Diligent

A DIgital LIbrary Infrastructure on Grid ENabled Technology

Deliverables No D4.1.1 and D4.1.2:
"Training Support Environment" and
"Preliminary Training Plan"

August 2005

Document Information

Project	
Project Title:	DILIGENT, A **DI**gital **L**ibrary **I**nfrastructure on **G**rid **EN**abled Technology
Project Start:	1st Sep 2004
Call/Instrument:	FP6-2003-IST-2/IP
Contract Number:	004260

Document	
Deliverable number:	D4.1.2 (includes D4.1.1)
Deliverable title:	Preliminary Training Plan (includes "Training Support Environment"
Contractual Date of Delivery:	Month 7 and 11
Actual Date of Delivery:	11th October 2005
Editor(s):	Donatella Castelli
Author(s):	Donatella Castelli, Andrea Manieri, Adeheit Stein, Claudia Niederee, Hans-J. Schek, Heiko Schuldt
Reviewer(s):	Patrick Wolf (FhG)
Participant(s):	CNR, UMIT, ENG, FhG
Workpackage:	WP4.1
Workpackage title:	Training Activities
Workpackage leader:	CNR
Workpackage participants:	CNR, UMIT, ENG, FhG
Est. Person-months:	3
Distribution:	Public
Nature:	Report
Version/Revision:	1.0
Draft/Final	Final
Total number of pages: (including cover)	27
File name:	D4.1.1 and D4.1.2.doc/.pdf
Key words:	Intra-project training, inter-project training, external training.

Disclaimer

This document contains description of the DILIGENT project findings, work and products. Certain parts of it might be under partner Intellectual Property Right (IPR) rules so, prior to using its content please contact the consortium head for approval.

In case you believe that this document harms in any way IPR held by you as a person or as a representative of an entity, please do notify us immediately.

The authors of this document have taken any available measure in order for its content to be accurate, consistent and lawful. However, neither the project consortium as a whole nor the individual partners that implicitly or explicitly participated the creation and publication of this document hold any sort of responsibility that might occur as a result of using its content.

This publication has been produced with the assistance of the European Union. The content of this publication is the sole responsibility of DILIGENT consortium and can in no way be taken to reflect the views of the European Union.

The European Union is established in accordance with the Treaty on European Union (Maastricht). There are currently 25 Member States of the Union. It is based on the European Communities and the member states cooperation in the fields of Common Foreign and Security Policy and Justice and Home Affairs. The five main institutions of the European Union are the European Parliament, the Council of Ministers, the European Commission, the Court of Justice and the Court of Auditors. (http://europa.eu.int/)

DILIGENT is a project partially funded by the European Union

Table of Contents

Summary

This report presents the plans for the DILIGENT intra-project, inter-project and external training activities. It describes the initial strategic and operational plans for each of these types of training (D4.1.2). The report includes a textual description of the training support environment (D4.1.1). For the intra-project training which started at Month 6, it also reports some of the already completed activities.

Executive Summary

Training activities will be a continuous output of the DILIGENT project. They will be the instrument that will enable the prompt transfer of the knowledge and experience acquired during the project to the project members and to external audiences. A careful planning of these activities is being undertaken in order to maximise their impact. This planning comprises:

1. *Strategic Plan* - aims at identifying the target groups of people for training, the required training activities and the needs for material and support environment development.

2. *Operational Plan* - identifies the training actions to be carried out and for each of them, its location and timing, the specific resource needs for training; and the personal responsibilities and accountabilities for training management and delivery.

The DILIGENT training activities have been organised into three main classes that address different users and, therefore, are characterised by different objectives:

- **Intra-project training**

This activity type is targeted to researchers and developers of the DILIGENT consortium. It constitutes a dedicated knowledge communication channel between the different partners with their different skills. Its activities aim to: a) introduce background methodologies and technologies; b) present the products developed within the project; c) select of relevant information and documentation; d) report on studies, experimentation and external training sessions conducted within the project.

- **Inter-project training**

This activity type addresses researchers and developers of other projects and initiatives that share with DILIGENT similar objectives and technological solutions. Each-project training activity will be tailored to the individual needs of the different target groups: a) researchers working in the area of Grid technology development; b) practitioners and researchers working in the information systems communities; c) technicians and system administrators; and d) content and third-party application managers/technical people responsible for Virtual Organizations.

- **External training**

This activity type aims at reaching people that could use the DILIGENT solution and to provide 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 will address the needs of: a) content and third-parties providers which are interested in understanding how to join the DILIGENT infrastructure; b) DL managers and system administrators who intend to adopt a Grid-based DL and are interested on how to install and maintain DILIGENT; and c) end-users of a Grid/DL infrastructure needing to learn about how to use a virtual DL.

