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1 Executive Summary

This document describes the Repository activity within the OMII-Europe project and in particular the SA1 activity. It provides details on the accomplishments of the first year including the decision process which led to the selection of a repository tool, the assessment of the required work to satisfy the OMII-Europe requirements, the implementation, set up and maintenance work still going on to ensure a quality service to the contributors and users of the OMII-Europe repository.

This activity is put into context with other activities within the project that together will:

- provide the software components contributors with the requirements of the quality assurance process, the various tests that are used to review the quality of a particular software project to be included in the project's repository, the framework and tools used to manage and deliver the test reports and the expected software packaging;
- inform end users of the software in the OMII-Europe repository as to its performance, its compliance with established standards to ensure interoperability, and its portability across a set of defined platforms and environments;

This document references the design document for the repository described in the first activity deliverable (D:SA1.0) and the milestone documents (M:SA1.1, M:SA1.2, M:SA1.3) which describe the implementation of the basic repository functionality (M:SA1.1), the implementation of the basic search functionality within the OMII-UK repository (M:SA1.2) and the completion of the integrated OMII-Europe repository. All these documents are available on the OMII-Europe web site[1] .

Together they provide detailed information on the work performed by the activity.

By April 2007 we have deployed the official OMII-Europe repository implementing the basic and integrated functionalities as described in the official documentation detailed above. Work is going on to improve existing functionalities, add more features and fix bugs.

Initial support tools to the contributors and end users are being finalized and will be part of a more comprehensive support procedure to be established in the following months.

The target audience of this document is the reader wanting an overview of the first twelve months of activity of SA1. For more detailed information and technical details, please refer to the M:SA1.0 milestone and M:SA1.1, M:SA1.2, M:SA1.3 deliverable documents.

Section 2 – Introduction, describes SA1 partners and the list of the official SA1 documents.

Section 3 – Progress, describes the initial effort, the gathering of the requirements, the development and customization of the tool chosen for the repository including the separation of the OMII-UK functionalities and re-branding, the search functionalities available from OMII-UK, the deployment and the addition of certificate-based authentication. Finally the current work is described including the initial content to have a user-friendly repository and the main feature which will be the integration with ETICS.

This document is complemented by the D:SA1.1 Appendix (OMII-Europe-DSA1.1-appendix.doc/pdf) which contains a glossary of terms used and the summary of the discussion about the component life cycle within OMII-Europe, a low level view on the interaction among the project's activities (which is discussed in another document from the project management).

2 Introduction

The OMII-Europe repository has been developed, set up and maintained by the SA1 repository activity.

The objective of the repository is initially to store the individual components re-engineered by the internal JRA1 activity and, in a later phase of the project, enable open source software projects within Europe to contribute their releases in order to promote their activities.

Contributed components will initially come from one of the following grid middleware stacks:

- gLite - <http://glite.web.cern.ch/glite/>
- UNICORE - <http://www.unicore.org/>
- CROWN - <http://www.crown.org.cn/en/>
- OMII-UK - <http://www.omii.ac.uk/>

There is an emphasis of the main re-engineering efforts being to enable any component to run on any platform.

The components will be evaluated against the quality guidelines of the OMII-Europe project provided by the SA2 activity which aims at ensuring a well recognized quality brand on the components with a focus on interoperability. More on this can be found in the official SA2 documentation.

2.1 Document Amendment

Updated information connected to this document will be published on the activity's Wiki at: <https://twiki.cnaf.infn.it/cgi-bin/twiki/view/OMIIEuSA1/WebHome> and will be included in future versions of this document.

2.2 Partners and Effort

This activity originally had the following partners: INFN (IT); SOTON (UK); CERN (CH); BU (China) and CNIC (China).

CNIC withdrew from SA1 at the end of October 2006. The effect of this fact is negligible.

This activity involves 8,10 staff years (2 years project) and is distributed among the partners in the following way per year:

- INFN: 0.8 funded; 1.0 unfunded
- SOTON: 0.5 funded; 0.5 unfunded
- CERN: 0.15 funded; 0.35 unfunded
- BU: 0.25 unfunded
- CNIC*: 0.5 unfunded

[*] As stated above, CNIC left SA1 at the end of October 2006.

During the start-up phase of the project (first three months), work proceeded slowly due to the hiring process necessary for some partners and the establishment of a contact with the ETICS project and the necessary analysis work about the direction to take.

The extent of the actual participation of CNIC and BU is under investigation since the contacts have been very sporadic at the beginning and non-existent after the first months.

