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Summary

This report illustrates the training activities performed until Month 23. In particular, it describes in detail the supporting tools created and the events organised. It also briefly presents an updated plan for the next year in order to provide a more complete vision of the overall training activities.

Executive Summary

The DILIGENT project is extremely innovative both for the adoption of several different new technologies (often released after the project start-up) and for the unconventional digital library infrastructure that it will produce. Because of this innovative nature, training activities play a key role in the context of the DILIGENT project. They produce informative material and organize events through which the DILIGENT partners can transfer the knowledge acquired to the other partners, thus maximising synergies inside the consortium, and to the interested groups outside the project. Moreover, user communities can be trained on the new functionality offered by the DILIGENT infrastructure in order to clarify how it can be used in their application context.

Given the wide spectrum of possible training topics, the DILIGENT training has been organised into three main classes that address different target audiences, each characterised by specific needs:

- **Intra-project training:** is targeted to researchers and developers of the DILIGENT consortium. It constitutes a knowledge communication channel among the different partners with their different skills. Its activities aim to: (i) introduce background methodologies and technologies; (ii) present the products developed by the project; (iii) select relevant information and documentation; (iv) report on studies, experimentation and external training sessions. This type of training events started at Month 6, when the first basic design decisions and technology choices to be communicated to the all partners were produced, and will be active for sharing experiences until the end of the project.
- **Inter-project training:** is addressed to researchers and developers of other projects and initiatives that share DILIGENT's objectives and technological solutions. Each-project training activity has to be tailored to the individual needs of the different target groups: (i) researchers working in the area of Grid technology development; (ii) practitioners and researchers working in the information systems communities; (iii) technicians and system administrators; and (iv) content and third-party application managers/technical people responsible for Virtual Organizations. It was planned to start at Month 19, when the partners had accumulated enough experience to train others on the project's technical choices and developed technology.
- **External training:** aims at reaching people possibly interested in the DILIGENT solution and at providing them with initial training and high level documentation to illustrate how to use the DILIGENT infrastructure and the DLs that are managed through it. In particular, these training activities have to address the needs of: (i) third-party content providers which are interested in understanding how to join the DILIGENT infrastructure; (ii) DL managers and system administrators who intend to adopt a Grid-based DL and are interested in how to install and maintain DILIGENT; and (iii) end-users of a Grid/DL infrastructure that need to learn about how to use a virtual DL. It will be initiated at Month 25, when the first DILIGENT Release will be available for experimentation.

This report illustrates the training activities carried out until Month 23rd. These activities are mainly concerned with the introduction of a number of supporting tools and the organization of training events. These events until now have been mostly focussed on the first class of training. An evaluation of these activities and an update to the training plan presented in Deliverable 4.1.2 is also given.

1 PURPOSE

The DILIGENT project is extremely innovative both for the adoption of several different new technologies (often released after the project start-up) and for the unconventional digital library infrastructure that it will produce. Because of the innovative nature training activities play a key role in the context of the DILIGENT project. They produce informative material and organize events through which the DILIGENT partners can transfer the acquired knowledge to other partners, thus maximising synergies inside the consortium, and to the interested groups outside the project. Moreover, training activities make user communities aware of the new functionality offered by the DILIGENT infrastructure and improve their understanding of how it can be used in their application context.

Given the wide spectrum of possible training topics, the DILIGENT training has been organised into three main classes that address different target audiences, each characterised by specific needs:

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The objective of this report is to illustrate the training activities carried out until Month 23rd, evaluate them and briefly present an update on the training plan presented in Deliverable 4.1.2. In particular, the rest of this document is organised as follows: Section 2 introduces the tools that have been set up to support the training activities carried out until now; Section 3 and 4 provide a detailed description of the activities done as intra and inter

project training, respectively, and presents the plan for the third year of the project; Section 5 presents an updated version of the external training activity plan for the third year of the project and, finally, Section 6 concludes.

2 SUPPORTING TOOLS

This section introduces the tools used within Training activities. It complements information already provided by deliverable D4.1.1 on these tools (Section 2.2.1, 3.1.3, and 4.1.3) and supplies a brief analysis of the benefits obtained through their use.

2.1 Support Environment

Initially the consortium conceived a light support environment for training in order to reduce organisational costs.

With this perspective four lines of support have been defined for enabling partners in the consortium (intra-project training), other projects (inter-project training), and other entities (external training) to interact and exchange expertise.

The four lines were:

1. a set of mailing lists dedicated to specific topics to facilitate and trace information exchange;
2. technical documentation, to support DILIGENT training events and to illustrate our experience on specific issues;
3. on-line courses addressing initial training requirements of the DILIGENT community;
4. a DILIGENT DL, now operational, where all the training material produced and collected by DILIGENT members are managed to share knowledge and technical references.

2.1.1 Mailing lists

Currently mailing lists are the main tools used to keep all partners informed about the different activities and topics under discussion. In particular, a number of mailing lists have been used to comply with the different type of interaction with the EGEE project; these are:

- `project-diligent-gLite` - an ad-hoc created mailing list, hosted at CERN, involving DILIGENT technical people and EGEE experts for discussing gLite adoption within the DILIGENT project;
- `gLite-discuss`: an already existing mailing list, hosted at CERN by EGEE, to share public debates on gLite users communities;
- `project-eu-egee-middleware-security@cern.ch` - the *Middleware Security Group* mailing list, i.e. a discussion group on security issues within EGEE in which ENG members participate to debate about Authentication and Authorization topics;
- `joint-security-policy-group@cern.ch` - the *Joint Security Policy Group* mailing list, i.e. the mailing list of a working group mandated to advise and make recommendations on matters related to LCG and EGEE on-site security in which ENG members participate to discuss about security policies to be adopted on the DILIGENT sites.

2.1.2 Technical documentation

The technical documents created up to now support the development activities related to Authentication, Integration & build, Testing, and Process design.

Document Title: *DILIGENT Authentication prototype - Developer Guide*

Version/release date: February 2006

Purpose: The aim of this document is to explain with concrete examples how to configure authentication mechanism in the DILIGENT Alfa prototype.

In a SOA, almost all the services need to authenticate all requests they make or receive. Thus almost all developers need to be aware of how to correctly manage this fundamental mechanism to avoid any break in the overall security.

DILIGENT is based on the gLite middleware and so needs to endorse its security rules. This document can be useful for EGEE people and any other interested external people to verify the congruence of DILIGENT authentication mechanism with the expected level of security.

Audience: All DILIGENT developers that need to develop secure services and anyone interested in understanding the inner mechanisms of authentication conceived in the project.

Content Summary: This document assumes that the reader has a basic knowledge of PKI concepts and authentication mechanisms in general.

After a brief introduction to DILIGENT security the document guides step-by-step the developers in all the activities required to configure the services to use the DILIGENT authentication mechanism (alfa version).

In particular this guide enables the developers to answer to the following questions:

- How to obtain DILIGENT credentials for users and containers?
- How to install these credentials locally?
- How to install certificates for trusted CA?
- How to configure DILIGENT services to enforce authentication?

Available at: http://dlib.sns.it/bscw/bscw.cgi/d39968/Authentication_handbook

Document Title: *Guidelines and Conventions to model the Diligent Project in the ETICS Build System*

Version/release date: First release 7th July 2006 (planned update in September 2006)

Purpose: The aim of these guidelines is to support developers in performing their day-by-day activities of integration and build. Each component/service needs to be initially built by developers, then it is passed to the Integration and Build team for further activities. Any component needs to conform to some general rules that make the process of integration more efficient and straightforward, especially in a distributed project with estimated 150-200 components in the alfa version.