For each of the above training types appropriate tools have been or will be developed. In particular, the project plans to create appropriate e-mail lists, create a Digital Library (DL) developed training material and organise a number of dedicated training events. Some work in this direction has already been done, in particular with respect to the intra-project training which started at Month 6, e.g., 1) a mailing list, project-diligent-glite@cern.ch,has been created to allow the exchange of experiences and troubles about gLite software among the DILIGENT partners; 2) technical documentation has been produced as supporting material for each of the organized training events; 3) a DL has been created to maintain the project documents and those documents produced by other

sources that are rated as relevant to the project activities; 4) a number of intra-project training events have been organised to share information on background technologies and methodologies.

A plan already exists to conduct training activities, when appropriate, jointly with other projects and initiatives in the Grid and DL area such as the DELOS NoE on Digital Libraries and the EGEE project.

This report describes in detail the strategic and operational plans the project developed for each of the three classes of training activities (Sections 2-4).

1 PURPOSE

Training activities will be a continuous output of the DILIGENT project. They will be the instrument that will allow the prompt transfer of the knowledge and experience acquired during the project. A careful planning of these activities is needed to maximise their impact. This planning comprises:

1. *Strategic Plan* - aims at identifying the target groups of people for training, the required training activities and the needs for material and support environment development.
2. *Operational Plan* - identifies the training actions to be undertaken and for each of them, its location and timing, the specific resource needs for training; and the personal responsibilities and accountabilities for training management and delivery.

In particular, DILIGENT will develop training courses and material for:

- *researchers and practitioners*. This will have a multiplying effect in terms of the number of researchers effectively working on the goals addressed by the project, and will help to establish a critical mass to maintain Europe at the cutting edge of research. Educating academic researchers has the added benefit that their knowledge is passed on to their students and via them to future employers;

- *technicians and system administrators*. Training of specific groups of system operators will have a strong effect in terms of technological sustainability and will create the necessary competence to guarantee a correct maintenance and running of the DILIGENT infrastructure;

- *content and third-party application managers*. Training these groups will have a strong impact in terms of knowledge diffusion as they can then make their archives and applications available to large communities;

- *technical people responsible for Virtual Organizations*. This training program will allow new communities to take full advantage of the DILIGENT technologies.

When appropriate training activities will be conducted jointly with other projects and initiatives in the Grid and DL area such as:

- "DELOS NoE on Digital Libraries" which includes several members of the DILIGENT consortium. In particular, joint activities can be organized jointly with the DLib Center of this network that can be used as direct channel to inform a large audience of European IT researchers about DILIGENT results;

- "EGEE project" whose leading organization is also a DILIGENT partner. In particular, strong participation in the events organized by the EGEE Networking Activity, will help awareness of DILIGENT to reach a wide variety of users interested in Grid-based applications.

In the DILIGENT Description of Work the training activities have been partitioned into three major classes and a task has been associated with each of them. Each class covers specific training needs and demand for specific programmes and environments.

1. **Intra-project training –** targeted to researchers and developers of the DILIGENT consortium. It constitutes a dedicated knowledge communication channel between the different partners with their different skills.

2. **Inter-project training** – addressed to researchers and developers of other projects and initiatives. It encompasses specific training to the Grid, digital library, and information knowledge communities that share with DILIGENT similar objectives and technological challenges.
3. **External training** - devoted to providers and consumers of DL resources that are potentially interested in using the DILIGENT infrastructure and the DLs that are managed through it.

This report illustrates for each of the above types of training, the initial strategic and operational plans. A more detailed description is given for the intra-project training since it corresponds with an already active task (Task 4.1.1). For sake of clarity, despite this report is intended to specify only the plans for training activities, we also briefly anticipate the description of the activities that have already been carried out under this task until now. These activities, together with all the other ones that we will be carried out during the project, will be collectively illustrated in more detail in D4.1.3 (due at Month 18).

2 INTRA-PROJECT TRAINING

The Intra-project is the first kind of training activity initiated in the project. Due to its nature we deliberately chose to maintain at the beginning of the project an high level of flexibility in its planning in order to be able to promptly satisfy the needs that were emerging from the partners. After the initial phase, however, more concrete strategic and operational plans have been identified. These are described in the following sections jointly with a number of activities already carried out.

2.1 Strategic plan

2.1.1 Target audience and objectives

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.

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.

In order to maximise the impact of the training and minimise its cost, this activity has been structured according to a *pyramid model.* This models functions by training small groups of people in both functional skills and training techniques, these then, in turn, train other small groups of people with functional skills and training techniques, and so on, until the functional skills are passed on to the lowest staff level. This model empowers the capacity to train advanced skills to a large group of people in a relatively short time with a sustainable approach that requires few resources.

2.1.2 Training activities

The inter-project training activities will be mainly devoted to two objectives; on the one hand the production and dissemination of appropriate documentation and on the other hand the organisation of tutorials on specific topics. In particular, these activities will focus on:

- **Introduce background methodologies and technologies**

The background expertise of the different project participants on methodologies and technologies useful for the project development will be shared among the consortium partners in order to speed-up the start up of the different project activities.

- **Present the project developed software products**

An extensive training will be conducted on the DILIGENT lower functionality services implemented by the project allowing for faster design and development of all the other services that will use them.

