

# ETICS 2

## DISSEMINATION AND USE OF KNOWLEDGE PLAN (FINAL)

EU DELIVERABLE: DNA2.11

---

Document identifier:	<b>ETICS-DNA2.11-1065007- Dissemination_Use_Knowledge_Plan-v1.1.doc</b>
Date:	<b>28/02/2010</b>
Workpackage:	<b>NA2: Dissemination, training and certification</b>
Lead Partner:	<b>ENG</b>
Document status:	<b>Final</b>
Document link:	<a href="https://edms.cern.ch/document/1065007">https://edms.cern.ch/document/1065007</a>

---

### Abstract:

This document is the final report describing how the partners have used and disseminated the knowledge resulting from the project activities.

*Copyright (c) Members of the ETICS 2 Collaboration. 2008-2010.*

See <http://www.eticsproject.eu/etics/partners/> for details on the copyright holders.

ETICS 2 (“E-Infrastructure for Testing, Integration and Configuration of Software – Phase 2”) is a project partially funded by the European Union. For more information on the project, its partners and contributors please see <http://www.eticsproject.eu>.

You are permitted to copy and distribute verbatim copies of this document containing this copyright notice, but modifying this document is not allowed. You are permitted to copy this document in whole or in part into other documents if you attach the following reference to the copied elements: "Copyright (C) 2008-2010. Members of the ETICS 2 Collaboration. <http://www.eticsproject.eu>".

The information contained in this document represents the views of ETICS as of the date they are published. ETICS 2 does not guarantee that any information contained herein is error-free, or up to date.

**ETICS 2 MAKES NO WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, BY PUBLISHING THIS DOCUMENT.**

### Delivery Slip

	Name	WP/partner	Date	Signature
<b>From</b>	Isabel Matranga	NA2/ENG	10/02/2010	
<b>Reviewed by</b>	Uwe Müller Alberto Di Meglio	SA2/VEGA NA1/CERN	20/02/2010	
<b>Approved by</b>	PMB		28/02/2010	

### Document Log

Issue	Date	Comment	Author
0.1	10/02/2010	First Draft	Isabel Matranga and Andrea Manieri (ENG)
0.2	15/02/2010	Added updated versions of single partners exploitation results	Isabel Matranga (ENG)
0.3	20/02/2010	Review	Andrea Manieri (ENG)
0.4	26/02/2010	Integrated review feedback	Isabel Matranga (ENG)
1.0	26/02/2010	Released	Alberto Di Meglio (CERN)
1.1	28/02/2010	Revision	Alberto Di Meglio (CERN)

### Document Change Record

Issue	Item	Reason for Change

---

## CONTENT

<b>1. INTRODUCTION.....</b>	<b>5</b>
1.1. PURPOSE OF THE DOCUMENT.....	5
1.2. APPLICATION AREA.....	5
1.3. REFERENCES.....	5
1.4. DOCUMENT AMENDMENT PROCEDURE.....	6
1.5. TERMINOLOGY.....	6
<b>2. EXECUTIVE SUMMARY.....</b>	<b>7</b>
<b>3. EXPLOITABLE KNOWLEDGE AND ITS USE.....</b>	<b>8</b>
3.1. THE EXPLOITATION RESULTS - HIGHLIGHTS.....	9
<b>4. DISSEMINATION OF KNOWLEDGE.....</b>	<b>11</b>
4.1. DISSEMINATION MATERIAL.....	11
4.2. DISSEMINATION EVENTS.....	13
4.3. ETICS IN THE NEWS AND SCIENTIFIC PUBLICATIONS.....	15
<b>5. PUBLISHABLE RESULTS.....</b>	<b>17</b>
5.1. ETICS SOFTWARE – PUBLISHABLE DESCRIPTION.....	17
5.2. A-QCM – PUBLISHABLE DESCRIPTION.....	17
<b>6. INDIVIDUAL EXPLOITATION PLANS AND RESULTS.....</b>	<b>19</b>
6.1. CERN.....	19
6.2. INFN.....	20
6.3. ENG.....	21
6.4. 4DSOFT.....	23
6.5. VEGA.....	25
6.6. MTA SZTAKI.....	30
6.7. FZJ.....	32
<b>7. CONCLUSIONS.....</b>	<b>33</b>

## 1. INTRODUCTION

### 1.1. PURPOSE OF THE DOCUMENT

The Dissemination and Use of Knowledge Plan is the main document describing in detail how the partners use and disseminate the knowledge resulting from the project activities.

This is an evolving deliverable which has been regularly updated during the project lifetime to give a cumulative overview of the project's planned and undertaken activities.

This version is the final report of all the dissemination and exploitation related activities, collecting information already submitted in different contexts (e.g. previous version of the deliverables, periodic reports, etc) with an assessment of the work done and the lessons learned during these two project years.

### 1.2. APPLICATION AREA

This document mainly applies to the ETICS 2 dissemination activities performed within NA2 but it is at the same time a reference point for the project as a whole. All partners' managers should read it and keep aligned with sustainability opportunities that arise during the project activities. This is a public document that can give the general public the instruments to understand the project's expected results and potential benefits that will be achieved by supporting this activity with public funding.

### 1.3. REFERENCES

[R1]	ETICS 2 Description of Work ( <a href="https://edms.cern.ch/file/901793/1.10/ETICS_2_TA_v1_10.pdf">https://edms.cern.ch/file/901793/1.10/ETICS_2_TA_v1_10.pdf</a> )
[R2]	ETICS 2 DNA2.9 - Long-term sustainability strategy and activity report (Final) <a href="https://edms.cern.ch/file/1065006/1.0/ETICS-DNA2.9-1065006-Long_term_sustainability_strategy-v1.0.pdf">https://edms.cern.ch/file/1065006/1.0/ETICS-DNA2.9-1065006-Long_term_sustainability_strategy-v1.0.pdf</a>
[R3]	ETICS 2 DNA2.2 – Dissemination and Use of Knowledge Plan (first update) <a href="http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.2-969959-Dissemination_Use_Knowledge_Plan-1.0.pdf">http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.2-969959-Dissemination_Use_Knowledge_Plan-1.0.pdf</a>
[R4]	ETICS 2 DNA2.5 – Dissemination and Use of Knowledge Plan (second update) <a href="http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.5-990850-Dissemination_Use_Knowledge_Plan-v1.0.pdf">http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.5-990850-Dissemination_Use_Knowledge_Plan-v1.0.pdf</a>
[R5]	ETICS 2 DNA2.8 – Dissemination and Use of Knowledge Plan (third update) <a href="http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.8-1032920-Dissemination_Use_Knowledge_Plan-v2.0.pdf">http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.8-1032920-Dissemination_Use_Knowledge_Plan-v2.0.pdf</a>
[R6]	ETICS 2 QR7 <a href="https://edms.cern.ch/file/1064251/1.0/ETICS2_QR7_1109.pdf">https://edms.cern.ch/file/1064251/1.0/ETICS2_QR7_1109.pdf</a>
[R7]	ETICS 2 DNA2.6 - Long-term sustainability strategy and activity report (first release) <a href="http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.6-990904-Long_Term_Sustainability_Strategy-v2.0.pdf">http://etics.web.cern.ch/etics/deliverables/ETICS-DNA2.6-990904-Long_Term_Sustainability_Strategy-v2.0.pdf</a>

#### 1.4. DOCUMENT AMENDMENT PROCEDURE

This document can be amended by the NA2 Work Package leader further to any feedback from the other teams. Minor changes, such as spelling corrections, content formatting or minor text reorganisation not affecting the content and meaning of the document can be applied by NA2 Work Package leader without peer review. Other changes must be submitted to peer review inside the NA2 Work Package and then submitted to the PMB for approval.

When the document is modified for any reason, its version number shall be incremented accordingly. The document version number shall follow the standard ETICS 2 conventions for document versioning. The document shall be maintained using the tools provided by CERN EDMS system.