Despite these problems, most of the planned tasks for the first year have been completed.

Below you can find the complete table with the monthly effort for each partner.

Partner	INFN		SOTON		CERN		CNIC		BU	
Efforts (FU)	0,80	1,00	0,50	1,00	0,15	0,35	0,00	0,50	0,00	0,25
May 2006	0,80	1,00	0,00	1,00	0,00	0,10	0,00	0,50	0,00	0,25
Jun 2006	0,80	1,00	0,00	1,00	0,00	0,10	0,00	0,50	0,00	0,25
Jul 2006	0,80	1,00	0,00	1,00	0,00	0,10	0,00	0,50	0,00	0,25
Aug 2006	0,80	1,00	0,00	1,00	0,00	0,10	0,00	0,50	0,00	0,25
Sep 2006	0,80	1,00	0,50	1,00	0,00	0,20	0,00	0,50	0,00	0,25
Oct 2006	0,80	1,00	0,50	1,00	0,00	0,20	0,00	0,00	0,00	0,25
Nov 2006	0,80	1,00	0,50	1,00	0,00	0,35	0,00	0,00	0,00	0,25
Dec 2006	0,80	1,00	0,50	1,00	0,00	0,35	0,00	0,00	0,00	0,25
Jan 2007	0,80	1,00	0,50	1,00	0,80	0,00	0,00	0,00	0,00	0,25
Feb 2007	0,80	1,00	0,50	1,00	0,80	0,35	0,00	0,00	0,00	0,25
Mar 2007	0,80	1,00	0,50	1,00	0,80	0,35	0,00	0,00	0,00	0,25
Apr 2007	0,80	1,00	0,50	1,00	0,80	0,35	0,00	0,00	0,00	0,25
Sum (Months)	9,60	12,00	4,00	12,00	3,20	2,55	0,00	2,50	0,00	3,00
Fraction	0,80	1,00	0,33	1,00	0,07	0,21	0,00	0,21	0,00	0,25

2.3 Official Documents

The following table documents the activity's milestones and deliverables.

No.	Title	Date	Completed
D:SA1.0	Design document for the repository including database schema definition	M3	M5
M:SA1.1	Development of the basic repository functionality	M6	M9
M:SA1.2	Implementation of the basic search functionality within OMII-UK	M6	M9
M:SA1.3	Completion of the integrated OMII-Europe repository	M9	M12
D:SA1.1	First annual report on the repository activity	M12	M13
M:SA1.4	Implementation of the capability to schedule specific tests on selected components, grid software distributions and operating systems	M15	
M:SA1.5	Population of the repository with test certification information, test reports, sample use cases and tutorials	M9-M24	
M:SA1.6	Population of the repository with initial software components	M9-M24	
D:SA1.2	Second annual report on the repository activity	M22	

Summary of SA1 deliverables and milestones

3 Progress

This section will detail the progress on the SA1 activity during the first year of the project.

3.1 Initial Effort: Gathering of the Requirements

The initial effort by SA1 has been to gather the requirements for the repository framework and—as part of that—identify the basic repository functionalities.

The high level requirements were to have a repository tool that:

- Allows us to store any type of digital content with a special emphasis on archived and compressed software packages and documentation;
- Is able to service a growing community of users;
- Is able to store a relatively large number of packages;
- Provides a user and administrative web interface including easy navigation of the contents and search capabilities based on a metadata schema associated to the packages;
- Is based on open source libraries and had an open source licence itself;
- Is able to provide some degree of security to the registered users;
- Is actively undergoing development;
- Has a well documented code base and an architecture which easily allows the implementation of new features and the customisation of the existing ones as this becomes necessary or required.

These requirements were key to the definition of the design document (D:SA1.0) and the basic functionalities as detailed in M:SA.1

3.2 First Phase: Selection, Analysis of the Tools and Decision

The first phase in the work of SA1 has been to research and identify, if possible, an open source tool that would allow us to start from an existing framework instead of having to develop an ad-hoc tool from scratch.

This approach was deemed to be the best and was agreed upon given the limited manpower available and the time constraints of the project. It allowed us to capitalize on already existing tools providing the basic set of features a repository should have. It also let us more time to focus our effort on the development of the interoperability features specific to our needs (e.g. the integration with ETICS[2]).

