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Editorial

Welcome to the ninth Kaleidoscope Learning Grid SIG newsletter.

We are now more than half way through the initial lifetime of Kaleidoscope and so also of the Learning Grid SIG. This seems like a good point to take stock and review how far the vision of the Learning Grid has progressed towards becoming reality during this time, so we have a featured article from our colleagues at CRMPA reviewing what progress has been made over the last two and a half years.

One of the technologies that has been the focus of much research and development over this time is the Semantic Web and the use of Semantic Web services. This is the focus of the other featured article in this issue, from colleagues at the Open University of Catalonia. This interesting article firstly gives a survey of technologies related to Grid learning frameworks, including the relevant protocols, standards and languages that provide tools and methods for the semantic description of Grid services. Clear semantic description of learning services will be an essential aspect of any Grid-services based learning system, and in the second part of the article the authors go beyond the survey material to present an initial proposal for a model for semantic description of Grid-based learning services.

Our research project review this issue is of the *Lifelong Learning In London for All (L4All)* project, which has created a pilot system that successfully combines web services to provide a system that supports the organisation of lifelong learning opportunities. Developments such as

the L4All system explore the possibilities for learning service composition, and so help to show the range of possibilities for future Grid-service based learning systems.

Activity in the areas of Grid, Semantic Web Services and Learning is flourishing, so we conclude this issue of the newsletter with a bumper-sized selection of events coming up over the next few months in the "When, What, Where?" section.

Another recent development for the Learning Grid SIG is the unveiling of our new website, which is located at:

grid.noe-kaleidoscope.org

Here you will find a record of all the SIG members, along with details of workshops, conferences and other relevant events. This is also the place to go if you have missed any of the earlier newsletters, as all past issues can be downloaded from the site.

Finally, a reminder that coming up in Barcelona in October is the workshop organised by the SIG as part of e-2006. You can find details in the News section of the previous newsletter (issue #8). A further call for papers connected to the same event (but sponsored by the EleGI project) is included in this issue.

Kevin Keenoy
Learning Grid SIG Member

Learning GRID SIG: State of the Art

Featured Article by Nicola Capuano.

The purpose of the Learning Grid SIG of Kaleidoscope is to contribute to the definition of open, distributed and pervasive environments for effective human learning where learning is a social activity consumed in dynamic Virtual Communities based on communication and collaboration and learners, through direct experiences, create and share their knowledge in a contextualized and personalized way. This article tries to synthesize the achievements of the first two years of SIG work also presenting SIG plans for next years.

Introduction

The Learning GRID SIG of Kaleidoscope investigates on how GRID technologies can be exploited in future learning scenarios to support the learning processes by allowing learners to collaboratively use online resources, by facilitating and managing dynamic communication with other people and agents on the GRID and by designing and implementing dynamic learning virtual organizations. The SIG also works on the concept of learning services and their deployment through GRID technologies.

SIG researchers cooperate to give a common answer on open issues about Learning GRID including the definition of new learning paradigms based on experiential, collaborative and contextualized approaches to exploit GRID technologies for addressing heterogeneous interoperability issues; the use and the extension of GRID technology for implementing Virtual Organizations to support the new emerging learning scenarios (collaborative virtual learning communities); the definition of evaluation models and strategies able to assess the efficacy and the effectiveness of GRID based learning models and systems.

SIG activities started in January 2004 on two main lines: research and networking. The main aim of the **research line** is to pursue a common research program aimed to the resolution of the above mentioned issues allowing the full exploitation of GRID technologies for effective human learning. The main aim of the **networking and dissemination line** is to share SIG findings inside and outside Kaleidoscope boundaries in order to favour an in-depth understanding of the advantages offered by distributed and GRID environments in applying innovative learning para-

digms and as enabling technology for creating dynamic Virtual Organisations.

Research

From the research point of view, main SIG achievements in these first 2 years and half of work can be summarised in the two points below.

- **Definition of challenging scenarios for distributed service-oriented e-learning.** Several futuristic learning scenarios that aren't realizable with the current platforms/tools for distance learning have been defined, advantages introduced from a pedagogical viewpoint have been described, necessary features/services have been scratched, business benefits/drivers/needs have been emphasised. Scenarios have been published in the second and fourth issues of the quarterly newsletter (available on-line on the SIG Web site [1]).
- **Analysis of technologies and definition of a methodology for creating distributed, service-oriented e-Learning environments.** A common set of concepts and terms that can be used in conversations about e-learning infrastructure were defined; the need for a service-oriented approach in the context of e-Learning was justified; the nature of a service-oriented framework and its benefits for education was clarified; a methodology for constructing service-oriented e-Learning frameworks was defined; services to address the most pervasive challenges existing in education as a requirement to exploit the benefits of a service-oriented framework was defined; possibilities in developing an international service-oriented e-learning framework to extend the scope of the existing needs in education was explored. The analysis document is available on the SIG Web site.