#### 1.5. TERMINOLOGY

ETICS 2	The name of the project. Acronym of E-Infrastructure for Testing, Integration and Configuration of Software – Phase 2
ETICS system	It includes the ETICS Software for creating a building, testing infrastructure and the ETICS Permanent Infrastructure for building, testing and assessing software quality

#### Glossary

DoW	The ETICS 2 Project Description of Work (Annex 1 of the Grant Agreement)
EDMS	Engineering Data Management Service, the CERN Document Management tool at <a href="http://edms.cern.ch">http://edms.cern.ch</a>
TA	Technical Annex (also known as DoW)
WP	Work Package

## 2. EXECUTIVE SUMMARY

This deliverable describes the dissemination and exploitation activities and results performed during the ETICS 2 project.

It first of all gives an update of the exploitable knowledge produced by the project:

- the ETICS System - which is a build-and-test framework supporting software professionals in their activities by automating the execution of builds, tests and software quality verification and validation
- the A-QCM - which automates the verification of the quality of the software and adheres to several Quality Assurance standards (ITIL, CMMi, ISO)
- The training courses - considered as the knowledge acquired during the ETICS and ETICS 2 project and the experience acquired during training activities performed.

During the project lifetime, the NA2 team has performed a set of dissemination activities which have included the production of dissemination material and involvement at dissemination events.

The ETICS partners have advanced exploitation plans both at consortium level and at single partner level.

Dissemination and exploitation activities have worked side by side and the mutual collaboration has brought to interesting results in both domains approached by the ETICS 2 team (research and commercial). The strong interdependence between the two tasks drove the project partners to assign their leadership to the same partner and this has helped in the coordination of the two activities. Moreover, assigning the two-task leadership to one of the commercial partners has made it easier to focus dissemination activities on the discovery and engagement of users and potential customers which may later become the pillars for a sustainable strategy.

One of the main results is that ETICS has attracted interest from researchers but at the same time also from private companies working in the domain of software development. Therefore ETICS is going to be used as build, test and quality verification tool in research projects, and commercial companies are going to invest on piloting and customisation phases and in promoting ETICS to their customers.

### 3. EXPLOITABLE KNOWLEDGE AND ITS USE

In this chapter the project partners present the exploitable results of the ETICS 2 project taking into consideration the work already performed during the first phase of the ETICS project. As described by the Commission, “exploitable results” are defined as “*knowledge having a potential for industrial or commercial application in research activities or for developing, creating or marketing a product or process or for creating or providing a service*”. For each exploitable result an overview is provided Table 1 regarding how knowledge can be exploited or used.

Exploitable Knowledge (description)	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable for commercial use	Patents or other IPR protection	Owner & Other Partner(s) involved
	ETICS System (for grid/cloud infrastructures)	Any Software development incubator/company/project	Late 2010	Apache 2.0 <sup>1</sup>	ETICS 2 partners
	A-QCM a model for Quality Certification	Any Software development incubator/company/project	Early 2011	CC by-nc-nd <sup>2</sup>	ETICS 2 partners
Training courses on the ETICS system		Any Software development project using ETICS system	Early 2011	CC by-nc-nd	ETICS 2 partners

**Table 1:** Overview of ETICS 2 exploitable results

In more detail, the exploitable knowledge identified by the ETICS 2 project is as follows [R2]:

- **The ETICS System** - a build-and-test framework developed starting from existing open-source software, smartly integrated, adapted to and exploiting grid and cloud infrastructures. It supports software professional in their activities by automating the execution of their builds, tests and software quality verification and validation on shared infrastructures, reducing the burden of manual processes and reducing costs by sharing the build and test infrastructures between different software projects. The ETICS software is released under the Apache 2.0 license.
- **The A-QCM** – as the theoretical guideline to provide a service for the quality verification of software based on automation. ETICS implements such guidelines for the automatic evaluation of the quality of software applications. A-QCM has been proven to adhere to several Quality Assurance standards (ITIL, CMMi, ISO).
- **The training courses** – the knowledge acquired during the ETICS and ETICS 2 project and the experience acquired during training activities performed. The courses will be developed for ETICS users and oriented to create and increase the knowledge of the ETICS Services and tools.

<sup>1</sup> <http://www.apache.org/licenses/LICENSE-2.0.html>

<sup>2</sup> Creative Commons By-Nc-Nd stands for Non commercial No derivative CC license. See <http://creativecommons.org/about/licenses/meet-the-licenses>, for details of each CC license.



### 3.1. THE EXPLOITATION RESULTS - HIGHLIGHTS

In this paragraph we report only some general information on ETICS 2 exploitation results as the subject is extensively described and analysed in DNA2.6 [R7] and DNA2.9 [R2].

In the last project months, ETICS 2 partners started the ETICS open source community. ETICS software, user manuals and training material are available through SourceForge<sup>3</sup> (<http://etics.sourceforge.net/>).

Through the creation of the open source community, ETICS aims to become part of a durable and collaborative development system, where each player can define his/her own open source strategy and everyone (companies, developers and users) will be able to contribute to the global sustainability of ETICS open source solution for the building, testing and quality verification of software at enterprise level.

The ETICS 2 project releases ETICS software under the Apache 2.0 license which guarantees re-use and extensions of code while keeping the initial ownership.

During its exploitation activities, the ETICS 2 team has approached both the research and the commercial domain and significant results have been obtained in both areas.

In the research domain, ETICS is going to be used as build, test and quality verification tool by a set of research projects also after the end of the ETICS 2 project:

- The EMI (European Middleware Initiative) – ETICS was selected to implement the integration, testing and quality assurance activities of the project.
- The D4Science 2 project – one of the main users of the ETICS system since the beginning of the ETICS project, which has confirmed the use of ETICS as build, test and quality verification tool for their second phase of the project
- EasyRider project – a research project financed by the Italian Ministry for Economic Development (MISE). ETICS will be used as build, test and quality verification tool by ENG team using the ETICS infrastructure available at ENG premises.

In the commercial domain, the project team has analysed the possible adoption of ETICS within commercial environments [R8] (e.g. the experiment run by VEGA and the experience started at ENG) and has identified a possible investment plan (considering efforts and costs) for running the “ETICS business” and the expected revenues aiming at generating a profitable and sustainable revenue streams [R7]. Furthermore as a result of the advancement of the single exploitation plan of the commercial partners, ETICS services will be part of pilot activities, promotional activities and the integration with other services opening the way to sustainability scenarios.

More in detail:

- At VEGA, ETICS is being integrated in the standard ALM (Application Lifecycle Management) platform for supporting the software development and maintenance projects

---

<sup>3</sup> <http://sourceforge.net/>

- 
- At ENG, ETICS has started a piloting phase at the innovation laboratory. The results will be analysed in order to evaluate the opportunity of a wide adoption of ETICS by the Engineering Group.
  - 4DSOFT aims to launch a new service (building, testing and evaluating the customers' systems) involving ETICS and has already performed dissemination activities towards some of its customers

To summarize, the results of the long-term sustainability activities performed [R2]:

- ETICS will continue to serve the research community through two different installations, one shared at CERN and INFN premises and supported by national and European funding (the EMI initiative), another at ENG premises and supported by internal funding (serving both research and commercial projects).
- ETICS is going to be an open source community with the aim of opening the source code to future development, evolution and improvements. This will increase the opportunity for a rapid penetration of the tool in the market.
- ETICS is currently under evaluation within the industrial context. The evaluation and piloting phases are seen as the basis for the future development of a commercial offering. A re-engineering period of about six to twelve months is foreseen in order to cope with specific requirements of the business environment (e.g. VEGA) or with the integration within the market offer (e.g. ENG and 4DSOFT).

## **4. DISSEMINATION OF KNOWLEDGE**

During the project lifetime the NA2 team has performed a set of dissemination activities that have included the production of a new brand identity, a website, brochures, posters, presentations and a video. ETICS was featured in on-line magazines and in collaboration with SA and JRA teams scientific papers were written and presentations were given at conferences and meetings. The dissemination activities performed have targeted both the research domain and an audience of companies involved in software development.