After considering different tools (see D:SA1.0 section 1 and D:SA1.0 section 4) and external reviews on some of them (see reference URL in D:SA1.0 section 1) a decision was taken to perform a detailed analysis on two of them: the OMII-UK repository infrastructure[3] and Fedora[4].

The analysis involved all partners and was led by INFN and SOTON. Test instances of Fedora and the OMII-UK repository software were set up at INFN and SOTON and were evaluated against the OMII-Europe requirements.

The following characteristics were examined:

- *Access to the repository*: how users and administrators access the repository and what types of roles are available to group users and assign special authorizations.
- *Automatic population of the repository from ETICS*: what kind of effort is needed to implement a connector with ETICS to allow the automatic population of the repository from

ETICS. This feature has been recently extended to include the ability of having some degree of visibility from each side of the two infrastructures on the other one.

- *Manual upload of software components or other digital content*: user-friendly characteristics of the manual procedure for contributing to the repository.
- *Manual download of components*: ease of the component downloading procedure for a user. This includes the ability of finding the desired component.
- *Search capability*: what kind of search capabilities the tool implements including searchable fields from the metadata schema and what kind of manual navigation is possible on the web site. This uses the software categorization information provided with the component's information by the contributors.
- *User management*: how the tool supports the management of registered users.
- *Compliance to standards*: if the tool implements recognized standards.
- *Licence*: what type of licence the tool is released with.
- *Scalability*: what the upper bound is of the ratio between the number of stored components and an acceptable time of service.
- *Interfaces*: what the usability of the user interface and other interfaces (e.g. API) are.
- *Database schema*: what is the effort needed to implement at least the part of the proposed database schema needed for the ETICS integration as detailed in D:SA1.0.
- *Security*: What type of security mechanism the tool offers.
- *Other functionalities*: what other functionalities the tool provides.

The tool that better suited the needs of the OMII-Europe repository was the OMII-UK repository software.

A summary of the discussion which led to the decision on what tool to adopt can be found in M:SA1.1.

This decision allowed us to immediately start our work on the implementation of the missing features and the customization of the existing ones. The fact that OMII-UK is part of the project gave us instant access to the source and a fast communication channel with the developers.

3.3 Development and Customization of the Chosen Tool

The main tasks on which the work on the OMII-Europe repository infrastructure started were:

- Establish a contact with ETICS and jump-start the cooperation between the two projects.
- Separate the OMII-UK specific functionalities from the basic features of the repository intended to be reused in OMII-Europe. This leads to a division of the code base into two parts: a common base and a part specific to each installation mainly containing the code connected to the user interface.
- Reorganize the code base and produce an installable package including installation instructions.
- Customize and re-brand the OMII-UK code base.
- Deploy the tool on a test server and on the official host for the OMII-Europe repository at INFN.
- Implement of certificate-based authentication for registered users.
- Set up the initial contents of the repository including the list of software categories, mapping of the host name on the official project domain, creation of support mailing lists.
- Implement the integration with ETICS.
- Cooperate with the other activities of the project. SA1 closely cooperates with other activities to define and participate in the internal processes of the project.

Details on these tasks are provided in the following subsections.

3.3.1 Separation of the OMII-UK Functionalities, Reorganization

This task consisted of:

- Separating the OMII-UK specific functionalities from the code base. This was in particular the case for the Web user interface which can now be easily customized to the needs of OMII-Europe;
- Producing an easy to install package
- Producing and updating the necessary documentation to support installation and configuration of the package
- putting the code base on a SVN server accessible to all SA1 members

After the completion of this task, SA1 had full control over the source code for the repository software and work could be started on the implementation of the new features in coordination with the developers of OMII-UK.

3.3.2 Basic Search Functionalities within OMII-UK Repository

The basic search capabilities provided by the OMII-UK software have been accessed in relation to the needs of OMII-Europe. What is currently provided by the software is described in M:SA1.3[9] and that satisfies the current needs of the project.

Changes might be necessary in the future if the current support for the metadata schema should be evolved.

3.3.3 Deployment

The deployment task started with the first release of March 19, 2007 and is, of course, an ongoing effort and part of the regular tasks of providing the users with bug fixes and new features. It consists of:

- Setting up, configuring and securing the official host for the repository at INFN.
- Installing the release on the official host for the repository
- Maintaining the official installation of the repository and keeping it up to date with the latest features as they are developed
- Testing the new and existing features (functionality and integration testing)
- Supporting the user through documentation - user guides, event notification, FAQ and Wiki - and troubleshooting.