Such guidelines are based on the ETICS tool that has been chosen to support the whole process of integration, building, deployment testing, system and functional testing.

Audience: All DILIGENT developers and integrators that need to model their components and services so that they can be managed by the ETICS system.

Content Summary: The document is an XML file easily modifiable and displayable on any Browser. The document is divided into six sections, to be updated by the Integration and Build team with different frequencies. In particular the document sections introduce:

- The ETICS Datamodel (Modules, Configuration, VCSCCommands, Properties, Environment, Dependencies) to be used in modelling each DILIGENT component for making it manageable by ETICS tools;

- The ETICS Build Process, to configure and perform the local and remote build, the scheduling and the acquisition of process results;
- Conventions, Warnings and best-practices to be followed in configuring and building components via ETICS facilities;
- Suggestions for structuring cvs modules, that can be consulted by each VCS owner to avoid possible problems in future activities (how to manage freeze of code, branching, etc);
- Guidelines for using gt4IDE (one of the most used IDEs supplied with Globus Toolkit) in conjunction with ETICS;
- A report on the current status of DILIGENT VCSs and XML files provided by partners.

Available at: <http://grids17.eng.it/iab/>

Document Title: *The Unit and Component Testing Handbook*

Version/release date: version 1.0 released on 10th August 2006 (a new release is foreseen in the next phase when portlets will be developed).

Purpose: Supporting DILIGENT development teams during testing definition and execution. The handbook is a practical guide to shorten each developer's training time for understanding how to apply usual testing techniques to grid-based software. The handbook provides a synthesis of the most useful aspects presented in the literature about unit and component testing - of Java classes and of Web Services- adapted to DILIGENT context and explained with some examples.

Audience: DILIGENT development teams

Content Summary: This document is conceived as a self-training tool: it outlines test cases design methods, it contains recommendations on different unit testing approaches, and it contains guidelines on how to apply testing frameworks and how to use the associated tools.

It is assumed that the programming language of the DILIGENT project is JAVA; Web Services and Portlets are also considered.

After an initial overview on testing (mainly unit and component testing), the handbook provides the background knowledge to perform testing. In particular it outlines test cases selection methods (equivalence-classes and category-partition test case design methods - for the latter it is described how to use an associated tool, i.e. CatGen), mock objects usage and description and component integration strategies (top-down, bottom-up and sandwich).

The document also comprises a proposal on unit testing process and component testing process including (i) possible alternatives, (ii) a general description of the unit and component software test documentation with references to IEEE Standard for Software Test Documentation and to templates for documenting them, and (iii) a survey of the main tools that can be used, namely JUnit, JMock, and Cobertura.

Finally it provides guidelines for Web Services unit testing.

Available at: <http://dlib.sns.it/bscw/bscw.cgi/0/3901>

Document Title: *DILIGENT CSDesignApplet Documentation - Users Guide*

Version/release date: July 2006

Author(s): Laura Voicu, UNIBAS

Purpose: The purpose of this document is to present in detail the functionality of the graphical modelling tool designed for DILIGENT within WP 1.5, Process Management, in the Process Design and Verification task. This tool is responsible for providing a user interface for viewing, editing and managing process definitions and for validating process definitions (Compound Service definitions) defined by a user or generated by another DILIGENT service or the DILIGENT system.

Audience: This document is meant to help the DILIGENT users to understand how to create, manage or validate process definitions.

Content Summary: The document is structured in two parts, with two different target audiences. The first part is addressed to the DILIGENT user, in order to help the user in understanding the functionality provided by the modelling tool. In particular, a step-by step tutorial on basic usage of the modelling tool is provided.

The second part provides some implementation details and is addressed to the DILIGENT developers who want to understand how some of the BPEL constructs have been implemented.

Available **at:**
<http://dlib.sns.it/bscw/bscw.cgi/d42870/DILIGENT%20CSDesignApplet%20Documentation%20-%20Users%20Guide>

2.1.3 On-line courses

Grid Community, up-to-now, has achieved no official standards, apart from Globus Toolkit that is a de-facto one. In the last three years we assisted in the early obsolescence of OGSA (Open Grid Service Architecture) in favour of WSRF (Web Service Resource Framework)¹ promoting Grid and Web Services standards convergence. The OGSA compliance-ness, as initially stated in the first version of the DILIGENT proposal was no more considered an add-on. Some issues related to this evolution are so critical for the success of the project that it was decided to organize series of on-line courses of this subject to maximize the sharing of partner's acquired knowledge with each project member.

Up to now three on-line courses have been prepared to address the initial requirements of the DILIGENT community, namely:

- The "Grid concepts and standards evolution" that traces a path in the evolution of the Grid technologies from the initial vision, through OGSI, to the "stateful resources" approach and the WSRF. This material allows new developers to familiarize rapidly with the technology and acquire the appropriate references available and the practical requirement. This course will be up-dated periodically.
- The "Java WS Core – A programmer approach" aims at providing basic material to start in the development of Grid services able to be hosted in the Java WS core environment. This course is essential for any developer that has to implement grid services in the context of DILIGENT. In fact the project chose to strictly identify the development environment to reduce useless difficulties, and the course aims to cover the selected technologies and approaches that has to be known for delivering DILIGENT services.
- "DILIGENT Information Service (DIS) design and implementation" that includes details on this critical component of the DILIGENT Architecture. This course specifically dedicated to DIS has been decided because almost all the DILIGENT

¹ Refer to D.4.3.1/3 for an updates on this trend in Grid technology

services need to interact with it. Further, because DILIGENT aims at instantiating a SOA (Service Oriented Architecture) where the discovery of right information is vital for the execution of any process. In particular the course introduces: the WS-ServiceGroup, the WS-Topics and the WS-BaseNotification, upon which the DIS is built. It also includes design information that better clarifies the current implementation, the Aggregator Framework and code examples related to this framework and to its exploitation in DIS.

Such courses are available through the DILIGENT DL and are accessible by any registered member of the Community.

2.1.4 Training DL

The DILIGENT DL was initially created to respond to the need of the partners to minimise the effort spent on learning technologies, like Web Services, Service-Oriented Architectures, gLite and other Grid technologies, by maximising synergies inside the consortium. The DL was set-up and loaded with a rich variety of documentation, like reports, PowerPoint presentations, videos of lectures and tutorials published on the Web sites of companies, like IBM and SUN, projects, initiatives and related events that, being rated as relevant by some partner, were recommended to the others. This documentation, which has grown considerably in the last years is difficult to retrieve since it is spread on many different sites and it is organised according to non-homogeneous criteria, such as project workpackages, that are meaningful only for the communities that are very well aware of the specific semantics associated with these criteria. As this documentation is of vital importance for the DILIGENT developers, it was decided to share, through the DL, the most useful documents among those already retrieved. Later, the DL has been fed also with the material produced by the project itself, like deliverables, training presentations and many other types of project documentation.

Currently the DL information space contains nearly 4000 documents. They are organised into the following four main collection classes, publicly accessible:

- *Projects* - that contains documents produced in the context of various projects and research initiatives deemed as relevant with respect to the topics of this digital library, i.e. Grid, Web Services and SOA technologies. This collection is further organized in sub-collections, one for each project. The documentation produced by various projects ranges from reports to papers submitted to journals and conferences, slides of talks, manuals and tutorials.
- *Scientific papers* - that contains documents created by researchers involved on various domains deemed as relevant with respect to the Grid and the Digital Libraries, as well as Web Services and SOA.
- *Standardization bodies* - that contains standards, specifications, recommendations, best practices and other documents to inform the community about everything provided by well known institutions and organizations related to the Grid, the DLs and the Web Services. It is further organized in sub-collections, one for each standardization body.
- *Technical documentation* - that contains documents and technical resources for designers and developers on technologies and on open standards technology such as Grid, Web services, XML, Java, UML, and more. These resources include tools, code, components, and standards, along with how-to articles and tutorials from introductory to advanced ones.