As an overall result of all dissemination activities performed in strong relation to exploitation activities ETICS has attracted interest both from the research and the commercial domains. This is demonstrated by the use which will be done of ETICS also after the end of the project as shown in chapter 3.

In the following paragraphs we summarize the main dissemination activities performed during the 2 years of the project lifetime. More detailed information on these activities can be found in [R3], [R4], [R5].

### **4.1. DISSEMINATION MATERIAL**

During the first phases of the project the NA2 team worked on the re-branding focusing on the restyling of the pre-existing symbol to capitalize on the awareness reached during ETICS project.

The new brand and style was adopted for all dissemination material.

The restyling activities concerned also the content of the website, brochures and posters which were not only updated with new information but also a more marketing-oriented approach and language was used.

In the following images are some examples of the dissemination material produced during the project lifetime.



**Figure 1 the ETICS 2 logo**



**Figure 2 ETICS 2 website screenshot**



**Figure 3 ETICS 2 second brochure (screenshot)**

## 4.2. DISSEMINATION EVENTS

During the two years of the project lifetime the ETICS 2 team has been involved in and organised a set of events aiming at spreading the knowledge on the ETICS system towards both the domains approached.

In Table 2 we include a list of the dissemination events oriented mainly to the research world while in Table 3 we show the list of events targeting the commercial environment (more detailed information on each event can be found in [R3], [R4], [R5] and [R6].

<b>Event</b>	<b>Type of participation</b>	<b>Dates and Location</b>
ETSI TG GRID	Presentation	Sophia Antipolis, Nice (France), 23 April 2008
Condor Week 2008	Presentation	Madison, Wisconsin (USA), 29 April – 2 May 2008
23 <sup>rd</sup> Open Grid Forum	Presentation	Barcelona (Spain), 2-6- June 2008
5 <sup>th</sup> e-Infrastructure Concertation Meeting	Presentation	Barcelona (Spain), 6 June 2008
Physics Service Meeting (PSM)	Presentation	Geneva (Switzerland), 3 July 2008
The Eleventh World Conference on Integrated Design & Process Technology (IDPT) 2008	Full Paper and Presentation	June 1-6, 2008 Asia University, Taichung, Taiwan
EGEE 2008 Conference	Presentation and booth	22-26 September 2008, Istanbul (Turkey)
European Condor Week	Presentation	21-24 October 2008 Barcelona (Spain)
SC08	Poster	15-21 November 2008 Austin, Texas (USA)
6th eConcertation meeting	Participation	24 November 2008, Lyon (France)
ICT 2008	Presentation	Lyon (France), 25-27 November 2008
EGEE JRA1/SA3 All-Hands meeting	Presentation	5-7 November 2008 Prague (Czech Republic)
ECRI 2008	Participation	9 – 11 December 2008 Versailles, France
Krakow Grid Seminar	Presentation	11 December 2008 Krakow, Poland
UMD workshop	Presentation	2 February 2009 Budapest, Hungary
OGF25/EGEE User Forum	Session with presentations	2-6 March 2009, Catania (Italy)
Presentation to SKA <sup>4</sup> project	Presentation	15 May 2009, Geneva (Switzerland)
BalticGrid 2009 Summer School	Lecture and hands on session	5 August 2009, Vilnius (Lithuania)
Gridka school	Lecture and hands on session	31 August – 4 September Karlsruhe (Germany)
EGEE 2009	Presentation	21-25 September, Barcelona (Spain)
Cracow 09 Grid Workshop	Presentation	12 – 14 October, Krakow (Poland)
DCABES	Presentation	16-19 October Wuhan, Hubei (China)

**Table 2: ETICS 2 dissemination events in the research domain**

<sup>4</sup> <http://www.skatelescope.org/>

<b>Event</b>	<b>Type of participation</b>	<b>Dates and Location</b>
QA&TEST 2008	Presentation	Bilbao (Spain), 29-31 October 2008
Workshop for CBT	Presentation and demo	10 March 2009, Rome (Italy)
Meeting with NETA <sup>5</sup>	Presentation	7 April 2009 (phone conference)
Hannover Fair	Presentation and booth	20 - 24 April 2009, Hannover (Germany)
CTI <sup>6</sup> workshop	Presentation	13-14 April 2009 (Brazil)
ENG internal workshop	Presentation and demo	4 June 2009, Rome (Italy)
Presentation session for NICE	Presentation	10 July 2009, Rome (Italy)
Demo session to Easy-Rider project	Presentation and demo	16 July 2009, Palermo (Italy)
ISO 37th JTC1/SC7/WG6	Presentation	19 October 2009, Rome (Italy)
GTAC (Google Automation Conference)	Presentation	21-22 October 2009, Zurich (Switzerland)
QA&Test 2010	Presentation	21-23 October 2009, Bilbao (Spain)
Innovation award at SELEX Sistemi Integrati (Finmeccanica event)	Presentation	26 October 2009, Rome (Italy)
Demo to ENG research and innovation PMs	Presentation	25 November 2009, Palermo (Italy)

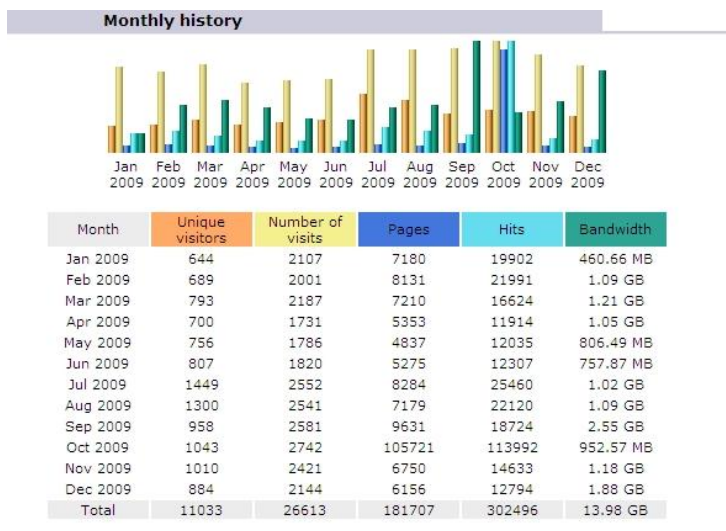
**Table 3: ETICS 2 dissemination events in the commercial domain**

As a result of the participation and organisation of the above mentioned dissemination activities ETICS was presented ‘live’ to about 400 people (taking into consideration the number of people present at sessions or presentations specifically on ETICS).

One of the means used to evaluate the interest shown towards the information delivered during dissemination activities was to monitor ETICS web site accesses. These have revealed interesting peaks in conjunction with the events as shown in Figure 4. As an example the image below depicts a very high number of accesses and at the same time number of pages visited in the month of October 2009 which saw the team involved in four different dissemination events among which the ISO working group meeting, the GTAC conference (Google Automation Conference) and the Innovation award at SELEX.

<sup>5</sup> <http://www.netanet.it/pagine/NETANET-10-344.asp>

<sup>6</sup> <http://www.cenpra.gov.br/> - CTI is one of the few organisations that make software product quality evaluation and have substantial experience with the ISO/IEC 25000 standards.



**Figure 4 Web statistics – monthly history**

### 4.3. ETICS IN THE NEWS AND SCIENTIFIC PUBLICATIONS

Through the publication of news and features in on-line magazine and newsletter ETICS has reached:

- More than 3000 subscribers of the ISGTW newsletter<sup>7</sup>
- 800 subscribers of the Belief e-Magazine<sup>8</sup>
- around 4,900 registered users of the ICT results e-bulletin and e-alert services<sup>9</sup>
- Readers of the Primeur magazine considered as the premier Grid Computing and Supercomputing information source in the world<sup>10</sup>

ETICS was also featured in the CERN computer newsletter<sup>11</sup>, Il Sussidiario<sup>12</sup> and EUAsiaGrid<sup>13</sup>

Research papers and presentations have been produced and given at numerous conferences. Some of them were published in scientific journals giving ETICS the opportunity to reach even a wider audience in the research domain.

