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Table of Contents

Document Information	2
DOCUMENT LOG	3
Disclaimer.....	4
Figures	6
Summary	7
1 Introduction	8
1.1 Outline and purpose of the document	8
1.2 Methodology.....	8
1.3 Sources of Information.....	9
2 Demonstration Strategy	10
2.1 Definition of the overall demonstration strategy.....	10
2.2 A Business perspective	12
2.2.1 Demonstrable results and their timing	12
2.2.2 Target groups requirements for Demonstration.....	13
2.2.3 Some concrete cases.....	14
2.3 Demonstrations selection	17
2.4 Demonstration timetable	18
2.4.1 Demonstrators GANNT	18
3 Demonstrators Design	19
3.1 Demonstrator 1: "Dynamic Service Instance Deployment"	19
3.2 Demonstrator 2 "Watermarking and Encryption of Videos"	20
3.3 Demonstrator 3 "Batch Feature Extraction"	22
3.4 Demonstrator 4 "Video Format Conversion"	23
3.5 Demonstrator 5 "Content-Based Multimedia Retrieval"	25
3.6 Demonstrator 6: "Identification and Configuration of Dynamic Services"	26
4 Conclusions.....	29
4.1 Evaluation of Process & Results	29
4.2 Further Work	29
A.1 References.....	30
A.2 Acronyms	31

Figures

Figure 1 Demonstration Creation Strategy	11
Figure 3 - Digital Libraries Market segments	13

Summary

This deliverable is an on-going document that describes the planned actions for demonstration activities within the DILIGENT project.

Demonstration activities have the objective to promote the main features of DILIGENT project to potential customers. Target customers have been analysed within WP 4.3 activities (Task 4.3.1 Virtual research organisation aggregation and analysis) and results of this analysis, included in this document served as starting point for the subsequent demonstration identification.

In this version of the plan has been described the selected demonstration strategy and the design demonstrators have been chosen depending on available technical results, selected communities and context of use of the same demonstrators.

1 INTRODUCTION

1.1 Outline and purpose of the document

The purpose of this document is to define a plan for demonstrating the results of the DILIGENT test-bed to potential customers through the initial definition of simple and well-focused demonstrators and finally to create a demonstration environment where any of them could experiment the usage of the full system.

The planning phase for DILIGENT demonstrators focuses on developing scenarios for DILIGENT services for different type of auditors, integrating and customizing results from technical work-packages.

Two main chapters, other than this one, compose the document:

- Chapter 2 that describes the strategy adopted for the whole demonstration activities, different technical and business aspects considered and success criteria;
- Chapter 3 that describes the initial set of demonstrators identified in this first phase of the project; for each demonstrator is given a short description of purpose, technical results used, potential target audience and success indicators;

The document is completed by a "Conclusion" chapter where we reflect upon work done and plan the next phase.

1.2 Methodology

DILIGENT project aims at creating "*an advanced test-bed that will allow members of dynamic virtual e-Science organizations to access shared knowledge and to collaborate in a secure, coordinated, dynamic and cost-effective way*" [4].

Demonstration of concrete results about such test-bed involves business aspects, content selection strategies, organisational and technological aspects. The main objective is to highlight innovative and interested results and present to potential users in an attractive way.

The methodology used in this WP follows the conclusions of the work undertaken in other Workpackages, i.e. User Requirements analysis reports [1][2][3].

In order to achieve design effective demonstrators the following steps have to be taken into account:

- Defining evaluation criteria for digital libraries on the grid environment by each different target community
- Define an overall demonstration strategy
- Come to agreements among content providers on definitions and find consensus on common procedures to be followed about management of content Intellectual Property Rights (IPRs).

- Defining roles for DILIGENT services and different service models from a business point of view depending on users interests.
- Ensuring the customization of available technical results according to business scenarios and matching target community specific interests.

In this document are defined the guidelines to identify the interesting results per each users category and operational structure to design and customize demonstrators.

1.3 Sources of Information

The information collected and the demonstrators described have be gathered from project deliverables and informal meeting with people of user partners.

All these documents are listed in the Appendix A1 and they are available on the project web repository (BSCW).

2 DEMONSTRATION STRATEGY

This chapter describe the strategy selected by DILIGENT project to create awareness and interests in potential customers. Such strategy is far to be seen as a commercial strategy since the maturity of the results have to be verified.

2.1 Definition of the overall demonstration strategy

A strategy for demonstration is made of exploitable results (piece of software that show interesting features of the whole system), one or more interests expressed by groups of customers and a process to customize such components in an appealing way for the decision makers.

For each target group one or more demonstrators could be set up. In the final phase of the project, one the Beta version of the whole system will be ready, an installation of the whole system will be made for demonstration purposes.

The Demonstration Plan will deal with the selection and design of such demonstrators and their planning with respect of availability of technical results; each demonstrator could be used to support dissemination or training activity or for pre-commercial contacts.

During the development phase main issues are firstly addressed through experimenting design principles. Some of these activities are related to issues that are relevant from the target group's perspectives and can be exploited for an early demonstrations creation, even if the DILIGENT framework is far from being completed than.

More complete demonstrators will be available in the second part of the project when the system will be released, at least in alpha version.