Single users or specific communities, if entitled, can tailor the DL information space to their own requirements through two specific functions that enable users to (i) organize private/public collections by simply defining which documents a collection has to contain and (ii) select which collections they want to search on.

Both Google-like and advanced search functionality are offered to any user to search public collections or inspect the content of them through the BROWSE function. This function displays all the documents of a collection in various orders according to the users' criterion. For example, this function can be used to know which types/quantity of document populate a given collection, which are the document authors or which subjects represent documents. Thus the BROWSE function can be seen as an aid to define search statements congruent with the DL content.

On September 2006, there are more than one hundred users registered into the DL user registry. Registered users are entitled with different rights, ranging from the right to organise personal collections to the right to submit documents or to act as a reviewer of submitted papers. Special administrative rights may also be assigned.

To help training, the DILIGENT DL has its own interface, although its search function can also be activated through the DILIGENT project Website as well as through the BELIEF DL. For example, this interface is especially tailored to self-publishing activities, so that people can be attracted to "publish" their documents directly into the DL. To this, a minimal set of Dublin Core metadata elements is required to describe documents (namely, Title, Publisher, Type, Language, Subjects), while very basic operations are requested to upload simple documents such as papers or reports.

In the next future we plan to enrich the library with other documents that are more directed to cover the needs of the inter- and external-training. In addition to the material produced by the DILIGENT organised events, selected material provided by our user communities will also be added.

2.2 Support environment evaluation

The evaluation of the tools adopted for the Training Environment is based on two distinct criteria: the achievement of the planned objectives and the effectiveness of the chosen instrument (in terms of cost/benefits ratio). Currently (at the end of the second year of the project) the DILIGENT partners agree on the adequacy of these tools, even if some expressed the need of reducing such tools and concentrating them into a unique Point-of-Access².

The table below reports the numbers related to how the training support tools have been used.

Tool	Number of registered users	Number of daily access
Mailing lists	167 (on 16 th Aug)	37 emails / 4,3 threads (average until 31 st July)
Technical Documentation (only for inter and intra-project trainings)	All DILIGENT partners + 16 EGEE members	N/A
On-line courses	-	-

² For this reason the technical issues have been collected in a single entry-point. The idea was to identify the main needs for techies and to set-up a predefined set of paths to reach the required information. Such Techies web pages that will be accessible soon through the DILIGENT web-site, are now available at <http://turing.eng.it/DILIGENT.Techies/index.html>,

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A quantitative evaluation permits us to deduce that the adopted tools were adequate and useful for the type of training required. The only remark is on the grow-up of so many tools that need to be integrated to provide a better support in daily activities of each member. In particular, new requirements concerning self-training needs have been identified, especially in the intra-project training. Different members have different background and different (sometimes) urgent needs for training on specific topics. The support tools need to carefully take into account also these aspects.

Obviously many solutions could be taken into consideration, even coming from other field of research (e-Learning and distance learning). However, the effectiveness of these solutions needs to be clarified. In particular, we must understand how much can be invested in e-Learning courses and what return such investment can give in the last year of the project.

These decisions will be adopted within a more general plan of actions that will be provided at level of Exploitation and Sustainability of the whole project. In such plan DILIGENT partners aim at better coordinating Dissemination, Training, Demonstration and Exploitation activities, finding more synergies and preparing the way for the future of the project.

If the adoption of a Distance Learning Tool will be considered useful, Engineering will bring all its competences on the field, based on running e-Learning commercial projects³. An alternative is to use Moodle, a free and open source Course Management System currently integrated in the ARTE scenario to support this community in building courses via the DILIGENT system.

³ Engineering is developing an open-source platform called Jmotus already applied for customer solutions.

3 INTRA-PROJECT TRAINING

The Intra-project training activities conducted since the start of the project have been detailed in this section. An introductory paragraph arguments the strategy followed for the definition of the training events. The performed events presented in paragraph 3.2 gained the understanding of the project needs while the experience acquired during them (analysed in paragraph 3.3) allowed updating the plan for the last year of the project.

3.1 Introduction

The objective of the intra-project training is to ensure that the DILIGENT consortium members share the required common background knowledge to carry out jointly the planned design and development activities. It also aims at establishing synergies among the partners in order to minimize the learning effort required to master the different technological areas involved in the realization of the DILIGENT infrastructure. This type of training should have officially been started at Month 6, before initiating the design phase, but actually it began before that date since partners felt the need of training and being trained on useful technologies developed by the other partners.

The intra-project training concerns several aspects, like the adopted design and testing methodologies, the development framework, the re-used technologies and the specific services implemented by the project.

The intra-project training activities are mainly devoted to two objectives; the first one is the production and dissemination of appropriate documentation; the second one is the organisation of tutorials on specific topics. In particular, the training activities organised until now have dealt with:

- Introducing background methodologies and technologies
The project participants have different background expertise on methodologies and technologies of interest for the project development. These expertises have been shared among the consortium partners in order to speed-up the start up of the different project activities.
- Presenting the software products developed by the project
An extensive training has been conducted on the DILIGENT lower functionality services implemented by the project with the aim to speed up the design and development of all the other services that use them.

In the next paragraphs the organised training sessions are described in detail.

3.2 Activities performed

In the first phase of the project, intra-project training focused on presenting the key technologies – either third-party technologies or products developed within the project – that have to known for the technological development.

3.2.1 Introduction to background methodologies and technologies

During the first part of the project relevant methodologies and existing technologies have been selected for their positive impact in the project activities. In particular two industrial partners have given detailed courses on their respective technology for the benefit of the rest of the project partners.

Location: Rome

Date: 17 November 2004 (one day)

Audience: 16 people (representatives of all partners except SNS, 4D-Soft and ERCIM)

Audience needs: To acquire an in depth knowledge about the FAST technology in order to integrate it into DILIGENT in an appropriate way, i.e. carefully considering its potentiality and discovering its weakness, if any.

Training objectives: Presentation of the FAST technology

Trainers: FAST

Agenda: 1) Introduction to FAST; 2) Search trends; 3) Digital Libraries challenges; 4) FAST Search Engine.

Achievements: The consortium became aware of existing technology that might have been reused in the development of the search service.

Training material: The presented slides are available in the DILIGENT DL as private collection accessible by the DILIGENT consortium members.

Location: Athens

Date: 13-14 April 2005 (one day)

Audience: 27 people (representatives of all technological partners)

Audience needs: To acquire an in depth knowledge on the testing strategy adopted into the DILIGENT context; in particular, the technological partners in charge to develop the DILIGENT system need to be informed about the test plan and the instruments to validate the system.

Training objectives: DILIGENT Training on Testing

Trainers: 4D-Soft

Agenda: 1) Test Planning Methods; 2) Unit Testing; 3) EBIT; 4) Web Services Testing Guidelines; 5) Diligent Testing Strategy.

Achievements: The training provided an overview of the overall testing methodology and illustrated in detail the testing procedures to be followed by each organisation in order to implement internal component testing.

Training material: The presented slides are available in the DILIGENT DL as a private collection accessible by the DILIGENT consortium members.

Location: Oslo

Date: 16 December 2005

Audience: representatives of all technological partners.

Audience needs: To acquire an in depth knowledge about the Portal and Portlet technologies and the related standards (JRS168 and WSRP). Portlets, and related standards, represents the technology which the DILIGENT graphical user interface will rely on and thus the attendees must become well aware about its potentiality as well as the constraints and weakness.

