Laying the foundations for next generation collaboration and knowledge management environments through the realisation of on-demand Digital Libraries over Grid enabled infrastructures.

Project Information:

Title: A DIgital Library Infrastructure on Grid ENabled Technology

Start date: September 1, 2004

Duration: 36 months

European Commission Contribution: €6,300,000

Administrative and Financial Coordinator: ERCIM

Technical and Scientific Coordinator: CNR-ISTI

Diligent

A DIgital Library Infrastructure on Grid ENabled Technology

Objectives

The DILIGENT project aims at supporting virtual research groups by providing the knowledge infrastructure that manages a network of shared resources (archives, database, and software tools) and enables creation of reliable and secure Digital Libraries (DL) on-demand.

More specific objectives are the following:

- ✓ to open up Grid technology to a broad range of research and industrial communities;
- ✓ to broaden the diffusion of Digital Libraries, which are so far restricted to large organisations, by supporting a cost-effective digital library creation and operational model;
- ✓ to promote cross-fertilization between the Digital Library and Grid technology domains that will foster synergies and advances in both areas

Test-bed

The infrastructure comprises hosting nodes, content and application resources provided by the project participants and by collaborating organisations. Its component services will use the EGEE infrastructure for carrying out the computational and storage intensive tasks

Technical Approach

The DILIGENT infrastructure is composed of a set of interacting services providing:

i. a number of typical Digital Library functions, like search, annotation, personalisation, document visualisation;

ii. access to information sources and applications provided by third-parties

iii. features necessary for handling the shared content and application resources; and

iv. support for the creation and operation of on-demand, transient Digital Libraries. These services will exploit the high computational and storage capabilities of the Grid infrastructure released by EGEE project in order to support complex and time consuming functionalities.

Applications

DILIGENT will serve a multitude of application needs. Project experiments include the creation of Digital Libraries for support activities, i.e. organisation of conferences, preparation of projects and periodical reports and course handling

DILIGENT establishes a knowledge management infrastructure based on standards and integration of state-of-the-art Digital Libraries and Grid technologies, capable of serving a heterogeneous range of research and industrial applications, allowing members of virtual research groups to access shared knowledge and collaborate in a secure, coordinated, dynamic and cost-effective manner.

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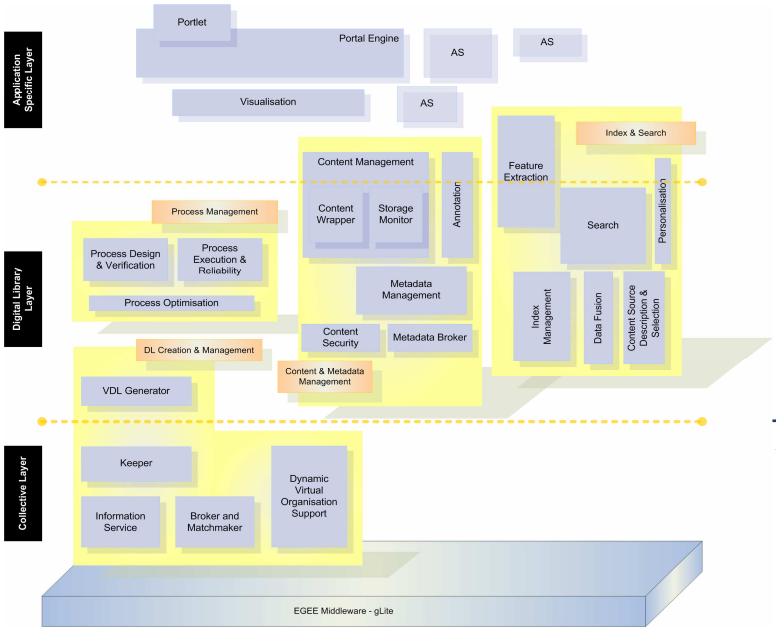
- ✓ The DILIGENT **Collective Layer** group of services provides the functionality to support both the dynamic construction and maintenance of transient Digital Libraries and the controlled sharing and management of the resources that are used to implement them.
- ✓ The **Content and Metadata Management** components provide traditional data management services on top for Grid infrastructure. There will be added advantage of using the same infrastructure for supporting different Virtual Digital libraries (VDL), and allocating resources on demand. Furthermore the base annotation service ensures consistent and distributed annotation handling.
- ✓ The **Index & Search** group of services provide powerful Digital Library Management system Information Retrieval facilities on top of structured, semi-structured and unstructured data. Within the DILIGENT platform, advanced personalised Search facilities are being aided by classic constructs such as indices, non-traditional Computational Intelligence technologies, such as advanced feature extraction and content source description and selection and a powerful substrate of services that manage infrastructure resources in an efficient manner.



Architecture

DILIGENT architectural approach builds a stack of logical layers on top of EGEE middleware, achieving the desired modularity and decoupling from the underlying middleware.

- ✓ **Process Management** group of services builds the functionality necessary to design , execute and manage completely new, more elaborate, services by re-using existing services and "plugging" them together into "**Compound Services**" (**processes**) thus providing more sophisticated functionality. These processes can not only be created by users but are also an integral part of the DILIGENT infrastructure, where processes are used to maintain the system in a consistent state.
- ✓ **Application Specific group of components and services** aims to implement the end-user **applications** for two specific scenarios identified in DILIGENT: The ImpECt and the ARTE scenarios. These applications will be built using the services made available to the Application Specific Layer (ASL) by the underlying Digital Library Layer (DLL) and the Collective layers in the DILIGENT Architecture. In addition, visualization support for user-specific services will be made available.

Collective Layer

The Collective Layer will enhance existing Grid collective services with the functionalities able to support the complex services interactions required by the Digital Library Layer. The Collective Layer will contain services that are not associated with any one specific resource but rather are global in nature and manage interactions across collections of resources.

Digital Library Layer

The Digital Library Layer will select, integrate and enhance a set of reliable and dependable production-quality services, developed in DL projects and applications, in order to cover the fundamental functionalities required for any application in the e-knowledge area. The DLL will provide submission, indexing and discovery of mixed-media objects (documents, videos, images, environmental data, etc.), and the management and processing of these objects through annotation, composition, cooperative editing, etc. It will also support the dynamic creation and access to transient VDLs.

Application Specific Layer

The Application-Specific Layer will produce specifications, API, and SDK that will enable third party providers to migrate their data or functional components to the DILIGENT framework. The ASL will facilitate the plug-in of legacy components needed to support user-specific scenarios, and will enable the re-use of existing content and applications.

** Images presented come from the ARTE archives and the EU and ESA public image galleries*