Finally a complete Demonstration Environment will be created starting from the Beta release of the system and made available to general public.

Core partners involved in the Demonstration since the first stage are fully involved in project development and they have links with internal users as well as potential target markets and external communities. In particular:

- CNR-ISTI appointed the Project Technical Support Manager and leads the development within the WP 1.2 Diligent Collective Layer;
- FhG/IPS I appointed the Validation Manager and leads the Content & Metadata Management and the User –Community specific applications WPs;
- ETH (now UMIT) is fully involved in Content Management and leads (as UMIT) the WP on Process Management.
- ENG appointed the Exploitation Manager and leads Exploitation WP and is involved in the implementation within WP1.2.

The creation of concrete demonstrators is essential for the promotion of project results and the deep understanding of exploitable results by target groups. A clear identification of users requirements (completed within related WPs) and the full analysis of target market (made in the Exploitation Work-package) identified a number of expectations and issues that have to be addressed.

A demo, depending on the features to be shown, will be make available on

- i) a CD or DVD as standalone application
- ii) a WEB CD as interface to the DILIGENT infrastructure
- iii) a Web application accessible from the DILIGENT web-site¹.

The following diagram represents the overall demonstration strategy:

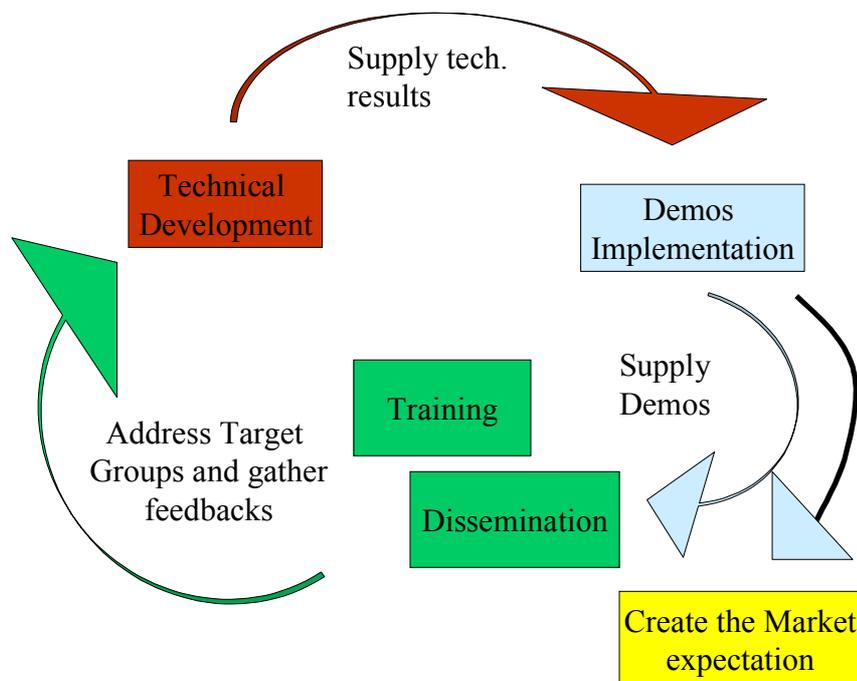


Figure 1 Demonstration Creation Strategy

Within the project a virtual cycle will be created when Training and Dissemination WPs are supplied with concrete demonstrators that support their objectives and allow gathering new requirements or the validation of the ones already addressed.

Using available demonstrators, dissemination of project results will be more effective showing working example of the project features. At the same time training activities will allow trained people to see how the system really works (at least for the feature covered by the demo). Both these activities could collect target groups feedback (positive and negative as well) that will be used by designers and developers to improve the DILIGENT solution.

In addition, each partner is to promote, outside the scope of the project, the research results and create the right market expectation that will enhance the commercial exploitation of DILIGENT could use the same demonstrators.

¹ Detailed design of each demonstrator interface has been left for the time when components will be really available.

2.2 A Business perspective

A business approach is crucial to avoid unappealing demonstrators or technical-oriented applications. The strategy adopted will be dynamically adapted depending on three variables i) the availability of technical results, ii) the customers groups' interests, iii) a commercial attitude.

In the following sub-paragraphs we describe the detailed analysis of these items.

2.2.1 Demonstrable results and their timing

The following table summaries the technical results usable for demonstration, along with the WP in charge of the development, the foreseen date of availability, and any constrain expressed by developers or authors for public demonstration.

All demos will be supplied with source code, developers and installation notes and user guide.

WP num	Component name	Component Feature (demonstrable mechanism)	API (language, URI)	Download code (URI, License references)	Release date
WP1.2	Hosting Node Manager, Package Repository, DL Management		Java	Available on BSCW (under GPL license)	3 rd quarter '06
	Hosting Node Manager, Package Repository, DL Management, DIS-HLS client, DIS-DiscoveryResource, DIS-Registry, MM e Catalog		Java	Available on BSCW (under GPL license)	3 rd quarter '06
	VDLGeneratorLogic, VDLDefinitionsRepository			Available on BSCW (under GPL license)	3 rd quarter '06
	DVOS		Java	Available on BSCW (under GPL license)	2 nd quarter '06
WP1.3	Content Security Service	Video Watermarking	Java/C++	Available on BSCW (under LGPL license)	2 nd quarter '06
WP1.4	Feature Extraction;	Batch feature extraction of plain image features;	Java;	Available on BSCW (under LGPL license)	3 rd quarter '05
	Search	Content-based image retrieval	C++/Java	Available on BSCW (under LGPL license)	2 nd quarter '06

This table is far from being completed and naturally expands when during project lifetime more exploitable results become available.