Training objectives: DILIGENT Training on Portlet technologies

Trainers: UoA

Agenda: 1) Portal and portlets introduction; 2) JSR 168; 3) WSRP; 4) Overall Architecture; 5) Open issues.

Achievements: The training event provided an overview of the current technologies for developing graphical user interfaces in a portal based environment. The audience gathered useful material, suggestions and ideas on how to concretely proceed in designing the graphical user interface needed to interact with the services they are in charge to provide.

Training material: The slides prepared for the event have been submitted to the DILIGENT DL and are available to all members of the DILIGENT team.

3.2.2 Presentations of project developed products

During the project lifetime some initial development of specific parts or products required to be presented to the rest of the project bettering order to improve the development of other DILIGENT parts. In particular this was true for a set of services called Collective Layer that constitute the basic services used by any other DILIGENT component to be DILIGENT enabled. For instance, the DVOS service (providing Authorization and Authentication facilities) as well as the Information Service are two services that each DILIGENT service must interact with and thus their presentation is fruitful to speed up the integration process. For all these DILIGENT products a specific training session was prepared to make the other developers able to understand the structure and the complexity of each component, and find useful suggestions on how to use them and their interfaces in ways more friendly than those stated in the product manuals.

Location: Athens

Date: 14 April 2005 (half of a day)

Audience: 14 people (representatives of technical work-packages)

Audience needs: To acquire details about the DL Creation and Management services specification as envisaged in the Deliverable D1.2.1 (the interim design document) and provide feedback about the solutions adopted and the per-service missing requirements and functionality, if any. Particular emphasis is on the "interfaces" these services expose to the other DILIGENT services as well as on the design methodologies adopted. In fact, April 2005 corresponds to the start month of the WP1.3-1.6 services design phase and the designers need to become aware of the outcomes and experiences acquired in WP1.2 services design phase.

Training objectives: DILIGENT Training on Collective Layer Services

Trainers: CNR, Eng

Agenda: 1) Architectural Representation; 2) Goals and Constraints; 3) Services Specification interim (and final) report; 4) Authorisation and authentication model; 5) Resource Management Model.

Achievements: As the Collective Layer services provide a common framework to all the other services, the developers of all the other services must be aware of the choices made at this level. This first tutorial provided an introduction to the Collective Layer service specification in order to facilitate their understanding before initiating the specification of the other services.

Training material: The training session has been supported by a series of Power-Point presentations that are available in the DILIGENT digital library.

Location: Milan

Date: 29 June 2005 (half of a day)

Audience: 18 people from the development teams.

Audience needs: To acquire detailed information about the DL Creation and Management services design as envisaged in the Deliverable D1.2.2 "DL Creation & Management services design report". Guidelines on how to interact with WP1.2 services and how to use their functionality are expected in order to improve the WP1.3-1.6 design.

Training objectives: DILIGENT Training on Collective Layer Services

Trainers: CNR, Eng

Agenda: 1) Services Specification report; 2) Authorisation and authentication model and examples; 3) Resource Management Model 4) How to use the Collective Layer Services; 5) How to configure Security

Achievements: This second tutorial provided a more detailed description of the Collective Layer Services. In particular, it presented the logical architecture each service adopts as well

as concrete examples of authentication and authorisation scenario and the DILIGENT resource model. These aspects are foundational for understanding the way through which the other DILIGENT services will be managed within the DILIGENT context.

Training material: The training session has been supported by a number of Microsoft Power Point® presentations available in the DILIGENT digital library.

Location: Oslo

Date: 15 December 2005

Audience: WP1.4 Development team (FAST, USG, UMIT, UoA)

Audience needs: To acquire knowledge on developing portlets within the DILIGENT project.

Training objectives: To give an overview about what portal and portlets are. To comprehend the need and relevance of portlets in the context of the attendants services in DILIGENT. To identify what the constraints and limitations are. To provide information about how to implement portlets.

Trainers: Valia Tsagkalidou (UoA)

Agenda: 1) Introduction to portals; 2) Introduction to portlets; 3) Introduction to JSR168; 4) Introduction to WSRP; 5) Per service use-case analysis;

Achievements: The training session was completed successfully and the participants became familiar with the portal technologies used by DILIGENT, in addition to being able to start implementing their own functionality in the form portlets.

Training material: The training session has been supported by a number of Microsoft Power Point® presentations available in the DILIGENT digital library with code samples distributed to the attendant.

Location: Geneva

Date: 30 March 2006

Audience: 18 people from the development teams.

Audience needs: To acquire information about the first Information Service concrete implementation. Because of the early prototype availability of this foundational services the DILIGENT technological partners are interested in technical details (even code examples) allowing them to concretely put in place and experiment the interaction with the Information Service.

Training objectives: Training on DILIGENT Information Service.

Trainers: CNR,

Agenda: 1) Information services architectural overview; 2) DIS-IP introduction, use cases, and API; 3) DIS-IC introduction, use cases, and API; 4) DIS-R-GMAClient introduction, use cases, and API; 5) DIS-Registry introduction, use cases, and API; 6) DIS-HLSCClient introduction, use cases, and API; 7) Notification - open issues and architecture.

Achievements: This third tutorial provided a more detailed description of the Collective Layer Services.

Training material: The training session has been supported by a number of Microsoft Power Point® presentations are available in the DILIGENT digital library.

Location: Athens

Date: 15 May 2006

Audience: UniBas technical staff.

Audience needs: To acquire an in depth knowledge about the ResultSet tool developed by the UoA technical staff and envisaged as a foundational instrument to support communication and cooperation in the context of the WP1.4 services.

Training objectives: To acquire knowledge on ResultSet internal mechanisms and capability of proper usage. To provide feedback on the ResultSet construct.

Trainers: Giorgios Papanikos (UoA)

Agenda: 1) ResultSet overview; 2) ResultSet API; 3) In depth description of the internal mechanism of the ResultSet service; 4) Detailed hands-on training on use of the mechanisms provided by the ResultSet

Achievements: The training section was completed successfully and the UniBas trained team is now capable of using the ResultSet mechanism for powering large semi structured data transfers through it. The UoA team acquired valuable feedback that was used during the design of subsequent versions of the mechanism

Training material: The training event has been supported by a series of slides and code samples have been that are now available through the DILIGENT DL.

Location: Darmstadt

Date: July 2006

Audience: DILIGENT development team

Audience needs: To acquire an in depth knowledge about the ResultSet tool developed by the UoA technical staff and envisaged as a foundational instrument to support communication and cooperation in the context of the WP1.4 services. This tool may be profitful used in other contexts. Moreover, the event aims to provide feedback on the construct to its developers.

Training objectives: Training on the ResultSet and Query Language

Trainers: Giorgios Papanikos, UoA

Agenda: 1) ResultSet overview, 2) ResultSet API, 3) Detailed hands-on training on use of the mechanisms provided by the ResultSet in various application scenarios.

Achievements: The DILIGENT development team acquired an in depth knowledge of the ResultSet library designed and implemented in the context of the WP1.4 by the University of Athens technical staff. The trained person is now capable of using the ResultSet mechanism for powering large semi structured data transfers through it. Possible exploitations of this tool in different contexts from that envisaged in WP1.4 have been discussed and will be carefully evaluated in the next implementation phases. Moreover, additional functionality aiming to enlarge its usage has been proposed and in some extent will be implemented in the future versions of the tool.

Training material: The training event has been supported by a series of slides and code samples that have been made available through the DILIGENT DL.