The temporary location of the repository is at: <http://omii010.cnaf.infn.it:8080>. A secure URL with certificate-based authentication can be accessed at: <https://omii010.cnaf.infn.it:8443>. Both these will soon be available under the OMII-Europe domain at: <http://repository.omii-europe.org>.

3.3.4 Certificate-based Authentication

The OMII-UK repository software originally supported only username/password authentication. In order to add a further layer of security, it was decided to add the possibility to login through a secure connection using X.509 certificates which are already provided to most members of the grid infrastructures cooperating with OMII-Europe.

All Certificate Authorities (CA) registered with the EUGridPMA[10] organization are supported and others can be easily added in the future if necessary.

The original authentication on the non-secure home page is still possible. See previous section for details and URLs.

Details on the implementation can be found in the document for milestone M:SA1.3[9].

3.3.5 Initial Content

The repository although fully usable as it is, has had some initial content pre-loaded to aid users and project partners. This is a list of tasks which have been started and are still work in progress and will evolve as the project moves on:

- Re-branding of the OMII-UK code base and web user interface with the OMII-Europe logos and descriptions.
- Identification of the software categories under which to classify the contributed components. This list should take into account all the major grid middleware releases and allow users to easily categorize their components when they are entered into the repository for the first time. As the size of the repository increases, new sub-levels of categorization might be taken into consideration.
- Production of a user and administration guide. Setup of an initial FAQ list to collect all frequent questions and answers from all users.
- Setup of an official name for the repository server under the project's domain and a support mailing list or email address for repository-related issues.

3.3.6 Integration with ETICS

The integration with ETICS is the most important feature added to the repository during this first phase of the project and represents our effort towards interoperability with other existing frameworks.

ETICS is a partner of OMII-Europe and of SA1 and provides an out-of-the-box build and test system which allows full automation of the build and test of a software product. The integration of ETICS into OMII-Europe repository aims to:

- Provide a light weight interface to ETICS system hiding the complexity of software build and test from end users.
- Establish a repository containing quality assessed software components based on comprehensive software test and build using ETICS facility.

The initial integration work performed by SA1 and ETICS aims at allowing a user of the OMII-Europe repository to:

- Map OMII-Europe projects and releases to corresponding ETICS objects (components and configurations respectively).
- Retrieve and browse ETICS build and test results from the OMII-Europe repository.

After a user registers her project with OMII-Europe, she has the option to add this project into the ETICS system. The user subsequently can build and test her software releases in ETICS. The test and build results can be viewed from within the OMII-Europe repository infrastructure. The integration work is still work in progress and the initial release is planned by month 15 of the project.

Implementation details can be found in the document for M:SA1.3[9].

4 Conclusion

During the second part of the first year the repository activity pace has picked up and all the required major milestones have been met.

Current work is focused on

- Completing the first release of the integration with ETICS.
- Preparing the necessary user documentation.
- Investigating having a uniform presentation layer with all the project's sites.

Future work will include:

- A revision of the supported metadata schema to access if it matches the updated requirements for the repository.
- Preparation of the repository for end users by providing user-friendly documentation and other facilities.
- User support for the population of the repository with the first component.

The repository activity will also support the training activity (NA3) in its promotion and use of the repository. Current discussion is establishing not only what participants in courses should be told about the repository, but also its use to hold practical examples that will be downloaded during training courses.

In the long term, a study will be started to verify the possibility of having distributed repositories implemented on different platforms, such as Fedora. A goal of a common interface to share information on the contents of each repository and to be able to find and access the desired objects is envisaged.

5 References

1. *OMII-Europe web site*: <http://www.omii-europe.org>.
2. *ETICS web site*: <http://www.cern.ch/etics>.
3. *OMII-UK web site*: <http://www.omii.ac.uk/>.
4. *Fedora (digital object repository system)*: <http://www.fedora.info/>.
5. *OMII-Europe support site*: <http://support.omii-europe.org>.
6. *D:SA1.0*: Design document for the repository including database schema definition. (Available on the OMII-Europe web site.)
7. *M:SA1.1*: Development of the basic repository functionalities. (Available on the OMII-Europe web site.)
8. *M:SA1.2*: Implementation of the basic search functionality within the OMII-UK repository. (Available on the OMII-Europe web site.)
9. *M:SA1.3*: Completion of the integrated OMII-Europe repository. (Available on the OMII-Europe web site.)
10. *European Policy Management Authority for Grid Authentication (EUGridPMA)*: <http://www.eugridpma.org/>.