Regarding Licensing for each component for the time this deliverable was produced no formal discussion on DILIGENT licensing approach have been made; all partners consider

the open source approach as the most suitable for such preliminary results and have the intention to converge on an open source license. For some of the modules an LGPL could better support further development by commercial entities, rather than the classical GPL.

For a deep description of Open Source license, please, refer to D4.3.2 Exploitation and Sustainability plan.

2.2.2 Target groups requirements for Demonstration

Following the market segmentation made within the WP4.3 activities and reported in [3] potential customers for DILIGENT are listed in the following table:

Market segment	User group members	Segment characteristics	Comments
Libraries	Public and corporate libraries	<ul style="list-style-type: none"> Digital libraries are business critical Small budgets Large amounts of data and low computational requirements 	Familiarity with Digital Libraries, low IT competency.
e-Science	Private and public research organizations	<ul style="list-style-type: none"> Digital libraries are business critical Large budgets Large amounts of data and high computational requirements Requires different types and sizes of Digital Libraries 	Familiar with Digital Libraries, high IT competence, drives Grid development
Media/publishing companies	Private media companies and public broadcasters	<ul style="list-style-type: none"> Large amounts of data Unknown budgets 	Demand for Digital Libraries is questionable.

Figure 2 - Digital Libraries Market segments

For each market segments distinct target audience – hence interests – can be identified for demonstration purposes.

Following the DILIGENT DoW we organized preliminary interviews made with partners and their affiliate to identified the main interests of each category. Such interests have been discussed in the light of available Technical and User deliverables [1][2][6]. Such activity allowed to identified for each category their primary interests.

Developers

Developers are those members of a research organisation, which are in charge to develop a DL, or are involved in evolution or maintenance of a grid middleware. They are interested in demonstrations of technical DILIGENT features.

Demonstrations should be focused on

- How grid services are used to implement basic capabilities of a DL either from the perspective of a DL developer or a Grid-middleware architect and

- How to develop or integrate third-party services on DILIGENT platform (API, security mechanism, etc).

Decision-Makers

Decision-Makers are those people that have the responsibility to make strategic chooses comparing DILIGENT approach to other solution based on non-only-technical characteristics.

Each decision-maker will have it's own perspective that could vary strongly their interest in the technology. Nevertheless some common issue can be highlighted:

- Reduction of initial and maintenance costs or optimise overall IT expenditure;
- Reduction of effort to address users needs (or to improve number of final users);
- Valorisation of institution assets;
- Improving the user experience interacting with the institution;
- Address unsatisfied requirements.

End Users

End or Final users are the people that will experience the daily use of the system, uploading and accessing the information, creating new contents and exploiting the DILIGENT solution in their business work.

In general End users are interested to verify that:

- The new system services will perform in the same way, or better, than their previous system (fastest or better response);
- The new system reduce the user effort (or attention) in performing an activity;
- The new system allows the user to do more complex or other things while the old one not.

Market segments and target audience form a matrix of demonstrations that can support the identification of demonstrators to be realized (depending on budget and time available).

2.2.3 Some concrete cases

Different target groups have different interests and decision-making processes. For each of them a deep analysis have been conducted with several talk.

More interesting groups are presented below. For each are described the context of work, the developer requirements, the decision-makers perspective and user interests.

The ESA case

The European Space Agency has been using grid technology for a while now, executing time consuming multi-part tasks on their Grid On-Demand system. All these processes are related to image analysis and data integration. The so-called "products" are geo-referenced images with visual representation of historical data.

The nature of earth observation implies that huge amounts of data are produced daily and scalable systems are required to deal with this information. While the current On-Demand system provides scalable data analysis, ESA expressed the need for scalable information management.

Developers are internal (or external) software developers that have the role to maintain and improve the Information Infrastructure (the On-Demand system is not the only information infrastructure available in ESA). The main interest is in how to allow DILIGENT services to gather information or products (security and API features) from the Grid On-Demand system and how allow interoperability with DILIGENT and the LCG II/gLite internal installations.

Decision-Makers in ESA are department directors that actually are well aware about grid technology. Their main interest is in reduce the effort in organize and aggregate the data they have to accomplish their institutional objectives.

End-users are ESA people working on several departments that are using On-Demand System to access its "products". They're interest in have some (semi-) automatic way to produce different reports, aggregating existing information or "products". The most interesting issue is to update a "product" (i.e. a document containing some aggregated data and geographical references) with new (fresh) data or maps.

The RAI case

Rai Educational is a department of RAI, the Italian broadcasters, mainly dealing with educational challenges.

During the last years several tools and systems have been supplied to general public, two of them are particularly interesting for the DILIGENT perspective.