Location: Darmstadt

Date: 1 August 2006

Audience: DILIGENT integration team

Audience needs: Understanding of the capabilities of the Search engine through the potentialities exposed via the Search Query Language. Use of a query construction mechanism for search purposes.

Training objectives: Attendants should acquire enough knowledge of the syntax and the capabilities of the query mechanism. Analysis of the syntax of the query language being employed.

Trainers: Paul Polydoros (UoA)

Agenda: 1) Demonstration of the capabilities of the querying mechanism through the ARTE Portal; 2) The philosophy behind the query language; 3) Detailed presentation of the query language; 4) Details on the query parsing mechanism and the access to the parser service

Achievements: The participants became familiar with the query language syntax and the use of the query parser.

Training material: The training event has been supported by a series of slides and code samples that have been made available through the DILIGENT DL.

3.3 Achievements and Lesson Learned

During this period the project performed several experimentations and new technical results have been achieved. Intra-project training task supported such activities with dedicated tutorials, technical documentation and on-line courses that foster a wide transfer of background knowledge as well as newly acquired knowledge. Training events, like those organised by FAST and 4DSoft, which do not have effort allocated on WP4.1, were felt as needed in order to introduce pre-existing technologies useful for the project.

The great majority of these events were held to respond to specific needs of the project to continuous align all members with new development and technologies. For instance, the Collective Services training events as well as the training events dedicated to Portal and Portlet technologies revealed to be fundamental in speeding up and facilitating integration and use of third party as well as DILIGENT technologies.

Due to the costs in attending a training event (either in travel expenses and in effort devoted to the event) only very few selected members of the team had the possibility to participate to training events. The plan was that, in turn, each attendee could train their colleagues.

This pyramidal training model was not easy to implement. In these past months we have understood that on-line courses, created after at least a physical session, would be very useful to meet this requirement. They would allow people that already attended the section to both reconsider more critical parts and support the training of their colleagues.

During these two years of organising and performing intra-project training events emerged the need to structure and organise them according to the following typologies:

- Mini or specific training sessions organised in conjunction with TCOM events and allocating the appropriate slot in order to cover focused and urgent topics. Such sessions need to be supported by self-training handbooks that describe in detail any concrete step to be performed in doing the job, and any background information required to understand the topic. Also some concrete examples could be very useful.
- More general training events, useful to the majority of partners, need to be scheduled well in advance to ensure good attendance. In these events trainers need to have operational knowledge on practical issues and include concrete experimentation that will allow a deep understanding of the topic⁴. The time to be allocated to this event may vary from one day (eventually split on two half days) to three days depending on topic and audience. These courses need to be supported by on-line courses on the same topic that allow people attending to re-propose the same course in their institution⁵.

⁴ This requirement comes from the understanding that people attending intra-project training events have the objective to be able to "do the job" the day after the end of the event.

⁵ This issue open the problem of intellectual property rights regarding the possibility that some on-line courses are used for commercial purposes. This problem will be further investigated in the next months.

3.4 Operational plan for the third year

According to the lessons learned and the needs that emerged in the second phase of the project, the intra-training plan for the third year will be dedicated to support internal development tasks for producing the Beta release. In particular, the plan includes training events dedicated to present new features and enhancements in system and services implementation that will be delivered during the third year. Moreover, events dedicated to assist DILIGENT user communities in exploiting and implementing the DILIGENT system have been scheduled. The following events have been planned:

Location: Basel - Switzerland

Date: October 2006 (in conjunction with TCOM week)

Expected audience: Members of the DILIGENT development teams

Expected audience needs: Using ETICS portal for DILIGENT build

Training objectives: This is a typical ETICS training session adapted to the context and requirement of DILIGENT for performing build activities using the ETICS portal, including how to perform the operations that are required by DILIGENT components.

Trainers: ENG (in collaboration with CERN under the support of ETICS project)

Agenda: 1) ETICS Overview and Data model, 2) ETICS Command Line Interface, 3) ETICS Web Application Overview.

Expected Achievements: Attendees will learn how to register and use the ETICS portal and how to perform the operations that are required by DILIGENT components how to report bugs and how to react to bug alert.

Planned training material: an ETICS Handbook adapted to DILIGENT case plus a series of slides used during the event will be made available through the DILIGENT Digital Library.

Location: Basel - Switzerland

Date: October 2006 (in conjunction with TCOM week)

Expected audience: Members of the DILIGENT development teams

Expected audience needs: Using the new version of the DILIGENT Collective Layer services, in particular DIS (Notification issues) and AuthN&AuthZ

Training objectives: This is a typical Collective Layer event aiming at introducing the novel features implemented by these foundational services and providing practical exploitation examples.

Trainers: ISTI and ENG

Agenda: This training session will focus on AuthN&AuthZ issues and on DIS-Broker. The planned agenda is 1) DVOS status, 2) Step-by-step procedure on the following AuthN & AuthZ issues: configure DHN security, configure service authentication, access the service by using authentication, provide your service with credentials, add authorization, extend authorization, 3) DIS-Broker overview and current status.

Expected Achievements: Attendees will learn how to equip their services with AuthN & AuthZ facilities. Moreover, they will become aware of the current facilities provided by the DIS about the notification issues.

Planned training material: Slides and examples of code and configuration files will be prepared in order to provide concrete and detailed information on how to use Collective Layer facilities. This material will be made available through the DILIGENT DL for future usage.

Location: to be defined

Date: January 2007

Expected audience: People in each development team who will develop the DILIGENT services on top of Collective Layer.

Expected audience needs: Developers of DILIGENT services needing to learn how to use security functions supplied by Collective Layer and how to solve known security issues

Training objective: Development of secure DILIGENT services by relying on the new version of the DVOS service

Trainers: ENG

Agenda: This training session will focus on DILIGENT security solution for the Beta version of the system. The event will be organised in two parts: (i) reporting of the experience acquired using the Alfa version, and (ii) usage of Security API (Beta version) to create secure services in DILIGENT Beta environment. The development for the Beta version of Authentication and Authorisation services foresees substantial novelties in the methodology adopted to be compliant with EGEE Pre-production Infrastructure, thus a new version of this course is required.

Planned training material: an AuthN&AuthZ Handbook on how-to use DILIGENT AuthN&AuthZ version Beta will be prepared. Moreover, this material will be made available through the DILIGENT Digital Library.

Location: to be defined

Date: January 2007

Expected audience: Programmer teams that will develop web services on top of Collective Layer (Beta version).

Expected audience needs: DILIGENT WP1.3-1.6 services developers needing to learn and understand how to use the new functionality delivered by the beta version of the Collective Layer services.

Training objective: Development of web services on top of Digital Library Collective Layer

Trainers: ISTI

Agenda: This training event will focus on the novel functionality provided by the Collective Layer services in their beta version. The development activity for producing the DILIGENT Beta version foresees substantial novelties in the granularity and performance of the functionality developed that fully justify a new version of this course during the third year of the project.

Expected Achievements: Developers of web services will learn how to update their services in order to be compliant and how to take advantage by the new DILIGENT Collective Layer capabilities.

Planned training material: a Handbook on How-to use DILIGENT DL Collective Layer services version Beta will be produced. Moreover, the slides along with these documents will be made available through the DILIGENT Digital Library.

Location: to be defined

Date: February 2007

Expected audience: Programmer teams that will test DILIGENT components (Beta version).

Expected audience needs: DILIGENT developer team that needs to acquire details about procedures and tools to be implemented and used during the testing tasks.

Training objective: Testing Process for DILIGENT components (Beta version)

Trainers: Eng (with the support of a 4Dsoft expert)

Agenda: This training session will focus on clarifying the details of unit and component testing that need to be performed by DILIGENT developers to reduce as much as possible the bug-fixing time after the release of Beta version. The session will be based on the Handbook already supplied and exploiting the Savannah tool installed to track bugs discovery.