- **Select relevant information and documentation**

Relevant information and documentation will be recommended and made available to the whole consortium through appropriate dissemination tools (see Section 2.1.3).

- **Report on studies**

The results of studies carried out by the project members on specific topics of general interest for the project design and development will be reported to all the partners.

- **Report on experimentation**

Large experimentations on the underlying Grid middleware will be carried out during project. As this experimentation is very complex and time demanding, the lesson learned will be shared in order to minimise the overall effort.

- **Report on external training sessions**

The knowledge acquired through the participation to training events organised by third parties on key technologies used for the development of the DILIGENT infrastructure will be disseminated to all the project participants, thus maximising the impact of the external acquired training.

2.1.3 Support environment & material

The intra-project training does not need very sophisticated training environments since it is mostly based on personal exchanges among people that operate within the same project framework. Mainly, it requires mechanisms for an easy exchange of information and for complementing the oral training. The tools identified until now for implementing this environment are:

- **e-Mailing lists**

Thematic discussion e-mail lists are a simple and powerful means to exchange information about new technology. A number of subject-based e-mail lists will be created following the requests that will emerge in the course of the project.

- **Technical documentation**

In order to better support and consolidate the information exchange internal to the project, it has been decided to produce for each training event an appropriate documentation that can also be exploited in training other project participants that have not taken part to the specific training event. This documentation, that has been initially stored on the BSCW Shared Working Space, is currently being copied and made accessible though the DL described below.

Given the experimental nature of most of the activities carried out within DILIGENT, we also plan to produce a number of documents that illustrate the experiments done and the lesson learned. These documents will be circulated among the consortium members.

- **Digital library**

Currently, the main sources of information for the researchers and practitioners, technicians and system administrators that approach GRID, WS, and SOA technologies are the Web sites of companies, e.g. IBM and SUN, projects, initiatives and related events. The rich variety of documentation, like reports, PowerPoint presentations, videos of lectures and tutorials published on the Web sites offers an updated and detailed view of the on-going activities and achievements. Unfortunately, this documentation, which has grown considerably in the last years, is difficult to retrieve since it is spread on many different

locations 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 has been planned to share the most useful documents retrieved through a DL. Each partner that rates a document as relevant to the DILIGENT community can submit it in the DL. The set of the so collected documents and the material produced by the project itself will be exploited both as an important source of information and as a useful information base for supporting a faster creation of training documentation.

This DL, created to satisfy project internal needs, will also be made accessible to other interested communities. In doing so, it will also serve as an instrument for intra-project training.

We will also evaluate the possibility of integrating the created DL with a distance e-learning tool, MOTUS. The integration of the two complementary tools should facilitate the construction of training courses accessible through the Web.

2.2   Completed and on-going activities

2.2.1 Support environment

An initial intra-project training environment that covers the current needs of the project has been created. It consists of:

- **e-mail lists**

A project-diligent-glite@cern.ch mailing list has been created to provide a room for exchanging experiences and troubles about gLite software. The goal of this list is to facilitate the interaction and discussion between the Diligent partners on gLite deployment and experimentation issues. So far, it is mainly used by technical people to help each other in the setting up of the Diligent development infrastructure.

- **Technical Documentation**

Technical documentation has been produced as supporting material for each of the training events already organized (see next section). In addition, a number of documents that illustrate our experience with gLite are being prepared. The purpose of these documents is to share the knowledge acquired in order to speed-up the creation of the DILIGENT infrastructures and their migration to new releases. In particular, a number of "How to" docs that guide the gLite installation by describing the steps required to install the gLite Middleware efficiently and to report the difficulties encountered and the solutions found are under preparation. These documents are now available at http://dlib.sns.it/bscw/bscw.cgi/0/21559 and they will also soon be accessible through the DILIGENT DL.

- **Digital Library**

The DILIGENT DL is operational. The uploading of the documents already produced and collected by DILIGENT and maintained on the BSCW and on different Website is on-going. This DL is available at the address http://diligent-training.isti.cnr.it/.

2.2.2 Training events

A number of training events, mainly dedicated to achieve a common background knowledge and common understanding of the methodologies and products, have already been carried out in this first part of the project. These activities, mainly driven by needs that emerged in the course of the project, have involved as trainers also partners that have not effort allocated on workpackage 4.1. Below we list the training events that took place until now (Month 9).

- **Introduction to background methodologies and technologies**

Location: Rome

Date: 17 November 2004 (one day)

Objectives: Presentation of the FAST technology

Trainers: FAST

Agenda: 1) Introduction to FAST; 2) Search trends; 3) Digital Libraries challenges; 4)Search Engine 101.

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

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

Documentation: The slides presented are available in the DILIGENT DL as private collection accessible to the DILIGENT consortium members.

Location: Athens

Date: 13-14 April 2005 (one day)

Objectives: DILIGENT Training on Testing

Trainers: 4D-Soft

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

Audience: 27 people (representatives of all technological partners)

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

Documentation: The slides presented are available in the DILIGENT DL as private collection accessible to the DILIGENT consortium members. A more complete documentation is under preparation (see Section 2.3.1).