- "Mediateca" is the Multimedia content repository related to the transmission "Mediamente" that for six years presented technological, cognitive and societal aspects of ICT. In the Mediateca users can find interviews (in text and audio format), sample video, hyperlink to related contents either in the same repository or on the web.
- "Prometeo" is the Rai web site dedicated to secondary school teachers interested in select RAI educational content (mainly video) for their lessons. Through the web site the registered user select the content required filling a request form. The Rai backstage find the video, and plan it broadcasting through the satellite channel (hot bird 1 or 2), then contact by email the teacher to advice him/her of the date and time of the transmission.

The concept of Developers in RAI is very complex, in fact within this category we could consider either who develop the software application or who deal with the creation of a services and its design in terms of infrastructure (web site, TV or satellite channels, Archives, etc). While the former are often third-party software developers, the latter are RAI people with ICT and Media competences. We chose to address only the second group by which we consider useful the mechanism to improve multimedia management using the grid technology.

Decision-makers, as in ESA, are the directors of each department with their institutional mission and assigned budget. Their interest is in identifying the most economic solution to

address their objectives. A clear understanding of concrete interest has not been possible since no interview was possible to organize with such figures.

End-users of RAI Educational services are the general public, primary and secondary teachers, academic researchers on Visual Arts, History, Social studies, Communication techniques, thus non-IT experts, that are interested in the quality of services (performance in accessing and retrieving the expected content, usability of the interface).

The SNS case

Scuola Normale Superiore is a university in Pisa, specialized in Humanities and strongly active in the historical field. One of the main interests is related to the ARTE project, a national initiative funded by MIUR, the Italian Ministry for Higher Education and Research. *"This is a community of scholars, distributed all over the world, who have decided to start working together in order to set up the basis for a new research discipline that merges together experiences from the medical, humanity, social science, and communication research areas"*[5]

In the SNS environment developers are only third-party programmers that are called on-demand to realise the required applications.

Decision-makers are professors and chief departments that at different levels have the autonomy to select the most appropriate tool to support their educational and research activity. Both figures are strongly interested in the reduction of costs in sharing resource and facilities within several research projects, and along different departments.

End Users are students, researchers and professors not experts in IT that look for – at least – the same facilities they have with their usual information system. Again, the key factors are related with the usability of the interface and the performance and quality of service supplied.

The EGEE case

About 70 institutions between research centres, academia and industries compose the EGEE project. The main objective of the EGEE project is to support the amount of data produced, and their consequent processing, by the Large Hadron Collider that will start its activities at CERN from 2007.

Within the EGEE activity the Joint Research Activity 1 (JRA1) is dealing with the integration and evolution of existing grid-middleware to create a unique, homogeneous grid-layer, generally considered the parent of the future European grid middleware.

Another Joint Research Activity (JRA3) is related with security issues: i.e. certificates, secure storage, multi-institutional access.

Within JRAs we have identified our target audience.

Developers are ICT people of several institutions involved in the extension of existing grid services or in the development of completely new one. They are interested in the experience of using their components, to detect possible errors, wrong performing, etc ...

Decision-Makers are designers of the components and the architects of the possible evolution. They have required to understand how gLite services are used within different application and scenarios, which features are useful, which not and which are needed in future releases.

End-users are other gLite communities using the middleware for their application. They're mainly the other Virtual Community within the EGEE project and the others in related initiatives (SEE-grid, Nordu-grid, Balkan-grid, etc). They're interested in experience the way we use gLite how we manage security, user management, and how we develop grid-services on top of the basic gLite services.

2.3 Demonstrations selection

Analyzing target group's interests and the technology development plan (which is an internal document not publicly available) we have identified some concrete demonstrators that could be created in the next phase of the project.

Some demonstrators have been selected to be usable with different target groups and will be designed to be cross-domain, in order to reduce the effort and investment required.

Following an iterative process partners involved in the technical activities proposed basic components that could be used and partners involved in target audience analysis identify useful scenarios based on these components. The result is an initial set of demonstrators that cover some of the requirements expressed by target groups but that cover all those groups.

The following table summarizes these findings:

	Cultural Heritage	E-Science	Multimedia	
Developers	Dem 1. <i>"Dynamic Service Instance Deployment"</i>			
	Dem 6 <i>"Identification and Configuration of Dynamic Services"</i>			
	Dem 7 <i>"User management and Security mechanism using Grid"</i>			
			Dem.4 <i>"Video Format Conversion using Grid"</i>	Dem. 2 <i>"Watermarking and Encryption of Videos"</i>
Decision Makers	Dem. 3 <i>"Batch Feature Extraction"</i>			
End-Users	Dem 5 <i>"Content-based Multimedia Retrieval"</i>			

All these demo will be included in the final demonstrator that will be an installation of the DILIGENT Beta release of a dedicated infrastructure for public access.

A detailed description of each demonstrator will be give in the next chapter.

2.4 Demonstration timetable

2.4.1 Demonstrators GANNT

Depending on components availability each demonstrators will be available at the end of the development period represented in the following GANNT.

	2005				2006				2007			
Demonstrators												
Dem.1												
Dem.2												
Dem.3												
Dem.4												
Dem.5												
Dem.6												
Dem.7												
Complete demonstrator enviroment												

Starting from the end of 2005 some demonstrators will be available mostly trough the web site. Most of them will be released in the second half of 2006 and with the release of the Beta version of DILIGENT framework a complete demonstrator will substitute all the previous demonstrators supplying the users with a unique environment to experiment DILIGENT capabilities.