Expected achievements: Developers will be able to smoothly perform the planned Unit and Component testing to reduce the impact of bug-fixing requirements after the release of Beta version.

Planned training material: The Unit and Component Testing Handbook already supplied will be accompanied by guidelines and best practices to be adopted.

Location: to be defined

Date: after April 2007 (expected deadline for DILIGENT Release to Communities)

Expected audience: ImpECT and ARTE technical people responsible for installation and running of testbeds.

Expected audience needs: DILIGENT user-communities technical teams dedicated to the installation and configuration of the DILIGENT system needs to learn the procedures to follow in order to build and customise their instances of the testbed.

Training objective: Provide any technical support to Communities to create a DILIGENT testbed

Trainers: Eng (with the support of ESA and SNS)

Agenda: This training session will focus on how to download, install and customise a DILIGENT testbed for the community. In particular this activity will be the starting point for the involvement of ImpECT and ARTE communities in using DILIGENT.

Expected achievements: System Administrator of ImpECT and ARTE testbeds will be able to run and customise DILIGENT according to Communities requirements.

Planned training material: Administrator guide that will be developed under WP1.8.

4 INTER-PROJECT TRAINING

Inter-project training is dedicated to the other projects and initiatives with the purpose that they share the knowledge acquired during the project and become aware of the innovative features of the developed technology. According to the established work plan, the activities related to this type of training started at Month 19, when the project was expected to have achieved a clear vision of the technology issues. In the next months these activities will progressively increase their impact in parallel with the advances of the development and integration phases. In this section we describe the training activities performed until now and those planned for the next future. The section ends by briefly presenting the achievements and the lessons learned.

4.1 Activities performed

Until now only few inter-project training events have been organized since we have preferred to postpone them until the first public release of the infrastructure will be available. The training events held have been mainly stimulated by other projects that were interested in evaluating the applicability of the DILIGENT solutions in their context. The events held are the following:

1. Location: Pisa

Date: 21st July 2006

Audience: This training event was dedicated to a number of participants in the ArcheoGrid project. ArcheoGrid is one of the approved EGEE Generic Applications. If on the one hand this particular human science application can largely profit from Grid and DL technologies, on the other it presents many interesting new challenges due to the complexity and heterogeneity of archaeological data from excavations and field surveys.

Audience needs: This particular human science application can largely profit from Grid and DL technologies, and, at the same time it presents many interesting new challenges due to the complexity and heterogeneity of archaeological data from excavations and field surveys. In addition to digging up artefacts and poring over ancient texts, today's archaeologists may draw on knowledge from dozens of scientific fields to create complex computer models of ancient societies. These fields range from physics, to chemistry, earth science, biology, geography, anthropology and social science, as well as from techniques developed during the development of archaeological methods and theories. Once all this knowledge is synthesized, it needs large amounts of computing power to run the created models and even more resources to create a meaningful visualization of the results.

Another important specificity of this particular field is that accumulated data loses much of its meaning when taken out from the original spatio-temporal context in which it was discovered. This spatial and temporal context of modern archaeological research extends from the dig site itself to much larger regions and long time periods. Appropriate tools are needed to maintain access and visualize this information which comprises digital maps, virtual worlds, 2D and 3D images, and textual descriptions based on the analysis of results.

A first prototype of the ArcheoGrid application is currently being developed using the GILDA testbed⁶. This consists of a paleoclimate application using a mesoscale model on the GILDA t-infrastructure that is tested with the presently available data.

⁶ <https://gilda.ct.infn.it/testbed.html>

The final ArcheoGrid application is expected to be a complex service-oriented application which combines different tools and accesses heterogeneous knowledge. The requirements of the expected final application were initially discussed in two informal meetings of ArcheoGrid and DILIGENT representatives. From this discussion it emerged clearly that the DILIGENT collective layer and many of the other DILIGENT services can be of key importance for supporting the ArcheoGrid application. It was then decided to dedicate a specific training event to this community.

Training objectives: To provide a technical overview on the DILIGENT technology, focusing in particular on the functionality of the Collective Layer services and those required to create Virtual DLs serving the needs of the archaeology community.

Trainers: CNR

Agenda: 1) Introduction to DILIGENT; 2) Collective Layer Services; 3) Overview of the DL Layer Services (with particular emphasis on the Process Workflow); 4) Discussion on how an archaeological application might be supported by a DILIGENT infrastructure.

Achievements: ArcheoGrid representatives acquired a better concrete understanding of the features that DILIGENT might offer to them. As an outcome of this event the participants agreed on looking for funding opportunities that could support the creation of an advanced ArcheoGrid prototype running on the DILIGENT infrastructure.

Given the interest raised by this first training event, it was also planned to evaluate the possibility of organizing a training event addressed to a larger community of archaeologists at the beginning of 2007 in Florence.

Documentation: Slides available in the DILIGENT training DL (<http://diligent-training.isti.cnr.it/>)

2. BRICKS-DILIGENT training meetings on "Annotation Services: Approaches, Models and Implementation Technologies"

Location: Darmstadt, FhG-IPSI

Date: 23rd January, 7th February, and 15th February 2006

Audience: The training event was jointly organized by DILIGENT and the EU-Project BRICKS. A number of members from each project presented their own approach to Annotation Services.

Audience needs: Both projects are developing Annotation Services although motivated by partly different requirements of their user communities, thus a detailed exchange about and comparison of the different approaches, models and technologies developed so far were considered highly fruitful for both sides. Advantage was taken of the fact that project members working on Annotation Management (aside from USG in DILIGENT) are located in Darmstadt, so three follow-up meetings could be arranged.

Training objectives: The aim of the face-to-face meetings was mutual teaching and learning about the specific approaches in DILIGENT and BRICKS towards Annotation Service Management as well as the resulting concrete design decisions taken within the two projects. By comparing and discussing the different approaches and models participants should be enabled to position them in a larger context, clarify their different potentials, and discuss possible enhancements of the individual models.

Trainers: Bhaskar Mehta, Claudia Niederée, Adelheit Stein (DILIGENT at FhG-IPSI)

Agenda: 1) General introduction of the projects and the relevant system components; 2) Project-specific approaches to Annotation Management and detailed Annotation Models; 3) Annotation Systems state-of-the-art as background information, e.g. demonstration of a complex existing annotation system COLLATE (paradigm, design concept and realization); 4) Discussion on possible enhancements and refinements of

the Annotation Models; 5) Presentation and discussion of subsequent implementation plans.

Achievements: Through comparison of the differences and commonalities of the application and user requirements in DILIGENT and BRICKS (additionally COLLATE) the participants acquired a much better view of the potential of different annotation approaches and models. In particular, it became more clear which parts of the suggested annotation models were (or could be) generic ones, and which services and features could be reconsidered, enhanced or refined in the light of a given application scenario in the future. The example of the COLLATE system with its complex annotation user interfaces was considered useful and inspiring for developing both an enhanced generic annotation model and the concrete annotation user interfaces.

4.2 Achievements & Lesson Learned

In the near future we plan to train first those application communities that are closer to the interest of the two DILIGENT user communities, i.e. teaching/learning and earth-observation areas. We also plan to address the EGEE-related projects and applications. We have received many requests from them. These projects can be classified in two main groups: those that must create applications that exploit the gLite middleware, which are interested in the experience done by DILIGENT in using a gLite-compliant Grid infrastructure, and those that have functional requirements similar to the DILIGENT ones and, therefore, are also interested in being trained on the specific services (e.g. content management, search, workflow management).