- **Presentation of project developed products**

Location: Athens

Date: 14 April 2005 (half of a day)

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.

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

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.

Documentation: The training session has been supported by a Power-Point presentation that is available in the DILIGENT digital library.

Location: Milan

Date: 29 June 2005 (half of a day)

Objectives: DILIGENT Training on Collective Layer Services

Trainers: CNR, Eng

Agenda: 1) How to use the Collective Layer Services; 2) How to configure Security

Audience: 18

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

Documentation: The training session has been supported by a number of Power-Point presentations are available in the DILIGENT digital library.

2.3 Operational plan for the future

The plan for the future is mainly dedicated to the training on technologies developed by the consortium partners as part of the project and on the experimentation done. Several issues that are common to many services have emerged during this first phase of the project (e.g. optimisation). We are now evaluating the possibility of exploiting synergies among services that were not initially planned. We expect that these new common issues and the solutions proposed will turn out to be, together with the experimentation, one of the main sources for intra-project training.

2.3.1 Technical Documentation

By following the requirements that emerged in the course of the project, we decided to produce a number of hand-books for key project activities. These will be a useful instrument both for the project partners and for other communities approaching similar problems. Up to this point, we have planned to produce a "Handbook for Unit and Component testing". Organised as a practical text book, this document will include content presented in the training activity on testing performed in Athens (April '05) and will lead each programmer toward a practical tour in installing testing software, briefly recalling the EBIT testing methodology concepts and describing application of this technology to concrete examples. This handbook will be delivered to each participant to the training event in Athens so that it can be used as practical guide in the next phase of unit and component testing. The handbook is foreseen to have the following chapters: a) general introduction of testing methodology; b) introduction to EBIT technology; c) what tools to install to perform the unit and component tests; d) how to create a unit test; and f) how to report a result test.

2.3.2 Training Events

As in the past, we intend to organise training events in conjunction with other events in order to minimise the cost of the attendance.

In particular, we have already identified the following two training events for the immediate future:

Location: Still to be fixed

Date: Spring 2006

Objective: Development secure DILIGENT services.

Trainers: Eng

Topics: This training session will be created on the basis of design principles of DILIGENT security solution. The session will be organised in two parts i) the theoretical approach of security in DILIGENT, compared with the usual Grid solutions, known problems in DL environment and best practices, ii) a concrete use of DVOS Security API to understand how to create secure services in DILIGENT environment with a special focus on the use made of gLite security services.

Expected Audience: People in each development team that will develop DILIGENT services on top of Collective Layer.

Expected Achievements: Developers of DILIGENT services to learn main security issues to be taken into consideration when they develop in a Grid environment, how to use security functions supplied by DLCL, how to solve known security problems

Location: Still to be fixed

Date: Spring 2006

Objective: Development of web services on top of Digital Library Collective Layer

Trainers: Eng

Topics: This training session will collect any required knowledge about the use of DLCL API within DILIGENT development of above layers and other web services. Registration of DL services to be integrated in the creation of a dynamic DL, use of authorization and authentication mechanisms to access DILIGENT and gLite services, security issues, etc. This training session will be improved each time new release of DLCL will be available (at least M20, M28).

Expected Audience: Programmer teams that will develop web services on top of Collective Layer.

Expected Achievements: Developers of web services will learn about how to produce web service that are compliant with the DILIGENT infrastructure and exploit all its capabilities.

Other potential training sessions foreseen for the future will be aimed at providing:

- initial (internal) user training on the Beta and final version of DILIGENT interface (administrator and user point of view). This training is expected to be done by Application Specific Layer Developers.
- providing training on acceptance testing (how to execute acceptance scenarios, how to collect results, how to report to Testing workpackage. This training his is expected to be done by the Testing team.

3 INTER-PROJECT TRAINING

This section presents the plan of the DILIGENT inter-project training activities.

3.1 Strategic plan

3.1.1 Target audience and objectives

The goal of the inter-project training activities is to address members of other projects with focus on ii.) Grid technology development, ii.) exploitation of Grid technology for Digital Libraries, and iii.) user community applications in the area of Digital Libraries as well as information and knowledge management.

In detail, the targeted audience includes all groups identified in Section 1

- *researchers:*
- *practitioners*:
- *technicians and system administrators:*
- *content and third-party application managers:*
- *technical people responsible for Virtual Organizations*:

3.1.2 Training activities

The training activities will provide tutorials, training courses, and focused material aiming at educating researchers and key people in the advances made by DILIGENT. Due to the variety of addressees, the DILIGENT inter-project training activities will be tailored to the individual needs of the different target groups.

- **For researchers working in the area of Grid technology development**, training activities will consist of the continuous exchange of information such as new requirements, technical aspects, etc. in order to i) foster the dissemination of results and experiences in both directions, and ii) feedback to the Grid community on the particular requirements of DL applications. In addition, specialized tutorials will be given on selected topics (such as content management in a Grid-enabled DL, process management, etc.) and thematic workshops will be organized with a small number of participating experts, with experience of either Grid or DILIGENT. The goal of these workshops is to illustrate the results of in-depth analyses of the middleware concepts and benchmarking activities, and to train on the first results of the test-bed evaluations.