Networking and Dissemination

From the networking and dissemination points of view, main SIG achievements can be summarised as follows.

- **Observatory.** An observatory on Grid technologies for learning to survey the field and report to the Kaleidoscope community through a Web site and a quarterly newsletter have been established. The observatory also have in charge of disseminating main technological and methodological findings of related projects and advancements in standardisation activities carried out by interna-

tional bodies such as the Global Grid Forum. The main output of the observatory is this quarterly newsletter.

- **Workshops.** An yearly workshop connected with main events in the GRID and TEL fields collecting and publishing reviewed papers on SIG topics coming from inside and outside SIG boundaries is organised. The 1st International Kaleidoscope Learning Grid SIG Workshop on Distributed e-Learning Environments was held in Hotel Oriente, Vico Equense (Naples), Italy the 14 March 2005. It was directed to Kaleidoscope members in order to give to the SIG internal visibility. Workshop proceedings was published on the Electronic Workshops in Computing of the British Computer Society and are available at [2]. Workshop presentations are available instead on the SIG Web site.
- **Networking.** Several networking activities have been organised till now including the establishment of connections with external projects and teams working on Learning GRID; the exploitation of the observatory newsletter as a mean to communicate advancements in the field among Learning GRID practitioners; the support to the organisation of joint events and the re-use and the integration of the work performed by different teams. Moreover the SIG is pursuing the building of a Grid for Learning Research Group inside the Technology Innovators Area of the Global Grid Forum.
- **Dissemination.** Several dissemination activities was performed in conjunction with conferences and events. Among the other things we organised a specific workshop inside the 1st International Kaleidoscope Symposium on Technology-Enhanced Learning held in July 2005 in Oberhausen; we presented SIG Results at Online Educa Berlin in December 2005 and at the International Conference on Computer Systems and Technologies in Varna in June 2005.

Future Plans

The main tangible result of the SIG by the end of the forth year will be a GRID technologies for TEL handbook that will try to give an answer to the main open issues for a deep exploitation of such technologies for effective human learning. In order to progress through this objective, next activities are described below.

From the **research** point of view, a survey of existing languages and frameworks for the dynamic composition of distributed resources and services with particular regard to e-learning re-

sources and services will be performed. The survey should include: methods of service composition spanning from workflow research (when the process model is defined) to AI planning (when there is no fixed process model but only a set of constraints and preferences), Web and GRID Service composition languages like BPEL4WS, BPML, WSCI, WS-CDL, DAML-S, learning resources and services composition languages like Learning Design, Simple Sequencing, EML and software frameworks allowing the dynamic composition of services.

From the **networking and dissemination** point of view, instead, our plans for 2006 include the production of an e-Learning Course on GRID Technologies to be delivered through the Kaleidoscope backbone and the organisation of the 2nd Learning Grid SIG Workshop "Next Generation in Technology Enhanced Learning" specifically targeted to industry and practitioners in the world of e-learning in the context of the e-2006 conference in Barcelona the 26 October 2006. An hypotheses of building a Grid for Learning Research Group inside the Technology Innovators Area of the Global Grid Forum will be also pursued.

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Nicola Capuano

CRMPA Centro di Ricerca in
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Semantic description of Grid-based learning services

Featured Article by Gustavo Gutiérrez and Thanasis Daradoumis.

Semantic Web Service technology promises to automate web service discovery, composition and integration, tasks that currently need to be performed manually despite the quickly increasing number of on-line services. The main goal of this article is to present a short survey of technologies related to Grid learning frameworks, methods for Grid services semantic description and an initial proposal model for semantic description of Grid-based learning services.

Introduction

The introduction of web services has fundamentally changed the way that software for learning is developed. A "service" is a network-enabled component. Like components, services in general (and learning services in particular) represent functionalities that can be easily reused without knowing the details of how the services are implemented. And, since Web protocols are completely independent across vendor, platform, and language implementations, the result is an application that is well integrated with the rest of the enterprise while being flexible enough to be modified as learning needs change.

The design of a Virtual Learning Environment (VLE) is based on several key characteristics. All other design details follow from these characteristics.

Distributed Services: The architecture of a VLE is based on a collection of distributed services, with each service (be it a component or an information source) providing one or more separately identifiable features for the user. The architecture makes no assumptions about the logical nor physical integration of services. Each service is considered to be independent and could be provided by one or more service processors located anywhere on the internet.