3 DEMONSTRATORS DESIGN

This chapter is dedicated to the high level design of demonstrators chosen. For each demonstrator the objectives and the scenarios of potential usage, the content selected for a real-world running, the audience to which is foreseen, the design itself in terms of components and their interactions as well as the success indicators as concrete measure of the usefulness of the demonstrator are described.

3.1 Demonstrator 1: “Dynamic Service Instance Deployment”

Objectives and scenarios

This demonstrator aims at demonstrating that location and re-location of a Web Service (WS) on a cooperating remote host is feasible and makes it possible to simplify the management of a Service Oriented Application developed on top of a grid middleware. This demonstrator will i) transport a packaged WS together with all required libraries to a remote host; ii) reserve the hosting resources for a given period of time; iii) personalize the WS by selecting the appropriate security descriptor; iv) deploy it in the container; and, finally, v) activate it.

The demonstrator will be executed in the following different scenarios:

- Scenario 1: the WS will be located on a predefined host. All the steps described above will be performed and a WS call will be performed in order to verify that the WS is up and running.
- Scenario 2: the WS will be located on a predefined host. All the steps described above will be performed and a WS call will be performed in order to verify that the WS is up and running. After that, the WS will manually be de-activated to simulate any problem that could occur in the communication network or on the hosting server that will impede the access to the WS. The WS will automatically and dynamically be re-deployed and activated on another cooperating remote host to demonstrate the capabilities of the services to maintain alive controlled WSs.

Content Selection

The demonstrator itself will use no content. Eventually the WS could manage some content that will be provided as needed, without specific criteria, since the feature under demonstration is not the one supplied by the WS chosen.

Audience aggregation

The demonstrator is mainly addressed to developers of any target groups. It aims at demonstrating that well packaged WS's could easier be deployed in a grid environment using the services of the DILIGENT Collective Layer.

Such a demonstrator will be available from the project web site as web application and will target:

- High-level services developers of the DILIGENT developers community
- The gLite development and design team

- Other middleware designers and developers
- Grid application developers, such as the ETICS team.

Demonstrator design

The demonstrator will be designed to exploit the capabilities provided by the Hosting Node Manager, by the Package Repository and by the DL Management services. Also the capabilities provided by the Information Service and by the Broker and Matchmaker developed by the DILIGENT Collective Layer will be used in order to support the Scenario 2. The demonstrator will include the following main steps:

- Detailed design of the demonstrator scenarios.
- Deployment of the services required by each scenario. These will be provided by the DILIGENT Collective Layer.
- Design and implementation of the human interface to interact with the services of both scenarios. This interface will make it possible to activate the selected scenario, to monitor the different steps involved in the experimentation, and finally to interact with the deployed service.

Success Indicators

The interaction with a remote web service deployed on demand is the indicator of the success of the experimentation for the first scenario. For the second scenario, the monitoring of the activities and the automatic re-deploying of the web service constitute the indicator of the success of the demonstrator. Both scenarios will demonstrate that:

- Automatic deployment in a cooperative environment is feasible
- The Collective Layer services are able to improve the resilience to failures in a geographically distributed environment.

3.2 Demonstrator 2 “Watermarking and Encryption of Videos”

Objectives and scenario

The Grid offers opportunities to deal with large amounts of data and to process it with the combined computational power of the grid constituents. Watermarking of audiovisual content offers a challenge where the strengths of DILIGENT can be demonstrated.

This demonstrator will show how DILIGENT will handle the securing of the copyright together with the distribution of an audiovisual. To achieve this goal, algorithms for watermarking and partial encryption have to be designed and then implemented on the grid. The key points in this scenario are as follows:

1. Specified parts of the video (the key frames) are marked by watermark algorithms without visual degradation of the content during the watermarking process. The key frames are the most important elements of the video material. The hidden

watermarking messages can be detected and verified to get the copyright holder of the video or to detect manipulation of the video material.

2. The altered content can now be partially encrypted, by using either a symmetrical or asymmetrical encryption system on specified content of selected frames.
3. The above encoding tasks can be "gridified" by splitting the video into smaller chunks, sending corresponding jobs to the computing nodes on the grid and afterwards gathering their results and then save this content in the grid. In addition to the decoding and gathering of the content, the Grid can also offer on-demand viewing of the rendered and distributed content.

The demonstrator will show two advantages: a) the speed-up of the de- and encoding process by taking advantage of the computational power of the grid, and b) the freeing of the storage and computational resources of the viewing computer.

Content Selection

The content used for the demonstrator will be identified from public (RAI and SNS) or user-supplied contents. Most of the content will come from the ARTE scenario.

Audience aggregation

Decision makers will be interested in this demonstrator, since it will show that their content can be saved and protected and this is accomplished in a fast and convenient way. Also end-users and developers could show interest, because the former can experience the little resource consumption and the easy access to the content and the latter can understand how to gridify a typical DL services.