- **For practitioners and researchers working in the and information systems communities (e.g., BRICKS or DELOS),** dedicated tutorials will be organized, e.g., on multimedia retrieval and retrieval support, and on service composition and workflow process management. These tutorials will help participants to increase their understanding of the new technologies needed for the knowledge infrastructure on the Grid enabled technology

- **For technicians and system administrators,** special technical tutorials will be prepared with focus on aspects needed to install, customize, and maintain the DILIGENT infrastructure.

- **For content and third-party application managers/technical people responsible for Virtual Organizations,** the training programme will mainly consist of specialized tutorials to possibly enable projects by communities not yet

represented in DILIGENT to use the DILIGENT infrastructure for their particular needs.

3.1.3 Support environment & material

The information exchange between Grid developers and DILIGENT developers is already supported by several mailing lists. For example, the project-diligent-glite@cern.ch mailing list has been set up by the DILIGENT- and EGEE partner CERN in order to foster interaction and discussion between DILIGENT partners on gLite deployment and experimentation issues. The archiving of the messages distributed via this list will help both DILIGENT- and gLite developers to access information on particular DL requirements, on solutions to already known problems, etc. The tutorials that will be given to members of other projects are supported by means of training material that will be distributed during the training events. This material will also be available via the Digital Library and the e-learning tool already mentioned in Section 2.1.3. In addition, there will be a DILIGENT demonstration and education system. The material for the inter-project training events shows very close similarities to the material provided for external training, i.e., there will be i.) classical material summarizing the presentations (PowerPoint slides, .pdf documents) as well as complementary documents (research papers, system documentations, bibliographies, etc.); ii.) tools and support environments for "hands-on" training courses, e.g. a DILIGENT demonstration and education system for special system features or components, film/video material as well as annotated screen-shots, concrete virtual DL(s) for demonstration purposes(i.e., pre-configured and deployed systems that allow end-user communities to immediately work with a full-fledged DILIGENT system, containing test data, and iii.) an operational DILIGENT prototype version.

For the workshops, proceedings will be prepared. Depending on the focus of the workshop and the envisioned target group, these will be either pre-proceedings (available during the workshop) or post-proceedings that will summarize the discussions held during the workshop.

3.2 Operational plan

Although some inter-project training activities have already been realized (e.g., the mailing list mentioned in 3.1.3) the majority of inter-project training activities will start as soon as the DILIGENT technical work packages have realized a first version of the DL services on top of the underlying Grid infrastructure.

In detail, the inter-project training events for Grid and Grid-related projects will be:

Location: Still to be fixed

Date: Still to be fixed

Objective: Tutorial on Collective Layer and Process Management

Trainers: CNR and UMIT

Topics: The training session will be based on the results of the functional specification and service design activities of both collective layer services and process management services. The goal is to make grid developers aware of the requirements stemming from both areas of the underlying Grid infrastructure.

Expected Audience: EGEE partner institutions in general and Grid developers in particular.

Expected Achievements: Allow Grid developers to learn about the particular DL requirements and how these requirements are supported in DILIGENT.

This event might be held in conjunction with the EGEE II conferences (if the proposal for the EGEE II project is accepted for funding). The plan is to permanently establish a "DILIGENT track" at these EGEE conferences. Starting with the above mentioned Collective Layer and Process Management services, it is planned to also address content management & storage, search, process optimisation and user community specific applications. Responsible partners are the respective DILIGENT work package leaders.

Training activities for other Grid-related projects (such as, for instance, CoreGrid) are still subject to discussions; details for these training activities have not been fixed yet.

Inter-project training for DL projects will mainly focus on the Network of Excellence in Digital Libraries (DELOS), but will address other projects as well.

Location: still to be fixed

Date: Winter 2005 / spring 2006

Objective: Tutorial on Architectural Issues of a DL on top of a Grid environment

Trainers: CNR, UMIT, possibly also other partners

Topics: The training session will focus on the overall DILIGENT architecture and the Grid exploitation. In particular, the individual DILIGENT services and their interrelations will be presented. Furthermore, the usage of the underling Grid infrastructure for the DILIGENT DL applications will be highlighted.

Expected Audience: Participants in the DELOS task "A DL Reference Model".

Expected Achievements: Contribute to the DL Reference Model that is currently being defined in the above mentioned DELOS task.

Location: still to be fixed

Date: Spring / Summer 2006

Objective: Tutorial on the usage of Grid resources for DLs

Trainers: DILIGENT partners (e.g., WP leaders for "their" services and functionality)

Topics: The training session will focus on efficient exploitation of resources in the Grid (services, storage, etc.) for DL applications

Expected Audience: Participants of the EU-funded project BRICKS.

Expected Achievements: Allow DL developers to learn about the potential of implementing a DL infrastructure on the basis of a Grid.