A large number of other requests for training courses come from the DL area. Non-traditional DLs, able to manage not only texts, but also more complex information objects, often very computational and storage demanding are more and more often required. In order to respond to this emerging need DL conferences are introducing scientific DLs and Grid-based DLs as new topics in their programme. This creates favourable conditions for the organization of training events on DILIGENT related issues.

The inter-project training events organized until now are still too few to say that we have obtained substantial achievements from this type of events and that we have acquired experience on how to better organize them. However, by discussing with representatives of other projects that are potentially interested in exploiting the DILIGENT technology, we have better focused their needs in term of training. In particular, we have understood that we must distinguish between generic training, like for example tutorial done at specific conferences, and training of specific application communities. While a presentation of the features of the DL infrastructure and of its enabling technologies suffices for the former, the second type of training requires a preliminary study of the needs of the application and a presentation that is framed taking into account the application context and is able to show how the developed technology can contribute to satisfy the specific needs.

4.3 Operational Plan for the third year

The operational plan presented in D4.1.2 has been revised and enhanced in this last period taking into account the better vision of the project potentialities and the links established in the meantime with other projects and initiatives. In what follows we report two training events that has already been scheduled and a few considerations about the new ones planned.

1. ECDL 2006 Tutorial "Bringing Digital Libraries to Distributed Infrastructures: Challenges, Solutions, and Lessons Learned"

Location: Jointly with ECDL 2006 (European Conference on Digital Libraries), Alicante, Spain

Date: 17th September 2006

Audience: Registered participants to the tutorial and the ECDL conference – Digital Library community in general and members of other DL-related projects.

Audience needs: Current plans for next generation DL architectures are aiming for a transition from the DL as an integrated, centrally controlled system to a dynamic configurable federation of DL services and information collections. This transition is driven by DL "market" needs and inspired by new technology trends that promise to solve at least a part of these market needs. With the uptake of DLs in a wider community there is a need for better and adaptive tailoring of the DL content and service offer to the needs of the respective community as well as to the current service and content offer. Furthermore, there is a need for more systematic exploitation of existing resources, like information collections, metadata collections, services, and computational resources for making DLs more cost-effective as well as a need for opening up of DL technology to a wider clientele by enabling more cost-effective digital libraries. New technologies, like Web services and Grid infrastructures, and new paradigms, like Peer-to-Peer networking and Service-oriented Architectures (SOA), suggest digital libraries that operate on more demand-oriented and flexible distributed or decentralized infrastructures.

Training objectives: The tutorial aims to introduce the audience to various central aspects of bringing digital libraries to distributed infrastructures and to suggest concrete solutions for the upcoming challenges. For this purpose, the tutorial looks at the issues from a very pragmatic point of view. The tutorial discusses the core ideas of building digital libraries on distributed infrastructures and the related architectural options. Furthermore, it introduces the underlying technologies as a foundation for the understanding of the concrete solutions. The main part of the tutorial revolves around the following core DL topics:

- Digital Library Management
- Content and Collection Management
- Metadata Management and Brokering
- Search and Retrieval - Advanced Services (Personalization, Annotation, etc.)

For each of the topics the key challenges are discussed together with possible solutions for the challenges and the lessons learned in implementing these solutions in concrete projects. The solutions are illustrated with concrete examples and small system demos from the projects DILIGENT, BRICKS, and DELOS as well as from other DL-related projects.

Trainers: Thomas Risse, Claudia Niederée (FhG-IPSI), Yannis Ioannidis (University of Athens, Greece), Carlo Meghini (CNR-ISTI, Italy), Heiko Schuldt (University of Basel, Switzerland)

Agenda:

- 1) Introduction: Distributed Infrastructures for Digital Libraries
 - Motivation with examples from BRICKS and DILIGENT
 - Architectures
- 2) Underlying Technologies and their Promises
 - Service-oriented Architectures

- Grid Infrastructures
- Peer to Peer Infrastructures
- 3) Challenges for DL Functionality in Decentralized Infrastructures
 - Overall challenges for each architecture
 - Short project introduction
 - Overall architectures of BRICKS, DILIGENT, DELOS
- 4) Solutions for DL Functionality in Decentralized Infrastructures
 - Digital Library Management (BRICKS, DILIGENT, DELOS)
 - Content (BRICKS, DILIGENT, DELOS)
 - Metadata Management and Brokering (BRICKS, DILIGENT, DELOS)
 - Collection Management and virtual libraries (BRICKS, DILIGENT, DELOS)
 - Search and Retrieval (BRICKS, DILIGENT, DELOS)
 - Personalization (BRICKS, DILIGENT, DELOS)
 - Annotation (BRICKS, DILIGENT, DELOS)
- 5) Lessons learned
- 6) System Demos
- 7) Conclusions and Open Issues

Documentation: Slides will be available after the tutorial in the DILIGENT training DL.

2. DILIGENT Tutorial at GRID & e-Collaboration for the Space Community Workshop

Location: ESRIN, Frascati (Italy)

Date: 11th-14th December 2006

Audience: Space community

Audience needs: To acquire knowledge about the novelties coming from the exploitation of Grid and e-Collaboration tools in the Space Community scenarios.

Training objectives: To introduce Digital Library technologies and services as instruments for supporting e-Collaboration. To attract new communities and investigate novel scenarios in the DILIGENT environment.

Trainers: CNR, ESA

Draft Agenda: 1) DILIGENT overview; 2) DILIGENT main functionality; 3) the ImpECT Scenario; 4) DILIGENT demo.

Expected Achievements: To gather further requirements about the exploitation of the DILIGENT technologies. To collect suggestions about the potentiality of the DILIGENT technologies in the context of the Space Community.

Documentation: Slides will be available after the tutorial in the DILIGENT DL.

3. Training DILIGENT CASPAR

Location: ESRIN, Frascati (Italy)

Date: early February 2007 (1 day)

Audience: ESA internal people who might be interested in knowing Diligent and people working on CASPAR. Several CASPAR technical partners like ACS, @semantics, CCLRC

Audience needs: The targeted audience expects to get an overview of the Diligent infrastructure and services as well as the ImpECT test-bed: □the participants want to

know the project and how it is currently possible to use and exploit it, either on a low level side and end user available services. CASPAR people would need such a training session to see what is already there in terms of digital preservation infrastructures, most of all to define their architectural framework and the requirements on their science test-bed.

Training objectives: To give an overview of the Diligent infrastructure, services and ImpECT test-bed to disseminate the project and to train CASPAR people on it. CASPAR people would benefit from such a training session by seeing what is already there in terms of digital preservation infrastructures most of all to define their architectural framework and the science test-bed requirements.

Trainers: Trainers able to illustrate Diligent from the architectural to the end-user and test-bed point of view.

Draft Agenda: 1) DILIGENT Introduction; 2) Grid infrastructure behind Diligent; 3) Collective Layer Services; 4) DL Layer Services; 5) Process management; 6) Report Generation; 7) Discussion on how both Earth science and Space exploration application might be supported by the DILIGENT infrastructure.

Expected Achievements: Exploitation of the DILIGENT technology and infrastructure in other earth-observation related applications.

Documentation: Slides published in the DILIGENT Training DL.

Some of the events planned in D4.1.2 are still considered valid opportunities for training, like repeating tutorials at major DL conferences, like ECDL (European Conference on Digital Libraries) 2007 and JCDL (Joint ACM-IEEE Conference on Digital Libraries) 2007. Other opportunities emerged recently. For example, a very concrete opportunity is to organise training sessions jointly with the EGEE and ICEAGE projects. In particular, we plan to explore the possibility of proposing sessions to the Grid Summer schools organised by these projects. In addition to this, we have established contacts with EGEE related projects and through the EGEE contact network we will establish synergies with new communities.

