EMBL, Janelia Advanced Imaging Center and the WP6 team in Dundee.

Enables the creation of a usable and user-friendly front-end
Enables all the planned functionality of the WAP (as outlined in Deliverable 5.1.)
Source code modifiable directly and quickly, to enable fast bug fixing and fast and flexible implementation of new features
Basic information content and workflow easily modifiable by those who operate the WAP, not only the WAP developers
Possibility to automate as much of the functionality as feasible, to enable cost-efficient operation of EuBI and its staff, and sufficient throughput and scalability
Reasonably priced and fitting preliminary EuBI budget plans
Highly reliable, secure, available and sustainable for several years to come
Support for sufficient user authentication and authorization systems
Compatible with the required database and reporting functions
Compatible with other EuBI online services and solutions, such as the Image Data Resource (IDR), and, wherever possible, compatible with other European research infrastructures (compare to e.g. Corbel)

Table 2. Requirements for the technical solutions of long-term WAP development.

Among the options for collaborating with another project, only *ARIA* (the web portal of *Instruct*) showed considerable promise, and among the commercial options, *Salesforce* was the only one combining sufficient functionality with somewhat sensible pricing. In the end Salesforce turned out to be prohibitively expensive for the operational models of EuBI and the WAP, while the ARIA team would be very willing to collaborate with EuBI, and the Instruct access workflow and some of the ARIA functionality were already fairly close to EuBI requirements. WP5 underwent extensive negotiations with the ARIA team, after which a unique agreement was reached: EuBI would get to run its own instance of ARIA, and get full access to modify the source code and use it as part of the EuBI WAP. EuBI would pay a one-time payment to the ARIA team for this

arrangement, and in return the ARIA team would focus resources to maintenance services, such as source code documentation, needed by EuBI in future WAP development. The conclusion of WP5 was that the most sensible long-term technical solution for the EuBI WAP would be to use ARIA as the underlying backbone, and the EuBI Executive Project Management accepted this decision in its meeting on December 6th, 2016.

Develop WAP from scratch	Collaborate with another infrastructure or project	Contract existing commercial solution
PHP and MySQL, e.g. • Joomla • Drupal • WordPress .Net and MS SQL server with hosting using IIS	Scientific societies/journal submission systems, e.g. • American Society for Biochemistry and Molecular Biology • American Society for Microbiology • The Company of Biologists • Biochemical Society • EMBO Peppi consortium Redmine ARIA eLife	Ungerboeck / Event Business Management Software OROCRM Alfresco EspoCRM and SuiteCRM Datapine Easy Redmine Red Mind Solutions Salesforce

Table 3. Summary of different technical solutions considered for the WAP.

4. ARIA platform

ARIA (Access to Research Infrastructure Administration) is an existing and currently operational end-to-end access management tool, developed for and presently used by Instruct (https://www.structuralbiology.eu/update/). ARIA is built on PHP and MySQL, and these will be used also for the EuBI WAP long-term development.

ARIA has been designed to address the following four development areas: facility, access, data and community. It has a wealth of features, some of which are almost directly usable by EuBI, and some of which are not. A lot of features will need to be developed, but ARIA is likely to form a very good backbone for the future development of the EuBI WAP. In addition to

functionality, WP5 will focus especially on usability when modifying the ARIA platform. Some of the key features already running in ARIA that are of interest to EuBI, are listed in Table 4.

Main features of interest to EuBI	Some of the more detailed functionality of interest to EuBI
- Proposal Management - Peer review system - Identity Management using single sign-on system - Reporting and statistics - Calendar booking - API integration and - User training	- Automatic email notifications with direct one-click link in emails - Single one-page actions for proposal management - Built-in messaging system - Simple visit management overview - Proposal timeline overview - Filterable reports generated from proposal data

Table 4: Some of the features of the currently running ARIA platform.

5. Advantages of ARIA collaboration

Collaborating with ARIA in the EuBI WAP development offers several advantages and synergies. In general, it is beneficial for the European biomedical research infrastructure landscape that different infrastructures collaborate, facilitating better resource management, streamlining of services, and unification of practises and workflows –ultimately, better services for researchers overall. EuBI and Instruct will be sharing all development done for their respective portals, which will be a mutually beneficial arrangement, enabling both infrastructures to benefit from better development resources than what either infrastructure could achieve on their own.

ARIA is currently being used also by a few other institutions and research infrastructures, such as iNext, Astbury Biostructure laboratory at the University of Leeds, and the CORBEL open project. The collaboration with EuBI will be more substantial than these, as EuBI will run its own portal and directly develop the source code. However, all these collaborations will be beneficial for the overall development of the WAP. In addition, collaboration with the ARIA team and other relevant partners offers significant potential to develop common authentication and authorization infrastructure solutions for easy cross-platform access to researchers.

The ARIA system also provides modules for booking management systems, with integration possibilities. These and other potential development targets may in the future provide valuable tools and possibilities for further services to the EuBI Nodes, for instance in terms of facility integration and centralized booking systems, and for further international collaboration e.g. through the Global BioImaging project.

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6. Current status and next steps

Currently, WP5 is finalizing contract negotiations with the ARIA team, after which source code development will commence. Source code management, maintenance services and support from the ARIA team are being carefully considered in the contract negotiations, to ensure proper collaboration and support during the development of the EuBI WAP.

The present EuBI database is currently being translated to a version that is compatible with the ARIA system, to facilitate a smooth transition from the "Interim" WAP.

The next steps of WP5 include setting up the hosting of the EuBI instance of ARIA, and modifying the ARIA workflows to suit the EuBI workflows. Mutual access to online resources, close communication and site visits (as needed), will be arranged with the ARIA team as will be specified in the contract negotiations.

The upcoming deliverables of WP5 (5.3, 5.4 and 5.5) will cover for instance testing of the WAP backbone, describing integration with other relevant services and databases, integration with the various training functionalities developed by WP7, setting up other features for each of the planned WAP building blocks (such as communication, quality control, reporting and new technology tools), and comprehensive feature and workflow testing.