Tutorials on the usage of Grid resources for DLs will also be planned for other, related DL projects.

Finally, inter-project training activities will also be held for "anonymous" projects. This means that tutorials will be given at DL and Grid conferences and workshops. The audience will encompass researchers working in different international, national, regional Grid and DL projects. In addition, specific workshops on Grid and DL-related architectural issues will be organized.

Location: ECDL (European Conference on Digital Libraries) 2007 (possibly also at JCDL 2007)

Date: ECDL 2007 (possibly also at JCDL 2007)

Objective: Tutorial on the exploitation of a Grid environment for DLs

Trainers: DILIGENT partners (e.g., WP leaders for "their" services and functionality)

Topics: The training session will focus on the potential of using a Grid infrastructure and Grid services for DL applications. The goal is to present the final results of the DILIGENT project and the DILIGENT prototype

Expected Audience: ECDL (JCDL) participants.

Expected Achievements: Allow the members of the DL community (i.e., mostly members of DL projects) to make use of the results of the DILIGENT project.

Location: EGC 2007 (European Grid Conference)

Date: EGC 2007

Objective: Tutorial on implementing a DL on top of a Grid environment

Trainers: DILIGENT partners (e.g., WP leaders for "their" services and functionality)

Topics: The training session will focus on the gains that can be achieved (in terms of performance, resource consumption, dynamics, flexibility, etc.) when using a Grid infrastructure for implementing a DL

Expected Audience: EGC participants.

Expected Achievements: Allow the members of the Grid community (i.e., mostly members of international, and/or national Grid projects) to learn about the requirements of DLs, and the extensions needed for Grid environments in order to support these requirements.

Location: to be decided (e.g., Dagstuhl)

Date: end of 2006 / beginning of 2007

Objective: Joint DILIGENT / DELOS Workshop on DL Architectures in general, exploitation of Grid environment in particular

Trainers: DILIGENT partners (e.g., WP leaders for "their" services and functionality) and DELOS partners

Topics: The workshop will aim at brining together the DL Architecture experts (in particular the DELOS partners defining the DL Reference Model) and the DILIGENT experts with expertise in implementing a DL on top of a Grid environment

Expected Audience: Workshop open to the public, but the core should be DELOS and DILIGENT partners.

Expected Achievements: Although there are organizations being both partner in DELOS and DILIGENT, the partners of the two projects are to a large extent disjoint and the workshop will foster the exchange of results between both communities.

4   EXTERNAL TRAINING

External training will be activated in the second part of the project when the prototype infrastructure will be available. The next sections describe the identified strategic and operational plans for this last type of training.

4.1 Strategic plan

4.1.1 Target audience and objectives

External training is the means to win over collaborators from potential user communities that could profitably *use* the DILIGENT solution. These will mainly be within the two original, main DILIGENT usage/application scenarios: (1) Life Science/Environmental Science and (2) Cultural Heritage for various content domains. The goal of the external training activities is to provide these potential users with the initial training and appropriate documentation needed, for example, in order to illustrate how to employ respective VDLs on top of the DILIGENT Grid infrastructure.

Some of the concrete activities proposed below involve other projects related to DILIGENT in their role as co-organiser of a training event. These activities are to be distinguished from the "inter-project training" activities which have the purpose of mutual learning/exchange of project members as described in the previous chapter.

External training activities will support DILIGENT objectives in several directions:

- **Training on existing solutions** proposed to other virtual research organisations will be used as leverage and to enhance the DILIGENT community, as well as to collect feedback and to gather new user requirements.
- **On-line courses** will be created for the generic public allowing access from distant locations, and they will be structured for different skills and training objectives.
- **Dedicated training courses** for content and third-parties providers will be organised upon request, and they will illustrate how to join their resources on the DILIGENT infrastructure and how to profitably maintain them.

Among the target audiences are all of the *professional roles* mentioned in the Description of Work (DoW), i.e. final users, technicians and system administrators of organisations using DILIGENT solutions, as well as content and third-parties provider managers, etc. Depending of the specific purpose of a given training event, however, the composition of the target group will be varied so as to allow us to present an adequate thematic focus for a certain level of expertise of the attendees.

For each of these roles different themes must be defined so as to tailor the training activity to the specific interests of the respective audience, for example:

- **Content and DILIGENT third-parties resource providers i**nterested in understanding how to join the DILIGENT infrastructure;
- **DL managers and system administrators** who intend to adopt a Grid-based DL and are interested in how to install and maintain DILIGENT;
- **End-users of DILIGENT's Grid/DL infrastructure** who need to learn about how to use a virtual DL in their everyday practice.

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

- **eScience:** for example, communities from Earth and Environmental Sciences, Biomedicine, High Energy Physics, Pharmaceutics, etc.
- **Cultural Heritage:** for example, (historical) archives, libraries, museums for all Sciences & Fine Arts, media archives, distributors and industries, etc.