<sup>7</sup> <http://www.isgtw.org/?pid=1001819>

<sup>8</sup> [http://www.beliefproject.org/zero-in/zero-in-first-edition-emagazine/folder\\_listing?b\\_start=int=15&-C=](http://www.beliefproject.org/zero-in/zero-in-first-edition-emagazine/folder_listing?b_start=int=15&-C=)

<sup>9</sup>

<http://cordis.europa.eu/ictresults/index.cfm?section=news&tpl=article&BrowsingType=Features&ID=90778>. The number of subscribers was taken from the IST Results User Survey 2005 – 2006 Summary of Results and conclusion (<http://cordis.europa.eu/ictresults/pdf/User%20Survey%202005-Summary%20V2.pdf>)

<sup>10</sup> <http://www.enterthegrid.com/primeur/09/articles/weekly/AE-PR-04-09-102.html>

<sup>11</sup> CERN computer newsletter No.2009-003

<sup>12</sup> <http://www.ilsussidiario.net/articolo.aspx?articolo=33555>

<sup>13</sup> [http://www.euasiagrid.org/index.php?option=com\\_eventlist&func=details&Itemid=&did=464](http://www.euasiagrid.org/index.php?option=com_eventlist&func=details&Itemid=&did=464)

In the following table a list of the scientific papers produced [R3] [R4][R5] [R6].

<b>Title</b>	<b>Conference</b>	<b>Publication</b>
ETICS Meta-data Software Editing - From Check Out To Commit Operations	CHEP 07 (International Conference on Computing in High Energy and Nuclear Physics) the paper was presented during ETICS project	Published in Journal of Physics Conferences Series (2008) <sup>14</sup>
ETICS: the International Software Engineering Service for the Grid	CHEP 07 (International Conference on Computing in High Energy and Nuclear Physics) the paper was presented during ETICS project	Published in Journal of Physics Conferences Series (2008) <sup>15</sup>
A Multi-node Mechanism to interoperability Issue in health care	The Eleventh World Conference on Integrated Design & Process Technology (IDPT 2008)	Submitted to Proceedings of the SDPS: Integrated Design & Process Science Transdisciplinary International Journal
The Impact of Grid on Health Care Digital Repositories	HICCS 2009 (International Conference on System Science)	Published in Proceedings of the 42nd International Conference on System Sciences and in IEEE Computer Society Digital Library <sup>16</sup> .
Integrated Service and Desktop Grids for Scientific Computing	DCABES 2009 (International Symposium on Distributed Computing and Applications to Business, Engineering and Science)	
Distributed Multi-Node Testing of Grid Services on the Grid		Submitted to the Journal of Grid Computing

**Table 4: ETICS scientific contributions**

The ETICS 2 team also worked on the preparation of a paper with the title “Software build and test using Grid and Cloud infrastructures” which was submitted to the HPDC conference (High Performance Distributed Computing - June 2010).

<sup>14</sup> [www.iop.org/EJ/article/1742-6596/119/4/.../jpconf8\\_119\\_042004.pdf](http://www.iop.org/EJ/article/1742-6596/119/4/.../jpconf8_119_042004.pdf)

<sup>15</sup> [www.iop.org/EJ/article/1742-6596/119/4/.../jpconf8\\_119\\_042010.pdf](http://www.iop.org/EJ/article/1742-6596/119/4/.../jpconf8_119_042010.pdf)

<sup>16</sup> <http://www.computer.org/portal/web/csdl/doi/10.1109/HICSS.2009.951>



## 5. PUBLISHABLE RESULTS

During the execution of ETICS, three exploitable results have been produced:

- ETICS Software (see 5.1 for details)
- A-QCM (see 5.2 for details)

In the following subsections, text is provided for each of the above items, following the required information set by the EC.

### 5.1. ETICS SOFTWARE – PUBLISHABLE DESCRIPTION

*“The ETICS Software contains all the integrated open-source software that composes the ETICS Services. The ETICS Software is released under the Apache 2.0 license, which is friendly to any commercial exploitation of the software, while the intellectual property rights lie with the ETICS partners.*

*The main novelty of the ETICS Software lies in its ability to automate the execution of software builds and tests also in distributed, multi-language and multi-platform environments, performing at the same time constant checks of the quality of the software. Among ETICS main features are its language-independence, its multi-platform support, its independence from any specific build or test tool, its quality certification model compliant with ISO standards and its built-in support for multi-node testing automation. The web clients are all integrated under a single application called the ETICS Portal. The Command-line client allows users to script the creation and execution of build and test procedures. The “Plug-in Framework” built in the ETICS command-line client allows users to integrate external tools, even commercial ones. This means that users can extend the ETICS system themselves and potentially contributing to its development, considering royalties and licenses. The ETICS Software can be used and applied to a wide range of applications, sectors and domains. The ETICS Software is the result of a four year activity performed during the ETICS and ETICS 2.*

*For more details, please contact Alberto Di Meglio ([alberto.di.meglio@cern.ch](mailto:alberto.di.meglio@cern.ch)), ETICS 2 Project Director or Isabel Matranga ([isabel.matranga@eng.it](mailto:isabel.matranga@eng.it)) Dissemination and Exploitation Manager”*

### 5.2. A-QCM – PUBLISHABLE DESCRIPTION

*“The A-QCM is an automated certification model capable of providing independent comparable results on the quality assurance of software products.*

*The main novelty of the A-QCM is the homogeneity of the results and the potential saving of resources usage. In A-QCM metrics are common to software applications of the same family and paradigm and they are always calculated in the same way, thus giving the opportunity to easily compare the quality of different artefacts. Moreover automation of quality assurance activities means that developers do not have to lose*

*time and computational efforts in running and monitoring quality tests, having simply to check the results automatically generated.*

*The possible market for this model is wide and can potentially apply to a number of complex Grid and distributed software components, services and distributions. The A-QCM has been subject of a feasibility study during the first ETICS project which highlighted the needs of the software production communities. The model has gone through its trial certification phase during which the quality of five projects has been checked and the goodness of the model has been tested.*

*A-QCM and the ETICS system are under field-evaluation by one partner in order to be adopted for achieving CMMi certification. This work should provide valuable feedback on the applicability of A-QCM in the commercial domain.*

*For more details, please contact Alberto Di Meglio ([alberto.di.meglio@cern.ch](mailto:alberto.di.meglio@cern.ch)), ETICS 2 Project Director or Isabel Matranga ([isabel.matranga@eng.it](mailto:isabel.matranga@eng.it)) Dissemination and Exploitation Manager”*

## 6. INDIVIDUAL EXPLOITATION PLANS AND RESULTS

At the beginning of the project, each partner has developed individual exploitation plans which involve the knowledge and technology created during the ETICS projects. In the following paragraphs we report information on the objectives foreseen by each partners, the activities performed and the results obtained by advancing the plans.

### 6.1. CERN

**General objective:** CERN general objective is to contribute to the provision of ETICS as a service to all projects where CERN is a partner and in activities of specific strategic interest to CERN scientific and technical goals. This includes projects in the context of the European grids infrastructures as well as more specific LCG activities.

**CERN business plan:** CERN plans for ETICS consists of two major parts:

1. The provision of ETICS as a service to projects where CERN is a member, with the goal of monitoring and increasing the overall efficiency and quality of the software produced by these projects
2. Investigation of potential areas of application of the ETICS system within CERN as part of the standard software development and quality assurance procedures with the long-term goal of integrating the ETICS Service in the standard CERN IT Department service offers to CERN projects and experiments

In terms of sustainability, CERN strategic approach is driven by the needs of its scientific communities. In this context, CERN is committed to support, maintain and further support ETICS as long it is required as part of CERN core business activities in support to LCG and other HEP-related projects.

**Activities performed up to now:** During the past twelve months CERN IT Department personnel have extensively promoted ETICS as part of several internal initiatives. This effort has been targeted both at including ETICS to meetings and discussions with projects with which CERN is establishing collaborations and at investigating how ETICS can be used within the IT Department as an internal service or as part of the Department service offering.