Open Communications: All components and services are interconnected via a messaging scheme. Messages (requests and responses) are XML data, and the messaging scheme is based on XML message encapsulation (e.g., SOAP, XML-RPC). All message formats and service protocols are published in an open directory, enabling any component to discover and communicate with any other component.

Standards Based: Whenever possible, the services, protocols and data formats should rely on established or emerging standards. Standards for core infrastructure and internet protocols are well established. Various application level standards are under development. In all cases, approaches that are compatible with an overall web model of distributed services and XML-formatted information bindings are preferred.

Web Interfaces: All components for use, operations, maintenance and content development must be accessible via web-enabled devices, using web protocols (http) for access.

COTS Components: Core components, such as database management, directory services, mail services, web server and web application servers are assumed to be available for direct use. In addition, application level services with appropriate interfaces are available or can be adopted for core services such as groupware, e-commerce, content management, news and event management.

Any Learning Services approach should be based on widely accepted technologies and commonly used standards. Standards for core infrastructure and internet protocols are well established. A variety of application level standards of the learning services infrastructure are under development (see Figure 1). In all cases, approaches that are compatible with an overall web model of distributed services and XML-formatted information bindings are preferred.

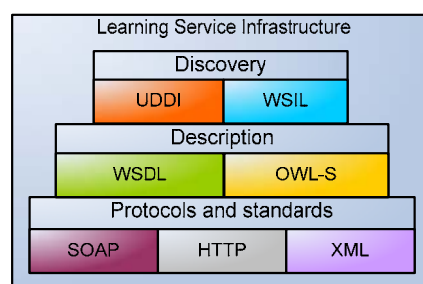


Figure 1

Some of the core concepts of the Web services approach include:

- Accessible over the Internet, Web services communicate through platform-independent Web protocols, facilitating the integration of heterogeneous environments.
- Web services standards define an interface and communication protocol that can be invoked from an application client or provided through a server.

- The Web Services Description Language (WSDL) adds a layer of abstraction between implementation and interface, providing a loosely coupled application that results in future flexibility.

Protocols and standards

In contrast to building large, closed, learning technology systems, the focus of the learning services architecture is on a flexible design that provides interoperability of components and learning content, and that relies on open standards (both learning technology standards and common web and network standards) for information exchange, behavior descriptions and component integration. Web services are built upon open, often already widely adopted standards. Typically, these standards are maintained by independent, non-profit standards organizations composed of a diverse membership. Some of the protocols and standards related to learning services are:

HTTP: The Hypertext Transfer Protocol (HTTP) is an application-level protocol for distributed, collaborative, hypermedia information systems. HTTP has been in use by the World-Wide Web global information initiative since 1990.

The HTTP protocol is a request/response protocol. A client sends a request to the server in the form of a request method, URI, and protocol version, followed by a MIME-like message containing request modifiers, client information, and possible body content over a connection with a server. The server responds with a status line, including the message's protocol version and a success or error code, followed by a MIME-like message containing server information, entity meta-information, and possible entity-body content.

XML: Extensible Markup Language (XML) is a simple, very flexible text format derived from SGML (ISO 8879). Originally designed to meet the challenges of large-scale electronic publishing, XML is also playing an increasingly important role in the exchange of a wide variety of data on the Web and elsewhere. By offering a standard, flexible and inherently extensible data format, XML significantly reduces the burden of deploying the many technologies needed to ensure the success of Web services.

SOAP: Simple Object Access Protocol (SOAP) is a standard that represents a lightweight "envelope" containing the message payload as it moves between service producers and consumers. It is an XML-based standard that describes the contents of a message and how to process

it, and offers a transport binding for exchanging messages.

Services Description Languages (WSDL)

In the learning services architecture, it becomes increasingly possible and important to be able to describe the communications in some structured way. Web Services Description Language (WSDL) is a new specification to describe networked XML-based services. It provides a simple way for service providers to describe the basic format of requests to their systems regardless of the underlying protocol (such as Simple Object Access Protocol or XML) or encoding (such as Multipurpose Internet Messaging Extensions).

A WSDL document defines services as collections of network endpoints, or ports. In WSDL, the abstract definition of endpoints and messages is separated from their concrete network deployment or data format bindings. A WSDL document is a document written in XML that describes a Web service. It specifies the location of the service and the operations (or methods) the service exposes. WSDL documents define a web service using the following major elements (see Figure 2).