Naturally, the DILIGENT user partners (ESA, RAI, SNS, CERN) have already well established relationships to these communities, which they can contact – directly or via some common association or community service – in order to win over collaborators and new users for the DILIGENT infrastructure. The trained communities will be selected among these and others that will have shown interest in the DILIGENT infrastructure functionality. The selection will be based on criteria that will better defined as part of the exploitation activity.

The training activities will (depending on the training topics) be conducted in many cases by technical DILIGENT partners, but user partners may be involved in order to report about their personal experiences with using DILIGENT and about lessons they learned themselves.

4.1.2 Training activities

We distinguish between a number of *training activity types*, each with a different scope and – most likely – different suitability in the various stages of the project. For example, tutorials with an introductory character addressing newcomers to the given theme or technology can be organised at an earlier stage of the project than "hands-on" training courses on implemented DILIGENT technologies or system components. The latter, as well as well-established "lessons learned" will be available only later, but training materials can be prepared incrementally as the project develops.

Training Activity Type	Independent event or activity	In conjunction with other event (e.g. conference)
Tutorial (single tutorial or series by several presenters)	X	X
Workshop - research oriented - industry oriented	X	X
"Hands-on" training course - technology oriented - user/usage oriented	X	-
Web-based training course/guide	-	-

Organizers and providers

All of the above mentioned training activities will be offered under the auspices of the DILIGENT project as a whole. However, one has to keep in mind that in some cases only a subset of DILIGENT partners may be involved in actually conducting the activity, e.g. organising an event, giving the training course/tutorial, or coordinating the collection of Web-based training material and courses. An event or offer can be organised by:

- single DILIGENT partner (possibly using materials from other partners);

- group of designated DILIGENT partners (which may be composed differently in case of a recurring event, e.g. course or workshop);
- joint event with other project as co-organiser, e.g. EU-project BRICKS;
- joint event (or Web course) with a co-organising institution, e.g. the Digital Library Competence Centre, or virtual research organisation, e.g. the Virtual Institute for Knowledge and Data Management.

4.1.3 Support environment & material

The internal DILIGENT training DL mentioned in Section 2.1.3 will also include training material to be used for external training activities. The nature and granularity of the thus provided materials must differ from the internal documents to take into account different usage purposes. For example, part of the material must be collated and organized into structured training guides/presentations that are suited for different *external* communities.

Among the necessary training materials we distinguish between

- "classical" items such as PowerPoint slides with graphics, charts, illustrations and comments as well as complementary documents and materials such as bibliographies, papers, system documentations, etc.
- tools and support environments for "hands-on" training courses, e.g.
  - demonstrator for some system feature or component
  - film/video material for training
  - concrete virtual DL(s) for demonstration purposes
  - operational DILIGENT prototype version

All of the different training activities should make use of specific training materials designed for the special purpose of the given event/activity. In addition they should also contain a general introduction to the DILIGENT project and its challenges and intermediary results.

4.2 Operational plan

According to the project's work plan concrete *external* training activities are only foreseen for the third project year, i.e. starting around September 2006. Preparatory actions will have to start earlier, depending on the concrete date of a selected event. Tutorials with an introduction/overview character might be placed earlier in 2006, whereas more detailed and concrete hands-on training courses are planned for the last few months of the project.

The following list of suggestions can be classified in detail along the above mentioned dimensions, i.e. training theme, activity type, event type (independent vs. attached to other event), organiser (single vs. joint organiser), etc. *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. Note that the example events below are given only for illustration purposes; the actual selection will be made in due time before the event, e.g. following a call for participation, an invitation or after an own proposal has been accepted to held a tutorial or workshop attached to a conference.

At the core of external training activities are (1) *independent training courses* for designated, focused user groups during about the last half year of the project. In order to get larger user groups and communities interested we will try to also organize training

events in conjunction with (2) *community-organized events*, such as scientific and culture-oriented conferences. These courses and tutorials may be held at an earlier stage, e.g. starting in 2006, and may include partly more general, introductory material. Finally, potential users of the DILIGENT infrastructure can also be found among the participants of (3) *application-oriented DL conferences* such as the ECDL. In conjunction with such conferences tutorials and courses for practitioners can be offered as well.

External training events:

Location: Summer school on DL topics and applications (e.g. DELOS Summer School 2006)
Date: Summer/Fall 2006
Objective: Tutorial on employing the DILIGENT Grid environment for DLs
Trainers: DILIGENT partners
Topics: "Introduction to the DILIGENT Infrastructure for Digital Libraries"
Expected Audience: Participants of the summer school
Expected Achievements: Allow (future) members of the DL community to learn about the potential of the DILIGENT's technologies and their practical usage.

Location: Conference or Workshop on DL topics and applications (e.g. ECDL 2006)
Date: Fall 2006
Objective: Tutorial on DILIGENT's architecture using a Grid environment for DLs
Trainers: DILIGENT partners plus possibly members from EU-project BRICKS or from the "Architecture" group from DELOS
Topics: "A Next Generation Digital Library Architecture – the DILIGENT Example"
Expected Audience: Conference participants, esp. DL practitioners and content providers/users
Expected Achievements: Allow practitioners from the DL community to learn about key features of DILIGENT's architecture and Grid environment, and how to use it in practice.