A major activity has been the proposal for ETICS to become the software engineering platform for the future EMI project. CERN has actively supported this initiative and several members of CERN not directly working in the ETICS project have attended the UMD/EMI workshops during 2009 promoting ETICS and showing how it was used in the other CERN projects. Ultimately the ETICS project was indeed selected as the strongest candidate among a shortlist of other 5 frameworks during a meeting that took place in Munich in June 2009. The ETICS Project Director was directly involved in the EMI proposal in August 2009 also as a consequence of this decision following a joint proposal of the gLite and UNICORE representatives.

More details on the following activities have taken place in the last three months:

Date	Event	Result
Ongoing	CERN/IT/CS Software Development	<p>The CERN IT Department is investigating potential areas where ETICS could be used. An experimental collaboration has started with the CS Group responsible for the Network and Communications technologies and services for CERN. The Group develops a number of custom monitoring applications for the network services they provide and it has started using ETICS on a number of pilot applications to evaluate its functionalities.</p> <p>A meeting with CS Group developers and the CS group leader took place in January 2010 to select the applications to be registered in ETICS.</p>
Ongoing	CERN/IT Security Team	<p>The CERN IT Security Team provides expert consultancy and assessment services to the IT Department in matters related to computer security. The Team has recently started collaborating with the EPFL in Lausanne to provide an assessment of tools to be used for performing static analysis of software developed by the IT Department. ETICS has been involved in the collaboration since such assessment has already been performed by the project as the base for its A-QCM model. The Security Team is currently reviewing the ETICS documentation on this subject and will assess the feasibility of providing an ETICS-based service to perform software security analysis.</p> <p>The results of this collaboration have been presented by the security team in February 2010 at a CERN/IT – wide meeting</p>

## 6.2. INFN

**General objective:** Use the ETICS system for the development of software in European Grid infrastructures, in all projects related with Grid middleware like EMI and in National Grid initiatives. This objective is expected to reduce costs of computational resources and to improve the quality of software.

**INFN business plan:** INFN plans to use the ETICS system internally in all the Grid-related projects it is involved in, e.g. INFN-grid project (e.g. INFN Grid release) and the INFN-grid middleware (e.g. STORM and WMS Monitor), and Italian Grid Infrastructure (IGI). IGI is currently a European Joint Research Unit (JRU), based on a Memorandum of Understanding signed between the members in December 2007, and formally supported by the Italian Ministry for University and Research (MUR) and the European Commission. Its formal predecessor is the Grid.it project, which came to a close in 2006. IGI focuses on setting up and operating a common e-Infrastructure for the Italian Sciences, and includes the main public Resource Providers and Computing Centres, in addition to various Regional Initiatives and other related projects. It coordinates all aspects of the Italian e-Infrastructure present in EGEE III and beyond. IGI contributes to the development of Grid services and software components

(like CEMon, CREAM, DGAS, GLUE Schema, Grid2Win, GridICE, StoRM, VOMS and WMS) and uses the ETICS system for automating the build, configuration and test of software. IGI will provide a consistent and coordinated Italian strategy as a step towards the European Grid Initiative (EGI) and as an interface to the EU Grid infrastructure projects e-IRG (e-Infrastructure Reflection Group) and ESFRI (European Strategy Forum on Research Infrastructures), and to other international activities as the need arises. IGI supports activities in a vast range of scientific disciplines, e.g. Physics, Astrophysics, Biology, Health, Chemistry, Geophysics, Economy, Finance, and any extensions to other sectors such as Civil Protection, e-Learning, dissemination in Universities and secondary schools.

INFN also plans to maintain the hardware assigned to ETICS and the ETICS Support Web Portal following EMI needs.

**Summary of activities performed during project lifetime:** ETICS is used for INFN projects, like STORM and WMS Monitor. It is adopted for the definition of the INFN Grid release. Moreover all the software components developed by IGI use ETICS in their process of build and test.

### 6.3. ENG

**General objective:** Integration of ETICS system in Spago4Q<sup>17</sup> and in ENG API portal as one of the tools which supports the software development activities and adoption of the ETICS software for internal use. Such a plan is expected to:

- Reduce costs and improve quality of the software according to the fact that a company-owned infrastructure for building, testing and quality verification would bring a total reduction of 50% of initial testing costs and an increase of the overall quality of the projects. Furthermore as an ISO and CMMI level 3 certified firms, ENG is highly interested in the quality assurance monitoring features offered by A-QCM. Consolidate Spago4Q which is one of ENG open source products for the assessment of the maturity and effectiveness of the development software process and for the quality inspection of the released software. It offers internal customers a service which supports them in developing high quality software compliant to recognised standards and in performing some of their activities part of the software lifecycle such as: build, testing, validation and verification, deployment, maintenance, review and improvement.

**ENG business plan:** ENG plans to internally use the ETICS services and at the same time enhance ETICS by integrating it into Spago4Q and into the ENG API portal as one of the tools which supports the software development activities. In a second stage, the ETICS/Spago4Q services will be offered as a service through the Engineering IT Data Centre in Pont S. Martin. The services will be offered both internally to ENG and to the companies who are part of the Engineering group. At the same time, as the ETICS system will become part of the Spago4Q product, it will also become integral part of the Spago4Q business model.

#### Summary of activities performed during project lifetime:

Activity name	Activity outcome
Analysis of ENG internal	The analysis aimed at better understanding how to approach ENG

<sup>17</sup> <http://www.spago4q.org>

customers	internal customers taking into consideration their needs and how ETICS can support them. The information collected during this activity was then used to prepare internal dissemination/exploitation material.
Presentation and demo to project managers of the research laboratory	The demos aimed at collecting more internal ETICS use cases. Some of the project managers approached have decided to use ETICS as their build, test and quality verification tool (Easy Rider project) others preferred using other similar tools which have been already used in previous experiences while others are still evaluating the possibility of using ETICS.
Presentation and demo to project managers and the head of the Innovation unit	This activity was in line with the internal organisation of the ENG according to which results from research projects coming from the Research Unit go through to the Innovation Unit for technological experimentation to finally reach the Production Units. Interest towards ETICS was shown and two R&I commercial projects will be using ETICS as their build, test and quality verification tool starting from the month of February. An experimentation phase has already started in order to get acquainted with the tool, and better understand its potentialities it was decided to add in the short term ETICS to ENG API portal as one of the tools which supports the software development activities to start its evaluation phase.
Presentation to representatives of companies who are part of Engineering group	This activity aimed at collecting feedback and at the same time finding new users of ETICS also outside ENG. The new users would then become success stories for the promotion of ETICS according to ENG business plan described above. Interest was shown towards ETICS but before starting any collaboration it was requested to finalize the implementation of the code privacy requirements already included in ETICS 2 technical implementation plan.
Installation of ETICS infrastructure at ENG offices	The infrastructure will serve as build, test, quality verification environment for the projects using ETICS within ENG (at the moment D4Science 2, EasyRider, two pilot project in R&I laboratory). It is also being used as a demonstration infrastructure and for the building of the necessary know-how for its management and maintenance preparing for the future ETICS service provision activities.
High level study on the integration of ETICS into Spago4Q	The study has given positive outcomes and has started a fruitful collaboration with Spago4Q team which will be continued after the ETICS 2 project end.
Experimental phase of ETICS at ENG R&I laboratory	In the month of January 2010 the experimental phase of ETICS at the R&I laboratory in Palermo has started. During this phase the team is evaluating ETICS potentialities and its integration in the development environment and with the customer's requirements.

A set of activities was also performed on behalf of the ETICS 2 Consortium as leader of the exploitation/sustainability task. In particular ETICS was presented to a set of potential new users both

with the aim of collecting feedback and to gather new users of the system (see DNA2.6 for more information).

ENG is also evaluating the QualiPSo Factory, an open service oriented integration framework (a forge for open source software) which proposes tools to facilitate development of open source software within distributed teams. The Factory already integrates Spago4Q and as part of its current experimentation the possible costs and benefits of the integration with ETICS are being assessed.