5 EXTERNAL TRAINING

External training is planned to start at Month 28 because it is strictly related with the release of the DILIGENT Beta version. This section includes an update of the strategy formulated in deliverable D1.4.2, and also a plan for the provision of external training based on a more general approach to external entities and communities. Such a plan, under preparation at level of Exploitation and Sustainability (all activities belonging to WP4.1-4.4), is conceived to complement the plan in D4.1.2 and will be released as a part of the New Implementation Plan M25-36.

5.1 Updated Strategy

External training is mainly dedicated to train users of DLs. External training is expected to run over a dedicate infrastructure, where multiple communities can simultaneously experiment the construction of their DLs.

DILIGENT External Training environment will be based on GILDA, the training environment for EGEE, maintained by INFN – Catania. A Memorandum of Understanding to set the overall agreement between DILIGENT and EGEE has already been prepared and signed by both the projects. This document states that DILIGENT will be allowed to access the GILDA infrastructure as well as will participate to enrich the same infrastructure by providing its own resources. Such resources will be recruited within project member organisations and will allow a training version of DILIGENT to run in a nearly real Grid scenario.

The potential user groups or communities that we plan to attract are from various areas, but we expect they will mainly stem from the three large application areas the DILIGENT project addresses in its two major application scenarios:

- ImpECt Scenario
 - eScience: for example, communities from Earth and Environmental Sciences, Archaeological, Biomedicine, High Energy Physics, Pharmaceuticals.
- ARTE Scenario
 - Cultural Heritage: for example, (historical) archives, libraries, museums for all Sciences & Fine Arts, media archives, distributors and industries.
 - Media: in particular content providers, public and private, either from the entertainment or from the publishing world.

We foreseen that the availability of a real test-bed environment, with real data and services, together with a number of demonstrators (created as part of WP4.4) will allow us to train several people on the usage of the new type of DLs envisaged by our project. We expect that we will progressively be able to change the attitude of these people towards digital libraries and let them to experiment the potentiality of the new DLs supported by DILIGENT. We also expect that the interaction with these communities will be a fruitful source of inspiration for improvements in the provided services.

Initially, we also planned to have training events for people belonging to third party services or resource providers. However the activities performed in the Exploitation and Sustainability context convinced us that third-party services developers or suppliers should be involved when we will be able to demonstrate concretely the value of the DILIGENT solution. For third-party services developers or suppliers DILIGENT has a net-externality value, and so we cannot consider them as early adopters. Maybe in the future some of them will ask for major details and so dedicated training will be organised.

5.2 Operational plan for the third year

Preparatory actions are foreseen to start on September 2006, depending on the concrete date of selected events. Tutorials focussed on introduction/overview to DILIGENT might start at the end of 2006, whereas more detailed and concrete hands-on training courses are planned for the last few months of the project (spring/summer 2007). The activity will consist of two main tasks: (i) the organization of training events, and (ii) the preparation of training packages.

5.2.1 External training events

The core external training activities will be *independent training courses* for designated, focused user groups to be held during the last year of the project. In order to get larger user groups and communities interested we will also try to organize training events in conjunction with *community-organized events*, such as scientific and culture-oriented conferences. Finally, potential users of the DILIGENT infrastructure can also be found among the participants of *application-oriented DL conferences* such as the ECDL. In conjunction with such conferences tutorials and courses for practitioners can be offered as well.

Tutorials and special *training packages* may be repeated if there are recurring events (conferences) or occasions (invited training sessions). Organising a *workshop* with multiple presenters requires more effort and can only be performed once or twice during the last project year.

Below, we provide two examples of typical training events addressing the DL user needs.

Training: ImpECt Using DILIGENT

Location: to be defined accordingly with ImpECt Community requirements

Date: April 2007

Audience: ImpECt end users that will actively use DILIGENT testbed

Audience needs: Comprehensive training on using DILIGENT from the ImpECt end-user point of view.

Training objectives: The aim of the course is twofold. On the one hand it aims to illustrate the possibilities provided by the "new generation" digital libraries, in terms of new types of content that can be handled and new functionality that can be supported. On the other hand it aims to teach how to create and maintain these new generation digital libraries. Emphasis will be posed on the specific needs in terms of functionality and content the ImpECt community deals with.

Trainers: Eng (with the support of ESA)

Draft Agenda: 1) Introduction on Digital Libraries and Second Generation Digital Libraries, 2) Introduction to DILIGENT as Second Digital Libraries generator infrastructure, 3) Demo on DILIGENT main features, 4) Experimentation in building sample ImpECt DLs, 5) Discussion and Questionnaire.

Expected Achievements: ImpECt users will be able to use the functionality of the DILIGENT testbed according to their communities and personal requirements. Through discussion and questionnaire DILIGENT will collect user community comments.

Training material: Slides and step-by-step exercises will be tailored to the audience needs. Moreover, the user guide that will be developed under WP1.8 will be used as a general-purpose document presenting the system functionality.

Training: ARTE Using DILIGENT

Location: to be defined accordingly with ARTE Community requirements

Date: April 2007

Audience: ARTE end users that will actively use DILIGENT testbed

Audience needs: Comprehensive training on using DILIGENT from the ARTE end-user point of view.

Training objectives: The aim of the course is twofold. On the one hand it aims to illustrate the possibilities provided by the "new generation" digital libraries, in terms of new types of content that can be handled and new functionality that can be supported. On the other hand it aims to teach how to create and maintain these new generation digital libraries. Emphasis will be posed on the specific needs in terms of functionality and content the ARTE community deals with.

Trainers: Eng (with the support of SNS)

Draft Agenda: 1) Introduction on Digital Libraries and Second Generation Digital Libraries, 2) Introduction to DILIGENT as Second Digital Libraries generator infrastructure, 3) Demo on DILIGENT main features, 4) Experimentation in building sample ARTE DLs, 5) Discussion and Questionnaire.

Expected Achievements: ARTE users will be able to run and use DILIGENT. Through discussion and questionnaire DILIGENT will collect user community comments.

Documentation: Slides and step-by-step exercises will be tailored to the audience needs. Moreover, the user guide that will be developed under WP1.8 will be used as a general purpose document presenting the system functionality.

5.2.2 External training packages

The training packages envisaged in D4.1.2 remain valid for the third year of the project. In particular web-based training courses as well as dedicated training courses upon request represent the extreme solutions to meet the requirements of both generic communities and focused communities. In addition to them tutorials and hands-on courses prepared for the planned community-organised events and application-oriented events will produce training material that can be easily arranged in novel ways being thus capable to match the training needs of different and unforeseen scenarios.

6 CONCLUSIONS & NEXT STEPS

This report presented the training activities performed until Month 23. In particular, it described in detail the supporting tools created and the events organised and it also presented briefly an updated plan for the next year with the aim to complete the vision of the overall training activities.

We have just started the training of people not working in the project. As the professional profiles of our possible clients will certainly be widely heterogeneous, these training events need to be carefully prepared and personalised according to the audience. We think that we can profitably perform this training in the future, now that the first release of the software is ready, we have acquired enough experience and validated our choices.

Strict synergies will be established with the other WP4.x activities. In particular, in order to optimise our training plan we intend to work closely to WP4.3 (Exploitation) for identifying the best strategy and which specific communities are to be addressed. Moreover, in order to concretely show what DILIGENT can do, we plan to closely relate training and demonstration activities.

Abbreviations

The acronyms used in this documents are defined in the glossary created by the project available at the address http://diligentproject.org/index.php?option=com_glossary&func=display&Itemid=76&catid=26.