Demonstrator design

The following DILIGENT components will be used to built the demonstrator

- Content Management (WP 1.3)
- Certification Authority
- (gLite-based) Computing Node

This demonstrator fits well into the gLite infrastructure, since the main task to be performed can be divided into smaller subtask and then parallelized (using the job-support of gLite) on the Computing Elements (CE) on specific chunks of data.

A job for a CE is a stand-alone service, which gets video data and the watermark or encryption information as input and provides the encrypted data as output. The input data are data chunks in form of readable video data. After the embedding process the marked video data is send back to the node, which distributed the data before the embedding. The complete video file can be reconstructed by decoding all watermarked and encrypted data chunk and then assemble them in the right order.

Success Indicators

A benchmarking will be performed running on the same content the same algorithms in a stand-alone server having the same characteristics of the best server hosting a Working Node (WN).

In this way we demonstrate, not only the feasibility of a watermarking and encryption mechanism in a grid environment but also even the improvement of performance that can be derived using the grid approach.

Tests will be made using several configuration of WNs and CEs. It will be studied the application performance depending on the number of WNs or the configuration used.

3.3 Demonstrator 3 “Batch Feature Extraction”

Objectives and scenario

The idea of this demonstrator is to exploit primary Grid advantages over non-distributed architectures in efficient batch processing. In detail, feature extraction of raw multimedia content enhances efficient content-based multimedia retrieval that employs multi-dimensional access structures such as the VA-file to accelerate search operations. The demonstrator will provide two distinct feature extractor components (CIELAB color histograms, texture analysis) for image data. Those components will be deployed in different configuration scenarios:

- Scenario 1: Both feature extraction components will be jointly deployed on all nodes. That is, the workload of extracting features from a set of images can be partitioned across all nodes. This scenario is beneficial if data transportation costs are high or image documents stem from distributed storage nodes where feature extraction should be conducted close to/on the respective storage resource.
- Scenario 2: Disjoint subsets of the nodes will be exclusively equipped with one feature extractor, only. That is, each image must be sent to two nodes, each one hosting a distinct feature extraction component. This scenario will turn out to be rewarding if data transportation costs are low but processing power on the participating nodes is restricted.

Content Selection

Even though there is no explicit requirement for demonstrating this feature, only images that permit a meaningful search over color histograms and texture features should be considered. In other words, feature extractors must match (1) the document domain and (2) the desired semantics of search operations.

The feature extractors will initially be applied to UMIT’s existing image archives. This decision alleviates the creation of the demo and permits us to test it without introducing further dependencies on DILIGENT partners. Later, ARTE and ImpECt image archives will be studied upon their applicability with respect to our feature extraction components. Specifically, the effectiveness of feature-based search in their image archives will be consulted to decide on incorporation of additional feature extraction components into the demo.

Audience aggregation

This demonstration is mainly intended for decision-makers as it will be focused on efficiency issues (time and resource consumption of Batch feature extraction). End-users might also be interested in experiencing use of this feature, i.e. how to pre-process images for content-based retrieval.

Demonstrator design

Appropriate content originates from two sources. Back from (1) previous projects, UMIT maintains a large archive of multimedia content, including some 100,000 images, audio, and video files. Moreover, (2) the ARTE team has initially provided us with a small set of drawings that should be searched in.

“Batch Feature Extraction” is supposed to integrate well with gLite intrinsic job-based architecture. In that sense, both deployment scenarios can possibly be achieved by submitting jobs that ship a feature extraction executable (probably a Java binary) alongside the documents (image files) that are subject to feature extraction. As we intend to demonstrate “Batch Feature Extraction” in an early stage of the DILIGENT test-bed implementations, dependencies on other components should be minimized. In particular, we will initially not store the features in the metadata repository neither retrieve the raw multimedia content from “Content Management”. System integration should be advanced when those components become available. In a later stage we also plan to equip “Batch Feature Extraction” with web service interfaces.

There is a trade-off between proper system integration (depends on maturity of the DILIGENT test-bed) and early demonstrator capabilities. Thus, the “Batch Feature Extraction” demo will be split up into two phases, firstly being a loosely coupled component that only interacts with gLite and then being a more tightly integrated version that invokes services from other DILIGENT components.

Success Indicators

A benchmarking will be performed running on the same content the same algorithms in a stand-alone server having the same characteristics as the best server hosting a WN. In this way we demonstrate, the improvement of performance that can be derived using the grid approach.

Tests will be made using several configuration of WNs and Ces to derive. It will be studied the application performance depending on the number of WNs or the configuration used.

3.4 Demonstrator 4 “Video Format Conversion”

Objectives and scenario

One of the main problems occurring in RAI Educational daily activities is the coding/decoding of audiovisual files for distribution purposes. Changing format of videos can be a time consuming activity for PC users. For example we verified that a DVD project performed by the Apple program iDVD run 437 minutes (about 7,5 hours) on a Powerbook G4 with 1,33Ghz CPU and 256Mb Ram.

The aim of this Demonstrator is to show the improvement of performance for the creation of a .mov file integrating video (with format exchange) text and audio.

Content Selection

The content used will be identified from public or user-supplied contents (mainly video and images of RAI Educational).

Audience aggregation

This demonstrator is mainly addressing Multimedia community interests. Within this community all the three target groups can find specific topic of their interest.