#### **Future activities:**

Short term (on-going)	Promotion of ETICS@home (the ETICS installation on ENG premises) within the company (i.e. 7000 employees and hundreds of development projects per year).
Short term (on-going)	Two commercial pilot project using ETICS@home within ENG Innovation department.
Short term (by the end of 2010)	Analysis of the experimentation of ETICS on commercial pilot projects taking into consideration adoption costs and efforts and at the same time the benefits obtained by the use of ETICS and the impact on company or contractual rules and procedures. The results of this analysis will be the basis of the decision whether to widely operate the ETICS services from ENG data centre.
Short term (by the end of 2010)	ETICS will be added to the ENG API portal as one of the tools which supports the software development activities.
Short term (by the end of 2010)	Integration study on ETICS and Spago4Q (as part of the Qualipso forge) will be finalized and the integration activities will start.
Long term	ETICS will become a service offered through Engineering.it data centre.

#### **6.4. 4DSOFT**

**General objectives:** Applying our services and our own analysers, testing tools and products exploiting the features of ETICS. The goal is to support continuous integration for companies, especially our existing partners and SMEs involving entire build, deployment and testing support.

**4D SOFT's model:** A complex service is going to be offered for SME-s, where ETICS infrastructure is available at 4D SOFT (or at an ETICS-based consortium if available). 4D SOFT offers a full service including building, testing and evaluating the customers' system. There are lots of open source testing and analyser tools as plugins in ETICS. Also ETICS leverages a plugin registration procedure which makes it possible the customisation of the required testing services within a short time. We think that

putting together a build system, a collection of open source tools with advanced testing techniques and also providing our company's test tools could be an attractive service.

4D SOFT own tools and products could enhance the capability and usability of ETICS and improve ETICS-based services. Such tools are Deeptest, a static debugger and analyser for java, and JATEST, a test data selection tool which is a triplet of tools (a code instrumenter detecting execution history, a syntactic code comparator and a test selector tool) capable of working together and registered into ETICS.

Nevertheless, 4D SOFT is open to use any business model made by ETICS partners if it conforms to our business strategy.

4D SOFT offers a complex test outsourcing from testing strategy involving the appropriate tool selection to the actual execution of the selected static analysers and testing tools.

In this way the user does not need to study several open source testing tools and static analysers, ETICS collected already for them, while 4D SOFT could have a new channel for selling its own products.

This model is an extension of an already existing business model, particularly to make services available through Internet, for example, Fog Creeks' FogBugz <http://www.fogcreek.com/FogBugz/> supporting 15,000+ users.

4D SOFT could also offer the same service for larger companies installing the ETICS system into the company's own infrastructure.

### **Summary of activities performed during project lifetime:**

- We developed a sample project involving almost all the features ETICS has.
- Sample project is a web application (JRA2 ETICS test system development) to demonstrate the usability of ETICS for large span of software development projects
- This includes build, deploy, unit test with coverage, dynamic testing acceptance test
- This sample project is used for marketing purposes to present ETICS features for 4D SOFT people and for our partners. We use ETICS on our own work in JRA2 development in order to use it as a model project ('marketing' project). Showing people that we really apply ETICS in our daily work is from our point of view the best approach to convince other people to use it

### **Future activities:**

- As soon as possible, a whole ETICS installation will be done in our machines (or following the agreement between project members) together with the test services.
- *4D SOFT has a contract with Bonn Hungary Ltd. to perform quality control, support testing and perform IVV for its granted robot airplane project implementing in C programming language. We suggest them using ETICS with ETICS plugins: Valgrind, LCov, cUnit, Flawfinder, Rats, CppCheck and Vera++. As a first step, in February, 2010 we are going to give a presentation of ETICS and these tools*
- A new 4D SOFT home page has been planned and it will include the new service described in "4D SOFT's model". The marketing strategy for this service has been started
- The new service involving ETICS will be launched in the spring of 2010.



- Presenting ETICS to our partners. Our first target group is our current partners where we can ease and accelerate development work.
- A complex service is going to be offered for IT SME-s, where ETICS infrastructure is available at 4D SOFT (or at an ETICS-based consortium if available). 4D SOFT offers a full service including building, testing and evaluating customers' systems.
- Nowadays companies require complex services from one key outsource company. With ETICS our company can extend its service capability. On the other hand, 4D SOFT has strong experience with testing we concentrate on ETICS testing features, but we also provide build, management and deployment automation.
- For us, one of the key features in ETICS is tool registration, which seems to be unique. Another advantage is the plugin generation, because in other continuous integration tools this feature is resolved following a complicated approach.
- By integrating our own tools into ETICS we will have a more complex service than our competitors.
- 4D SOFT's own tools to be integrated (following our general objectives) by November: Java instrumenter, Semantic Comparator, Test Selector (and a necessary tools that execute test cases, i.e. JUnit that has been integrated)

## 6.5. VEGA

### History updates to last version:

WISE (VEGA integrated Software Environment) has been renamed to SESOME (SELEX Software Management Environment). ETICS is now an integrated tool and is used for the mapping of the Configuration Management, Software Integration and Deployment Processes.

The first draft of the process description has been finished within 3Q of 2009. VEGA's team presented this adapted Application Lifecycle Management (ALM) approach which uses ETICS as standard ALM platform for supporting the software development and maintenance projects as proposal of a standardized environment. The approach was reviewed by a committee of subject matter experts and the presentation "Model Driven Architecture applied to the Simulation Domain" received a Level 2 prize. This success was a big step ahead in the attempt to integrate ETICS as a central tool in VEGA's standardization attempts.

The complete process of SESOME has recently been presented and demonstrated to the SELEX System management on 28 February 2010 in a broader form and gained a huge amount of attention.

In parallel to these successful steps in establishing the system in-house, discussions with EUMETSAT to adapt this concept to their own in-house maintenance procedures are very promising. This is a consequent step into the direction of the planned VEGA business model as described below.

Again, it has to be mentioned that all these activities and plans are closely relying on the establishment of the adequate security requirements as described for DSA 2.2, which are still pending.

**Introduction:** VEGA Deutschland GmbH & Co. KG, a German subsidiary of SELEX Systems Integration Ltd, is based in Darmstadt and Cologne and employs more than 300 staff. VEGA is specialised in consulting and technology for the aerospace and defence markets. VEGA's clients include most of Europe's satellite operators and aerospace prime contractors, as well as similar organisations around the globe.

One of the main activities of VEGA is the development of satellite ground segments. This includes software-based systems for spacecraft control, mission planning, full mission simulators, payload data

processing and training systems, based on a mixture of VEGA kernel software and COTS products. These systems are often highly complex distributed systems and are developed in collaboration with other organisations.

VEGA's key interest in the ETICS system thus concerns the ability to use ETICS in a multi-contractual environment. As most of the software has to be developed in a close cooperation between organisational independent companies, VEGA is looking for a system which offers the ability to synchronize the software development process in a shared, but nevertheless protected environment giving all involved partners the ability to share common resources and such to minimize the effort in the maintenance of their local build environments, which otherwise have to be set up at the location of each contractual partner separately and are thus highly redundant.

Several potential strategies for using and disseminating the system for a commercial approach are being analysed: (1) VEGA can act as a Service Broker, supporting commercial companies in setting up their own local ETICS System in which the customer then itself is acting as the Service Provider to his contractors, after the system is finally being set up. (2) A second strategy to be followed is to set up an own ETICS pool, maintained and driven by VEGA as a Service Provider and to offer other companies the ability to use parts of this pool for the development of their own projects. (3) A third strategy could be as well, to procure the already existing resources and build capacities of the installed ETICS pool also for commercial software development projects.

All these business strategies require the existence of appropriate security features that need to be addressed, before the system can be used for such approaches. Identified requirements are thus security of data and the protection of intellectual property rights on proprietary software (such as embedded flight code) and algorithms. These requirements have been identified and collected in the delivery DSA2.2.