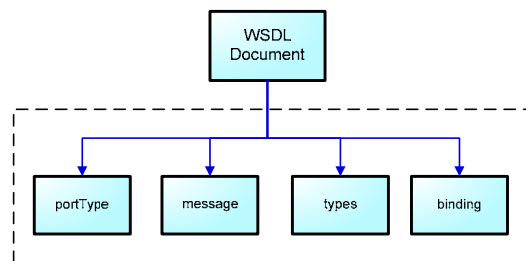


Figure 2

- The **<portType>** element is the most important WSDL element. It defines a web service, the operations that can be performed, and the messages that are involved. The port defines the connection point to a web service. It can be compared to a function library (or a module, or a class) in a traditional programming language. Each operation can be compared to a function in a traditional programming language.
- The **<message>** element defines the data elements of an operation. Each message can consist of one or more parts. The parts can be compared to the parameters of a function call in a traditional programming language.
- The **<types>** element defines the data type that are used by the web service. For maxi-

mum platform neutrality, WSDL uses XML Schema syntax to define data types.

- The <binding> element defines the message format and protocol details for each port. A WSDL port describes the interfaces (legal operations) exposed by a web service.

Semantic Web Services Description (OWL-S)

Semantic Web and Knowledge technologies provide an expressive and semantically enriched description of services through the use of ontology description languages such as OWL-S. They allow for the automatic selection, location and composition of services in order to achieve the required objectives. OWL-S is based on the Resource Description Framework (RDF), which integrates a variety of applications using XML for syntax and URIs for naming.

Semantic Web Service technology promises to automate web service discovery, composition and integration; these are tasks that currently need to be performed manually, despite the quickly increasing number of on-line services. The complexity of the reasoning tasks that can be performed with semantic web service descriptions is conditioned by several factors. First, all web services in a domain should use concepts from the same domain ontology in their descriptions. Otherwise the issue of ontology mapping has to be solved which is a very difficult problem in itself. This requires that domain ontologies should be generic enough to provide the needed concepts by any web service in a certain domain. Second, the richness of the available knowledge is crucial for performing complex reasoning. Therefore, the domain ontology should be rich in semantics. We conclude that such quality domain ontologies are at least as important as generic web service description ontologies. Despite their importance, few domain ontologies for web service descriptions exist and building them is a challenging task. A major impediment is the lack of guidelines on how to build such ontologies, what knowledge they should contain and what design principles they should follow. In the bioinformatics domain, for example, different communities used different approaches to build very different ontologies for semantically describing web services.

OWL-S is motivated by the need to provide three essential types of knowledge about a service, each characterized by the question it answers (see Figure 3):

- What does the service provide to prospective clients? The Service Profile describes what

the service does by specifying the input and output types, preconditions and effects.

- How is it used? The Process Model describes how the service works. This perspective is captured by the Service Model.
- How does one interact with it? The Service Grounding contains the details of how an agent can access a service by specifying a communications protocol, parameters to be used in the protocol and the serialization techniques to be employed for the communication.

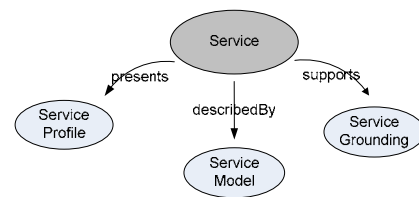


Figure 3

Grid Learning Services Characteristics

A Grid learning service is a granular functional component accessible to other applications via standard interfaces.

The abstract learning framework proposed by IMS Global Learning Consortium can be represented as a layered model, as shown in Figure 4, consisting of four layers:

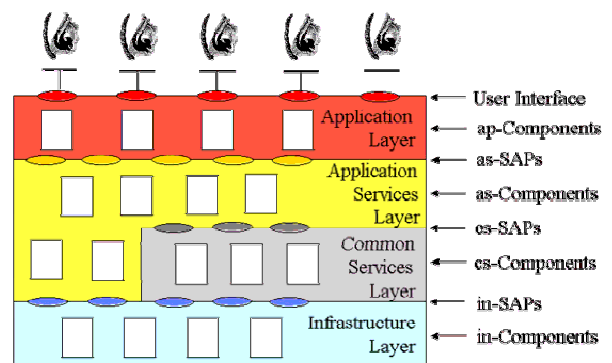


Figure 4

- Application layer - this is a tool, system, agent, etc. that presents the appropriate application services to the user i.e., an application which manages the user interface. The application may use one or more application services but whenever possible the system composition should be hidden from the user;

- Application Services layer - a set of services that provides the required eLearning functionality to the applications. An application service may make use of one or more common services. Distributed application services communicate using the Infrastructure Layer;
- Common Services layer - a set of services that are available to the application services. Common services may use other common services. Therefore, a common service is available to any other service;
- Infrastructure layer - this provides the end-to-end transaction and communications services for the application and common services.

Access to a service is obtained through the appropriate Service Access Point (SAP). Each service has a single SAP. A Component may support one or more SAPs (in an object oriented representation, a SAP could be supported by one or more operators where the class is itself the definition of the service).