In particular developers could understand how to manage coding-decoding algorithms on a grid environments, managing the certification and the security mechanism to run their algorithms (as a pool of jobs).

Decision-makers and End-users will find interesting features as the reduction of the elapsed time.

Demonstrator design

The following components/services will be used to built the demonstrator

- DVOS (Wp 1.2)
- Engineering Certification Authority
- Engineering (gLite-based) Computing Node and Storage element
- CODEX algorithms
- CONDOR-G
- GLOBUS TOOLKIT

The demonstrator will be created exploiting the Authentication and Authorization features of DVOS. A CODEX algorithm supplied by the Media Division of Engineering Research and Innovation Direction will be gridified as a DAG of Jobs using CONDOR-G.

Then the following mechanism will be experimented:

- Storing an audiovisual content on a storage element.
- a service in charge to run the CODEX-DAG will ask a certificate to the Engineering Certification Authority,
- then it will obtain access to CE and
- will submit the CODEX-DAG transferring it from the Storage Element where is stored.
- It will monitor the execution of the DAG and
- it will move the result to the storage element of the users, supplying them with the advise of completed job.

Success Indicators

The success indicator of this demonstrator is essentially the reduction of time in performing the CODEX algorithms. Performance are already known from daily activity with customers against which will be compared the resulting performance of this scenario.

3.5 Demonstrator 5 “Content-Based Multimedia Retrieval”

Objectives and scenario

Content-based multimedia retrieval is an attractive demonstration scenario, both from a Grid and a DL perspective. The Grid perspective is covered by efficiency enhancements through distributed feature-based multimedia retrieval. State-of-the-art access structures like the VA-file allow for distribution of the search workload by disjoint logical partitioning of the indexes. The DL perspective is covered by effectiveness of content-based multimedia retrieval (multi-feature-multi-object-queries) where documents lack textual descriptions (or enhanced selectivity if they come with textual descriptions).

Currently, UMIT provides the ISIS multimedia retrieval system, which is an instance of our Grid infrastructure OSIRIS. Since OSIRIS differs from the architectural approach of gLite (service vs. job-oriented), a first iteration of this demonstration is to open up components of ISIS (like search and UI) and equip them with DILIGENT-aware interfaces (i.e. web services). Then the ISIS search service will be integrated into DILIGENT search functionality (through the external index interface).

We are still sorting out how to integrate OSIRIS and ISIS into the DILIGENT architecture. OSIRIS comes with an own GRID layer and service interactions (no web services, though) whereas gLite is job-oriented. Our idea is, thus, to equip ISIS with a web service interface for the CBIR service, whereas ISIS will have been split up into its functional components (basically: feature extraction, indexing, query composition, distributed searching, relevance feedback, and presentation modules) to be partially integrated into the DILIGENT test-bed. Most likely, search services of ISIS will be coupled through the external index facilities of WP1.4.

Content Selection

A small data set of images (black-and-white drawings) from the ARTE scenario has been made available. We used that data stock to test our retrieval effectiveness for the ARTE end-user community. Though the restricted set of images (<200) does not permit any universally valid statements, some impressive results could be achieved despite of the limitations in number and format of the provided documents.

Audience aggregation

Many aspects of content-based multimedia retrieval are very attractive for end users as it usually comes with a user interface that permits to formulate queries in a query-by-example manner, i.e. uploading query documents (images, audio files). Besides, also decision makers and programmers might be interested in this demonstration as it (1) stresses the efficiency of Grid-based search and (2) points out interfaces to integrate this functionality into own services. In particular, similarity search is an I/O and CPU intense operation where parallel resources can tremendously speed up answering time (making it appropriate for interactive use, at all).

Demonstrator design

The demonstrator will initially be a web-based instance of ISIS that has no further dependencies on other DILIGENT components. Later the demonstrator will be split up into OSIRIS components with web service interfaces that can be accessed by "Search" (WP1.4) through the external index interface and may use "Content Management" to access its index files and materialize query results (if needed).

Success Indicators

A benchmarking will be performed running on the same content the same algorithms in a stand-alone server having the same characteristics of the better server hosting a Working Node. In this way we demonstrate, the improvement of performance that can be derived using the grid approach.

Tests will be made using several configuration of WNs and Ces to derive, if possible, a general function of performance depending on the number of WNs or the configuration used.

3.6 Demonstrator 6: "Identification and Configuration of Dynamic Services"

Objectives and scenarios

The demonstrator will be created taking into consideration a simplified scenario to avoid unnecessary complexity. In particular we consider that:

- a) you have a set of Web Services (WS) tailored to provide digital library functionalities;
- b) These WSs are described in and their properties are available through the Information Service;
- c) Some of these WSs are configurable with respect to a given number of known parameters;
- d) There exists a Digital Library definition that has been provided by a user to satisfy the needs of a specific user community;

This demonstrator aims at demonstrating that the identification and the configuration of the set of WSs able to satisfy the user request can automatically and dynamically be done by exploiting the formal representation of each WS and the reasoning capabilities of the services provided by the DILIGENT Collective Layer.

The demonstrator will be executed in the following different scenarios revealing different constraints and validating the performance of the software.