**Feedback after the First Project Year:** A general statement when introducing the concept of ETICS was always that industrial customers will not accept the development of their commercial applications inside a system which is neither under their own nor the control of their direct business partners. This has several reasons which are:

- The addressed security issues and privacy as listed in DSA 2.2;
- Uncertainty about availability of the CERN-hosted ETICS infrastructure after the project phase of ETICS 2;
- Lack of control and confidence, as system-dependent decisions for a third party ETICS system may be taken outside of the direct business relationship between the two direct contractual partners.

The consequence is that the phase-in of commercial applications into a third party system like the CERN-hosted ETICS infrastructure for commercial usage is difficult (not to say impossible) to procure. The table below lists the activities during which the above feedback was collected.

Category	Name	Country	Contact	Kind of approach	Main outcome	Future steps
Aerospace Industry	ESOC/ESA	GE	OPS/GIM, S. Moulin	Demo	Requirement Collection as was specified in DSA 2.2. Interested in usage after requirements are fulfilled	Still waiting for requirement fulfilment before show any further interest.
	EUMETSAT	GE	Maintenane Dept. Y. Buhler	MEETING Presentation	Requirement Collection as was specified in DSA 2.2, interested in usage after requirements are fulfilled.	Came back to VEGA with a Study, started with begin of 2010
Industrial Partners	Selex Systems Finmeccanica	IT	Department Head R&D	Demo performed	Potential user with Commercial code. Will take into consideration the use of ETICS for future projects, if demo is successful.	Presentation + Demo performed 28, 29. Jan 2010

**Strategy Changes:** Due to this feedback during the first project year, VEGA has decided on a couple of strategy changes for its own exploitation activities.

As the originally planned phase-in of the customer owned reference project (SLE API) into the CERN-hosted ETICS system was not possible due to license restrictions and the objections of the customers as referred to above, VEGA has set up a local in-house system with the help of CERN. The basic system is established and is currently in the state of customisation. Additional (project-specific) worker nodes will be attached to the system during the next weeks and months - which are dependent on the special project needs as they emerge from the running dissemination activities.

Ongoing development of the SLE API by VEGA (which is in the state of negotiation with our customer) foresees to use ETICS as underlying development platform. Using ETICS in this way and demonstrating its usability to ESOC will be from our point of view a more promising argument than preparing simple demos or presentations.

A second VEGA project, called EGOS-MF, is in the pipeline for further development and has been phased-in to the ETICS environment as well.

The Project Manager of EGOS-MF serves as a “friendly but highly critical client” for VEGA in our attempts to establish ETICS. The outcome of his experience with the system will have a relevant influence on VEGA’s future engagement in the ETICS after ETICS consortium.

**New Challenges:** During the last year VEGA became a part of Finmeccanica SpA, a global concern with headquarters in Italy. There are significant software developments in Finmeccanica and this represents a new potential market which VEGA is now addressing.

To support our drive to address this market, we have created a concept with the working title “**SELEX Software Management Environment**” (**SESOME**). It is planned to evaluate the integration of ETICS as basic a framework for this attempt.

SESOME has the following three objectives:

1. To prove ETICS during the development of a real commercial application;
2. To prove cooperation of mixed teams using ETICS as a common base;
3. To spread the knowledge and experience of the usage of ETICS inside our parent company.

The exploitation strategy can be divided into three activities on different time scales:

- **Short term activities:** to establish ETICS in VEGA's in house development procedures and processes (current activities shall be finished during the 3rd quarter of the second project year). Failure to convince our internal project teams of the benefits of ETICS will have impacts on our chances of success with the middle and long-term activities.
- **Middle term activities:** to attract software development projects from other parts of our parent group and to the customers of the projects currently been phased in (ESOC).
- **Long term activities:** If good experiences can be made with steps 1 and 2, ETICS can be offered as a service to outside customers as was already described in detail in the original Exploitation Plan, as given in the introduction (this activity lasts after the ETICS 2 project phase).

The long term activities are thus a scenario for a realistic ETICS after ETICS approach. The goal is dependent on our ability to establish ETICS within VEGA and to attract projects from other parts of our parent company, which in turn requires the demonstration of real added value.

### **Summary of Exploitation Strategy:**

1. Defining a set of procedures and processes for SESOME, including ETICS as an Integrated Development Framework (see details below).
2. Establishing ETICS as substantial part within SESOME. This includes also convincing of our internal developer teams;
3. Developing applications for internal and external customers, using ETICS as a Framework;
4. Disseminating the system also to other companies of our parent trust and to the customers originally intended (ESOC) providing that we make good experience with our approach;
5. Offering ETICS as a service, embedded in the SESOME to the outside world as already described in detail in the original Exploitation Plan of DNA2.2 (see above).

Activities 3 -5 represent a realistic scenario for a possible VEGA in-house business model of ETICS. If the use of ETICS is proven by a new software development project which follows established and defined rules and processes, this will increase our ability to convince potential customers (internal and external) of the added value of ETICS in contrast to the current established development approaches.

**The VEGA Integrated Software Environment (SESOME) in detail:** Processes and procedures for SESOME shall comply with the ISO/IEC 12207 standard describing Software Life Cycle Processes.

ISO/IEC 12207 establishes a common framework for software life cycle processes, with well-defined terminology, on a “best practices” level.

ISO/IEC 12207 also includes those aspects of system definition which are needed, to provide the context for software products and services.

A mapping between ETICS and ISO/IEC 12207 has been performed and is part of the project documents.

SESOME shall comply with ISO/IEC 12207 in the two following modes:

- Management specific — to help develop an agreement concerning processes and activities. Via this agreement, the processes and activities of ISO/IEC 12207 are selected, negotiated, agreed to and performed. In this mode ISO/IEC 12207 is used for guidance in developing the agreement between a potential customer and VEGA as a custom specific project implementer.
- Implementation specific — to help select, structure and employ the elements of an established set of life cycle processes to provide products and services. In this mode ISO/IEC 12207 is used in the assessment of conformance of the project to the declared and established environment.

According to this standard, VEGA is in the progress of setting up a set of procedures and processes which accompany a customer project from its initial outline up to its maintenance state:

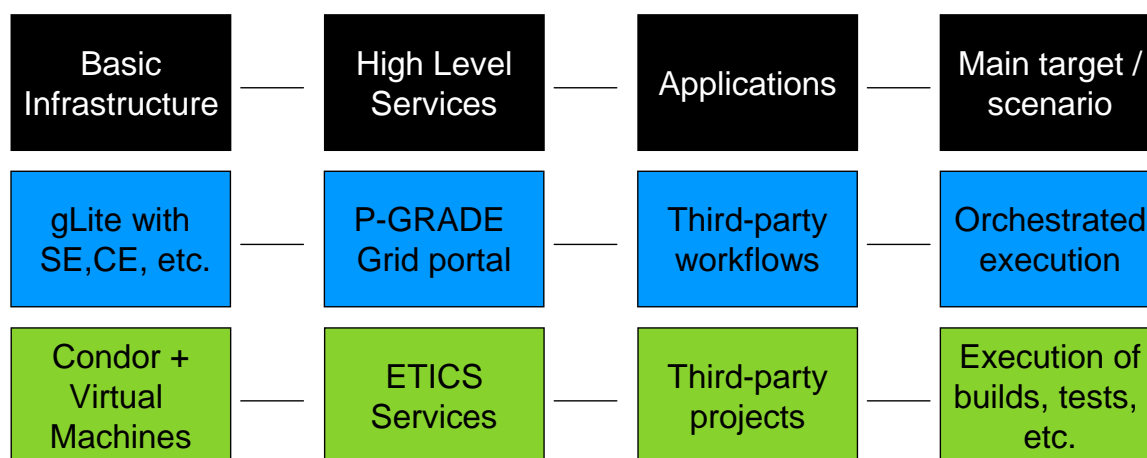
- Part I is describing the relevant procedures and processes and is oriented to the template given by ISO/IEC 12207:2008, which lists:
  - System Context specific related processes, further subdivided into:
    - Agreement;
    - Project Management - and
    - Technical processes.
  - Software specific related processes, subdivided into:
    - Implementation;
    - Support specific - and
    - Software Reuse processes.
- Part II describes the concrete implementation of these procedures for a detailed project development / maintenance and covers the following stages of the software development life cycle:
  - Requirement and Specification;
  - Architecture and Design;

- Implementation and Build;
- Testing, Validation and Verification;
- Deployment;
- Maintenance, Review and Improvement.