The SAP may consist of one or more objects and each object will, in general, have more than one operator. Each object is defined using a class definition and consists of a group of attributes and operators. The operators describe how the state of the attributes may be changed. The set of behaviours permitted for each class must also be defined. These behavioural definitions ensure that any implementation of the class provides the same predicted behaviours for the same triggered events. Both the classes and their behaviours are defined in an implementation-independent manner.

This approach means that every service (application and common) must be defined using this form of abstraction. In many cases services interact with each other e.g., an application service will use a common service. This interaction is reflected by the service invoking the SAP of the required service.

Model Proposal

We propose a model that allows semantic representation of Grid Based Learning Services (GBLS) based on the OWL-S standard and using two main characteristics of GBLS: (1) Services Access Point, which defines the core information related with a GBLS, and (2) an ontological domain of Service Categories, which depend on the e-learning framework.

Each part of the model is described below:

- **Learning Services Category** – An instance of ServiceCategory of OWL-S ServiceProfile description. Depending of e-learning framework we can construct the domain of categories for group services.
- **Description.** It defines a general description of the service. It is supported by textDescription of Service Profile.
- **Related Services.** In this parameter we can specify one or more services related to the service. The Related service description is supported by the Service Model.
- **Process.** The service is described like a process making references to the Service Model definition.
- **Request.** This parameter defines the inputs of the service and is represented by the attribute hasParameter.
- **Results.** With this parameter we specify the results or outputs of service. It is supported by hasResult of the Service Profile.
- **Bindings.** It supports all the definitions included in the WSDL description of the learning services. It's supported by WsdIA-tomicProcessGrounding of Service Grounding.

In Figure 5 we show a graphical view of the model complete definition.

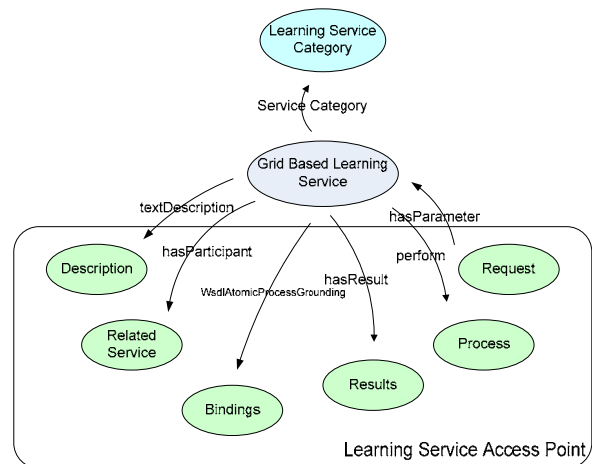


Figure 5

Example Scenario

We used our model to demonstrate the description of a Grid-based learning service using a specification of learning services of the Carnegie Mellon Learning System Architecture Lab. They implemented a Simple Sequencing Services Tool based on a collection of lower level Sequencing

Services. For our example exercise, we focus on the Rollup Services of the Sequencing Tool. The properties and parameters of these services are shown in Table 1.

The graphical result of the model implementation is shown in Figure 6.

We can observe that the relationship of the services with each one of the properties defining the model is represented by a link specifying the superclass relationship with the OWL-S model. For example the relationship between Rollup Service and Related Services is hasParticipant, but since this parameter is a member of the OWL-S Service Model, it is substituted by the relation describedBy.

Property	Parameter Value
Learning Service Category	Sequencing Control Services
Related Services	Tracking Model Services
Request	Activity tree Root activity End activity Learner
Results	Data errors Processing Errors
Description	Perform the rollup process and update the tracking model for the learner
Process	Overall Rollup Process
Bindings	WSDL file

Table 1

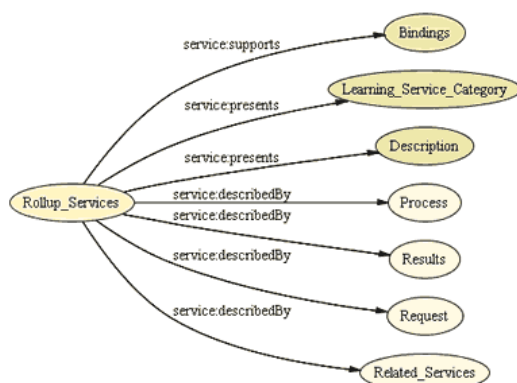


Figure 6

An overview of the OWL file result for the model representation is shown below.

```

+ <process:Input rdf:ID="activity_tree">
  <process:Result rdf:ID="Data_Errors" />
+ <profile:ServiceCategory rdf:ID="ApplicationServices">
+ <process:Input rdf:ID="root_activity">
+ <process:Process rdf:ID="Request">
+ <profile:Profile rdf:ID="Learning_Service_Category">
+ <process:Participant rdf:ID="Tracking_Model_Services">
+ <profile:ServiceCategory rdf:ID="LearningServiceCategory">
+ <process:Process rdf:ID="Results">
+ <process:Process rdf:ID="Related_Services">
</rdf:RDF>
    
```

Conclusions

In this article we have first reviewed some technologies related to learning services description and then we proposed a model based on two principle characteristics of Grid learning services: Services Access Point and Service Categories related to an e-learning framework. We are currently working towards the implementation of the model in a Collaborative Learning Grid environment as well as the construction of a conceptual model of interactions related to an e-learning collaborative scenario based on Grid.