Location: Site of a DILIGENT partner (e.g. CNR or FhG) or venue of the conference to which this workshop is being attached
Date: Fall 2006 or 1st quarter of 2007
Objective: Workshop – either independent or attached to a user domain conference on Cultural Heritage technologies (e.g. ICHIM 2006) or a DL conference (e.g. ECDL, JCDL)
Trainers: DILIGENT technology and user partners (e.g. SNS, RAI) plus possibly members from EU-project BRICKS
Topics: "Cross-Fertilisation of Cultural Heritage and a Next Generation e-Science Technologies: Bridging the Gap between different Worlds with DILIGENT"
Expected Audience: Members from Cultural Heritage domains, content providers and potential users of DILIGENT
Expected Achievements: Provide members from Cultural Heritage domains (media archives, historical archives, museums, etc.) an introduction to the potential of new Grid/DL technologies with special emphasis on cultural digital archives/libraries and usage aspects.

Location: Site of a DILIGENT partner (or venue of the respective conference)
Date: 2nd quarter of 2007

Objective: Workshop – either independent or attached to a user domain conference in Natural Science (e.g. Life Science or Biomedicine) or DL conference (e.g. ECDL, JCDL)

Trainers: DILIGENT technology and user partners (e.g. ESA) plus possibly members from the EGEE project

Topics: "How to Share an e-Science Repository or Service through the DILIGENT Infrastructure – Experiences from the DILIGENT user scenario"

Expected Audience: e-Science communities (invited participation plus possibly attendees of the respective user conference), content providers and potential users of DILIGENT

Expected Achievements: Provide members from e-Science user communities a detailed overview on the DILIGENT infrastructure technologies and on how to use selected services and functionalities.

Location: Site of a DILIGENT partner (or venue of the respective conference)

Date: 2nd quarter of 2007

Objective: Workshop or extended tutorial – either independent or attached to a user domain conference in Natural Sciences and/or Cultural Heritage

Trainers: DILIGENT technology and user partners (e.g. ESA, SNS)

Topics: "Building a Digital Library on Top of the Grid – Lessons learned from DILIGENT"

Expected Audience: e-Science and Cultural Heritage user communities (invited participation plus possibly attendees of the respective conference), content providers and potential users of DILIGENT

Expected Achievements: Provide members from the selected user community a detailed overview on the DILIGENT infrastructure technologies and on how to use selected services and functionalities.

Further possible training packages:

Topics: "How to Create a VDL using the DILIGENT Infrastructure"

Training Type: Tutorial (year 2006), hands-on course (2007)

Expected Audience: VDL providers

Topics: "How to Use my Virtual Digital Library"

Training Type: Template for easy creation of tailored end-user training material for concrete Virtual Digital Libraries, possibly WBTs

Expected Audience: VDL users

Topics: "Metadata Management and the Grid"

Training Type: Tutorial (year 2006), hands-on course (2007)

Expected Audience: technicians, other EGEE applications

Topics: "Process and Job Management in the Grid"

Training Type: Tutorial (year 2006), hands-on course (2007)

Expected Audience: technicians, other EGEE applications

Topics: "Search and Retrieval in a Grid-based Infrastructure"

Training Type: Tutorial (year 2006), hands-on course (2007)

Expected Audience: technicians, other EGEE applications

Web-based training course/guide:

Material for Web-based Training (WBT) can be offered via the DILIGENT project Website. Its number may be increased and complemented incrementally as the project develops and may be derived from other training activities. Note that the preparation and provision of this material is, however, no mere side effect of previous training activities – to be suited for Web-based distant training the material must be edited and tailored in a new way in order to satisfy the need of potential communities. The extent of efforts to be invested will depend on the available resources in the project after all of the other scheduled training activities.

Dedicated training courses upon request

As a follow-up from DILIGENT dissemination activities and special earlier training events, industrial consortia and/or user communities may develop an interest in further training activities w.r.t. building DLs for serving their own needs. With a number of pre-prepared training packages from other events (or from the Web-based course) DILIGENT members are enabled to organise smaller training courses as requested by special consortia or virtual user organisations. The topics offered and training materials used in these courses will in most cases be more specific to allow for a "hands-on" character of the training. It can also be expected that the duration of the training needs to be longer than for more general tutorials, and the target groups to be trained need to be smaller. This holds especially true if a quite detailed technical know-how for implementers and system builder must be communicated and special success criteria are to be reached.

5   CONCLUSIONS

In this report the plan for the DILIGENT training activities has been presented.

Different strategic and operational plans have been designed for intra-project, inter-project and external training activities. Most activities have not yet begun, however some of those planned for the intra-project training have already been successfully completed. This makes it possible to expect that the planned instruments, materials and events will prove to be adequate to achieve the planned training purposes.

6 ABBREVIATIONS

The acronyms used in this document 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.