SESOME intends to use ETICS for the technical realisation of the above described procedures and processes. Due to ETICS features as a complete infrastructure for managing projects and providing the relevant tools for the build process, configuration management, testing and quality metrics on a platform independent basis, it is assumed to be well suited for providing the technical base of such a integrated development environment as is planned. The approval of this appropriateness is an essential part of the current activities of VEGA.

## 6.6. MTA SZTAKI

**General objectives:** MTA SZTAKI is one of the non-profit research partners of the consortium; the commercial exploitation is targeted in our plans via an open source approach and franchise model similarly to the case of P-GRADE Grid portal, which is one of the major achievements of the MTA SZTAKI/LPDS.



The figure above outlines the similarities between the ETICS and P-GRADE portal projects (according to MTA SZTAKI's interpretation) at the different levels; basic infrastructure, high level services, applications, and main target/scenario. One of the key for the success is to find third-party projects with willingness to use the provided infrastructure and services and to pay for their further development and sustainability. In case of P-GRADE portal (released under GPL v3 in January 2008), all the further developments and maintenance is now financed by Swiss, Malaysian, and Kazakhstani companies and partners, which means the 20 percent of budget of MTA SZTAKI/LPDS in 2009-2010.

**Summary of activities performed during project lifetime:** Within the context of the EU FP7 EDGeS project MTA SZTAKI as the coordinator tried to involve some third party project (including

---

applications from industrial partners) as ETICS users, and a MoU was signed between the projects on 24 June 2009 including this aim among others.

In a nutshell, the targets of the Enabling Desktop Grids for e-Science (EDGeS) project are user communities that require large computing power not available or accessible in current scientific e-Infrastructures. In order to support the specific needs of these research communities and commercial partners the consortium interconnected the largest European Service Grid infrastructure (EGEE) with several existing Desktop Grid systems based on the widespread BOINC or XtremWeb solutions.

Service Grids (SG) are more flexible and can accommodate a broader variety of applications than Desktop Grids, however, their setup and maintenance require more efforts, highly skilled IT specialist, and dedicated resources. On the other hand, Desktop Grids (DG) are currently restricted solely to a subclass of compute-intensive applications but these easy-to-scale systems are able to collect one or sometimes even two orders of magnitude more computational power by utilizing the involved spare and volunteer IT resources at a fraction of the cost. Making a bridge between these two types of Grid systems will enable the users to transparently execute applications on any arbitrary platform involved in the new infrastructure. Taking the advantages of both approaches the EDGeS infrastructure can represent a step towards a worldwide scientific grid where extremely large number of resources could be integrated to support grand-challenge scientific and other applications.

Combining the efforts of EDGeS and ETICS-2 in some areas can be mutually advantageous and help in the exploitation. On one hand, the success of EDGeS project depends partially on the software quality and reliability of the Desktop Grid enabled applications to be executed on donor's computers, which provide a highly heterogeneous computational platform from PCs with limited capacities. In the EDGeS Application Development Methodology during the testing and validation phases of these applications the EDGeS application support teams must rely on well-established and automated tools in order to build, test, and validate the mostly third-party applications before their execution on the production DG infrastructures of EDGeS. The ETICS-2 services could help accelerate and make more efficient these essential steps in the EDGeS application validation procedure. Furthermore, the migration of some key components of EDGeS Grid middleware, such as SZTAKI Desktop Grid and the developed bridge under the ETICS-2 Build and Test system can ease the build, deployment, test on a heterogeneous multinode environment, and maintenance of these components. Moreover, obtaining an A-QCM certificate for the developed Grid middleware core components could contribute to the successful exploitation of EDGeS achievements and solutions towards other industrial partners. On the other hand, the ETICS-2 System efficiency, correctness and completeness depend on the involvement of software engineering professionals and of project developing distributed software for as many communities and applications as possible; EDGeS can contribute to these efforts, too.

Currently, some core components and test applications of EDGeS project have been already migrated and partially tested under ETICS, including the BOINC server and client packages, the DC-API interface, and the core 3G Bridge middleware components. MTA SZTAKI demonstrated the approach and the current results at different events where potential non-profit and industrial partners attended as well; the DCABES 2009 conference (October), and the Supercomputing 2009 exhibition (November). See the dissemination plan for the details. Obtaining A-QCM certificate (at least partially for some EDGeS core middleware components) is also in progress. The details can be found in the deliverables DJRA2.5 and DJRA2.6.

### Future steps:

Due to the slightly underestimated manpower, the unforeseen difficulties mainly with third-party EDGeS applications, the late availability of these third-party software components to be ported and tested, the extended duration of EDGeS project, and sometimes the lack of enough experienced IT staff; the exploitation-related work will be continued and finished after the end of ETICS-2 project. MTA SZTAKI is going to put efforts in the extended period of EDGeS (until 31th March) in order to use ETICS in the EDGeS validation phase, and in the framework of its successor projects, such as that nationally funded WEB2GRID project ([http://www.sztaki.hu/search/projects/project\\_information/?uid=00274](http://www.sztaki.hu/search/projects/project_information/?uid=00274)).

The results will be disseminated and demonstrated at various events such as the 5<sup>th</sup> EGEE User Forum (Uppsala, Sweden) and the Grid section of Networkshop Conference (Debrecen, Hungary) in April (organised by MTA SZTAKI).

The core parts of the workflow editor will be reused and maintained in the successor projects of MTA SZTAKI as well as the ETICS related extensions depending on the users needs.

### 6.7. FZJ

**General objectives:** Forschungszentrum Jülich (FZJ) is interested in using the ETICS services in the future, in particular for the automated and regular testing of the server components of the UNICORE middleware across various operating systems. Thereby the targeted users of the service at FZJ are the developers in the UNICORE developer community, which is coordinated by FZJ.

**Summary of activities performed during project lifetime:** Within the context of the EGI middleware taskforce, which provided input for the EGI blueprint and functions documents, FZJ actively pushed the usage of ETICS in the future EGI organisation and other EGI-related projects.

Furthermore the use of the ETICS service was promoted by FZJ inside the UNICORE developer community at various occasions and in discussions with the developers.

**Future steps:** In case the ETICS service would be offered for free to the research community by a research organization and if UNICORE will be used as a backend submission system, FZJ will provide 1-2 worker nodes. Making these worker nodes available can be realized in a rather short timeframe of 2-3 months. However, the start of this work depends on whether another research organization commits to operate the ETICS services for free to the research domain.



## 7. CONCLUSIONS

The ETICS 2 team during its dissemination and exploitation activities has approached two kinds of ‘customers’ coming from two different domains: the research and commercial domains. The two groups of ‘customers’ have shown some similarities but also many differences. The presence of both commercial and research partners in the NA2 team and the strong collaboration among them have helped the project approach differences and take advantages of similarities.

During the first ETICS project more attention was given to the research domain as the ETICS system was still in its full development phase. It was clear since the beginning of the ETICS 2 project that the importance of the development of new solutions had to keep in mind the market and its evolution. This has brought the team to perform a set of activities which have:

- analysed the market
- identified a possible investment plan and revenue streams for a potential “ETICS business”
- analysed the possible adoption of ETICS within commercial environments.

In the past two years ETICS has been presented to research projects and commercial companies through the active participation to conferences but also through the organisation of specific events.

As a result of all dissemination and exploitation activities ETICS will become part of a durable and collaborative development system through its open source community and will continue being used by research projects while the commercial companies will continue promotion and evaluation activities and piloting phases for a possible commercial adoption of ETICS.