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Gustavo Gutiérrez and Thanasis Daradoumis

Open University of Catalonia

Research Project Focus: L4A//

The LifeLong Learning in London for All - L4A// - project has investigated the concept of 'trails' as a way of organising lifelong learning opportunities. The L4A// pilot system combines a set of web services to provide the functionality needed to support this central idea.

Overview of L4A//

The LifeLong Learning in London for All (L4A//) project¹ is funded under the UK's JISC Distributed e-Learning Programme² and has focussed on supporting the independent lifelong learner, particularly those 16+ learners who traditionally have not participated in higher education.

A pilot system has been developed, which records and shares learning pathways through educational offerings with the aim of facilitating progression of lifelong learners from Secondary Education through to Further Education and on to Higher Education (HE).

The L4A// system allows learners to access information and resources registered with the system by their providers, to plan their own learning pathways, and to maintain and reflect on their learning throughout life. Tutors are able to register recommended pathways through courses and modules (which might be developed by a number of providers), thereby encouraging progression into HE. The system allows learners to share their learning plans and pathways with other learners (if they wish) in order to encourage collaborative learning and collaborative formulation of future learning goals and aspirations.

The "trails" approach is based upon the work of Vannevar Bush (Bush, 1945). More recently this concept has been further developed within the Trails project within Kaleidoscope (Keenoy et al., 2004 [4,5]; Peterson & Levene, 2003). The concept has been developed further in L4A// to provide the basis for modelling user behaviour and informing system designs.

L4A// allows tutors and learners to create learning pathways through the learning resources registered with the portal by their providers. As an aid to constructing their own learning pathways learners are able to search for pathways provided by tutors and other learners, giving

¹ L4A//site: <http://www.lkl.ac.uk/research/l4a//.html>

² http://www.jisc.ac.uk/programme_edistributed.html

them a repertoire of learning possibilities that they may not have otherwise considered.

Service Composition in L4A//

The L4A// pilot has successfully integrated a set of external services, tools and resources exhibiting high heterogeneity. The initial technical requirements mandated by the JISC Distributed e-Learning programme were that the L4A// functionality would be provided, as much as possible, by existing e-tools and services compliant with the JISC E-Learning Framework and service-oriented architecture³.

The L4A// system consists of a set of components and services that form a two-part architecture comprised of: (a) the backend and (b) the user interface (see Figure 1). The user interface comprises two parts: a Web portal that serves as a platform for the user interaction components to be built upon, and a Flash application that interacts with the backend and presents to the user the L4A// functionality relating to the creation of personal timelines, searching the available courses metadata, searching for other users and other timelines, and obtaining recommendations regarding future learning. The backend connects with RDF repositories for storing, retrieving and modifying metadata describing users, courses and timelines. It also calls three external services: the DELTA metadata search service⁴, the ISIS sequencing service⁵ and a service for search and retrieving information about courses in the Ufl LearnDirect database⁶.

Evaluation of L4A//

The main project outcome has been the development of the L4A// pilot system. A Web Portal has been developed that allows learners to access information and resources registered with the portal by their providers, to plan their own learning pathways, and to maintain and reflect on their individual record their learning throughout life. Tutors are able to publish recommended pathways through courses and modules in the London region. The L4A// system allows learners to share their learning plans and pathways with other learners (if they wish) in order to encourage collaborative learning and collaborative for-

³ http://www.jisc.ac.uk/index.cfm?name=elearning_framework

⁴ www.essex.ac.uk/chimera/delta/index.html

⁵ www.hull.ac.uk/esig/isis.html

⁶ www.learnirect.co.uk

mulation of future learning goals and aspirations.

The main preliminary finding of the evaluation has been the overall endorsement of the L4All pilot system. The evaluation study has also identified areas for further technical refinement and development that are required in the coming months e.g. differentiating the needs of different learner groups and developing strategies for differentiated interaction with the system; extension with e-portfolio and online journal capabilities; and extension with a 'live chat' facility.