1. each WS provides a specific functionality that is not provided by any other service; each WS can be configured in at least two different and alternative modes; the DL definition can be satisfied by a subset of the available WSs.
2. the same functionality is offered by at least two WSs, WSs can be configurable or not, the DL definition can be satisfied by more than one subset of the available WSs.

3. the same functionality is offered by at least two WSs (WSs can be configurable or not) the DL definition can not be satisfied completely by any subsets of available WSs.

Content Selection

The WSs used in this demonstrator will be prepared and made available by the CNR-ISTI. However all services prepared as DILIGENT packages might be used in this demonstration.

Audience aggregation

The demonstrator is mainly addressed to developers. It aims at demonstrating that I) well described WS's could easier be selected to satisfy the needs of specific user communities and ii) a complex Service Oriented Architecture could automatically and easier be designed by using the services of the DILIGENT Collective Layer.

Demonstrator design

The demonstrator will be designed to exploit the capabilities provided by the VDLGeneratorLogic and by the VDLDefinitionsRepository, as well. The former is in charge of automatically identifying the DL components/resources needed to fulfil the user requirements. The latter will host the DL definitions for the three scenarios.

Also the capabilities provided by the Information Service developed by the DILIGENT Collective Layer will be used in order to support the scenarios. The preparation of the demonstrator will include the following main steps:

- Detailed design of the scenarios.
- Deployment of the services required by each scenario. These will provide by the DILIGENT Collective Layer.
- Description of the WSs and their registration in the Information Service.
- Design and implementation of the human interface to interact with the services of the scenarios. This interface will make it possible to activate the selected scenario, to monitor the different steps involved in the experimentation, and finally to visualize the result of the experimentation.

Success Indicators

The identification of which WSs are required to satisfy the user requirements and their correct configuration are the indicators of the success of the demonstrator. For the second scenario, the identification of an ordered list of WS sets and their configuration are the indicators of the success of the demonstrator. Finally, for the third scenario, the identifications of an ordered list of WS sets, their configuration, together with the list of discarded requirements are the indicators of the success of the demonstrator. All scenarios will demonstrate that:

- a) The identification and the configuration of the set of WSs able to satisfy the user request can automatically and dynamically be done by exploiting the formal representation of each WS;

- b) Contrasting requirements or requirements that cannot be satisfied can automatically be identified.

4 CONCLUSIONS

The document contains the preliminary plan for demonstrations activities. Such activities will be conceived to be constructed upon technical results as soon as they will be available and to serve dissemination and training activities to promote project results with concrete example of the RTD findings.

A timeline for their production and a detailed design of each of the initial demonstrators have been defined and will guide the rest of the project for Demonstration activities. When the whole system will be available (Beta version) a full-version of it will be installed for a complete demonstration of the system capabilities.

4.1 Evaluation of Process & Results

This document is the result of the task 4.4.1 User demos requirements gathering and design that has involved all the WP participants. Each partner in relation to its competences and role in the project has analyzed target group interests (by informal interviews, project deliverables, public documentation, past experience, identifying a useful minimal set of demonstrators. A formal questionnaire for the interviews even if it could result in a more complete a rigorous analysis was considered out of the scope of this WP as it was considered not useful at this stage of the project.

The whole process started in May, lasted for three months and involved users present in the project as well as other potential users related to each partners by different relationships (e.g. customers, other project collaborations).

Demonstrators identified cover all the market segments and the audience groups. Their effectiveness will be validated later on in the project.

4.2 Further Work

As reported in the plan for the next phase of the project (2nd year) the Demonstration activities will be concentrated to the creation of demonstrators for each target group. Partners have been assigned to each demonstrator and will be coordinated and monitored by the WP leader.

Starting from M18 other partners will be involved in the creation of the identified demonstrators and in the implementation of the complete demonstrator.

A.1 References

- [1] D2.1.1 ARTE scenario requirements analysis report
- [2] D2.2.1 ImpECt scenario requirements analysis report
- [3] D4.3.2 Market and Technology trends Analysis
- [4] Diligent Description Of Work
- [5] The ARTE project – <http://www.sns.it>; & DILIGENT DoW, Part B, p.55
- [6] D.1.1.1 Test-bed Functional specification

A.2 Acronyms

Acronym	Term Description
API	Application Programming Interface
BSCW	Basic Support for Cooperative Work
CD	Compact Disk
CE	Computing Element
CIELAB	Commission Internationale de l'Eclairage – L*a*b metric
CPU	Central Processing Unit
DAG	Direct Acyclic Graph
DL	Digital Library
DoW	Description of Work
DVD	Digital Versatile Disk or Digital Video Disk
DVOS	Diligent Virtual Organization Support
EGEE	Enabling Grid for E-science
EU	European Union
GPL	General Public License
Ghz	Giga Hertz
JRA	Joint Research Activity

Acronym	Term Description
IST	Information Society Technologies
IT	Information Technology
ICT	Information and Communication Technology
LCG	Lhc Computing Grid project
LGPL	Lesser General Public License
RAM	Read Access Memory
RTD	Research and Technical Development
SOA	Service Oriented Architecture
VDL	Virtual Digital Library
VO	Virtual Organization
WN	Working Node
WP	Work Package
WS	Web Service