The high heterogeneity of the different services that had to be integrated made developing the L4All pilot a challenging task. In order to achieve the full L4All requirements it was sometimes necessary to extend an external service in order to cover the full L4All requirements (in the case of DELTA) or to write mapping code in order to translate metadata between the L4All system and that supported by an external service (in the case of ISIS). In the case of the visual front end it was technically not feasible to integrate an existing service as was originally planned – a custom-built L4All extension had to be developed to provide the functionality missing from existing services.

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(Based on de Freitas et al., 2006 - [2] and [3])

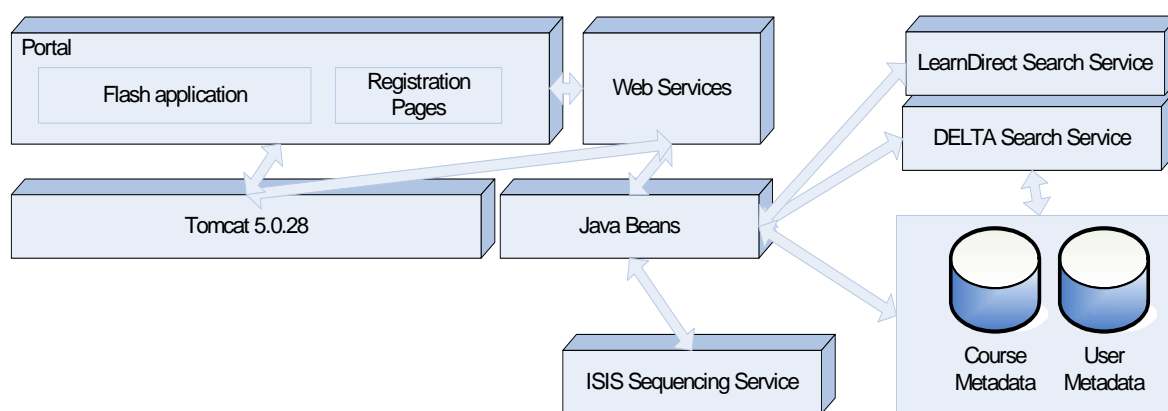


Figure 1: L4All version 2 architecture

News

Collaborative and Learning Applications of Grid Technology

May 2006

A special section on "Collaborative and Learning Applications of Grid Technology" was published in the May 2006 issue of *Future Generation Systems*, the International Journal of Grid Computing. The papers included in this section are extended and revised versions of the best papers presented in the Second International Workshop on Collaborative and Learning Applications of Grid Technology (CLAG 2005), which was held in conjunction with the IEEE International Symposium on Cluster Computing and the Grid (CCGrid 2005) in Cardiff, UK, 9-12 May 2005.

This special section includes the following content:

- Bote-Lorenzo, M.L. and Ardaiz-Villanueva, O. "Special section: Collaborative and Learning Applications of Grid Technology" (Guest editorial), *Future Generation Computer Systems*, 22(6):699, May 2006.
- Bardeen, M., Gilbert, E., Jordan, T., Nepywoda, P., Quig, E., Wilde, M. and Zhao, Y., "The QuarkNet/Grid Collaborative Learning e-Lab", *Future Generation Computer Systems*, 22(6):700-708, May 2006.
- Vega-Gorgojo, V., Bote-Lorenzo, M.L., Gómez-Sánchez, E., Dimitriadis, Y. and Asensio-Pérez, J.I., "A semantic approach to discovering learning services in grid-based collaborative systems" *Future Generation Computer Systems*, 22(6):709-719, May 2006.

The FGCS Journal is available from: <http://www.sciencedirect.com/science/journal/0167739X>

Special Issue on Web Services, Business Processes, and Services Science

May 2006

The International Journal of Web and Grid Services (IJWGS) has published a special issue on Web Services, Business Processes, and Services Science. The papers in the special issue are:

- Composition and evaluation of trustworthy web services

- A framework towards web services composition modelling and execution
- Analytical comparisons of switching of web services and switching of service offerings
- Compiling business processes: untangling unstructured loops in irreducible flow graphs
- A mobile agents-based approach to test the reliability of web services

The IJWGS Journal is available (by subscription) from:

<http://www.inderscience.com/browse/index.php?journalID=47&year=2006&vol=2&issue=1>

Call for Papers: IEEE Intelligent Systems Special Issue on Intelligent Educational Systems

July 2006

For this special issue papers are invited that discuss novel methods, tools, and applications addressing key challenges in creating intelligent educational systems tailored to both students' and teachers' individual needs, such as semantic interoperability (both of subject-domain data and instructional data); context-sensitive feedback generation; alignment of teacher and student viewpoints; personalised content delivery and generation; motivational and affective interactions; and distributed content and intelligence.

Typical technologies that tackle these challenges include:

- user-modeling techniques
- highly interactive intelligent user interfaces
- simulations of instruction dialogues
- "edutainment" systems
- intelligent tutoring systems
- distributed intelligent learning environments
- collaborative learning environments.

Submissions due: 17 Nov. 2006

Issue published: July/Aug. 2007

Visit the website to view the full call text: <http://www.computer.org/portal/pages/intelligent/content/educfp.html>

When	What	Where
Aug 30-31, 2006	<p>UNICORE Summit 2006</p> <p>In conjunction with Euro-Par 2006 - European Conference on Parallel Computing 2006.</p> <p>The goal of the UNICORE Summit is to bring together researchers and practitioners working with UNICORE in the areas of Grid and distributed computing, to exchange and share their experiences, new ideas, and latest research results on all aspects of UNICORE.</p> <p>http://summit.unicore.org/2006/</p>	Dresden, Germany
Sept 4, 2006	<p>The 2nd International Workshop on Grid and Peer-to-Peer based Workflows (GPWW)</p> <p>In conjunction with the 4th International Conference on Business Process Management (BPM 2006).</p> <p>The objective of the International Workshop on Grid and Peer-to-Peer based Workflows is to bring together researchers and practitioners from academia, industry and governments to report advances in grid and peer-to-peer based workflow research.</p> <p>http://www.ict.swin.edu.au/conferences/gpww/</p>	Vienna, Austria
Sept 10-11, 2006	<p>VLDB Workshop on Data Management in Grids</p> <p>Co-located with VLDB'06.</p> <p>This workshop is the second workshop organized at VLDB on the topic of Data Management in Grids, after the success of the 1st edition in 2005.</p> <p>http://liris.cnrs.fr/~jpierson/DMG_VLDB06/</p>	Seoul, Korea
Sept 11, 2006	<p>The 1st International Workshop on Semantic Matchmaking and Resource Retrieval: Issues and Perspectives</p> <p>Co-located with VLDB'06.</p> <p>Matchmaking is a process common to several scenarios in the Internet era, spanning from e-commerce to web-services, to grid computing, to human resource management, to actual dating services, to Peer-to-Peer computing.</p> <p>The aims of the workshop are to:</p> <ul style="list-style-type: none"> • Gather researchers from different communities and from both academia and industry to debate and find common ground on match-making issues. • Present open and emerging issues, and possible solutions to match-making problems, which we summarize in the next section. • Propose shared and acceptable methods to evaluate effectiveness of approaches to matchmaking. <p>http://sisinflab.poliba.it/smr06/</p>	Seoul, Korea

When	What	Where
Sept 17-21, 2006	<p>12th International Workshop on Groupware (CRIWG'06)</p> <p>This workshop have been motivated by advances in Computer Supported Cooperative Work, and by the need for CSCW to meet the challenges of new application areas. This workshop aims at providing a forum for academic researchers and professionals to exchange their experiences and their ideas about problems and solutions related to the design, development and use of groupware applications.</p> <p>http://www.criwg.org/</p>	Valadolid, Spain
Sept 18-21, 2006	<p>The 3rd International Conference on Grid Services Engineering and Management (GSEM'06)</p> <p>In conjunction with the 7th International Conference Net.ObjectDays 2006 (NODE'06).</p> <p>The GSEM 2006 conference aims at presenting and discussing the impact of the latest theoretical and practical results from Service-Oriented Computing, Semantic Web, Grid Computing, Software Engineering, Business Process Technology and Agent Technology on the engineering and management of Grid services and service-oriented applications.</p> <p>http://www.ict.swin.edu.au/conferences/gsem2006/</p>	Erfurt, Germany
Oct 1-4, 2006	<p>1st International Workshop on Building Technology Enhanced Learning solutions for Communities of Practice (TEL-CoPs 2006)</p> <p>In conjunction with the 1st European Conference on Technology Enhanced Learning (EC-TEL 2006).</p> <p>The workshop focuses on current research trends in technology enhanced learning solutions that aim at addressing the multiplicity and complexity of needs of Communities of Practice all along their lifecycle. The workshop seeks for quality research papers that propose solutions to the issues identified above. It advocates for approaches that build on the synergy of concepts such as multimedia information authoring and reuse, knowledge management, argumentation and negotiation. It aims to bring together scientists and engineers who work on designing and/or developing the abovementioned solutions, as well as practitioners who evaluate them in diverse real environments. Particular interest will be given to approaches built according to well-established pedagogical principles.</p> <p>http://palette.cti.gr/workshops/telcops06.htm</p>	Crete, Greece
Oct 15-18, 2006	<p>Cracow Grid Workshop - CGW'06</p> <p>The Cracow Grid Workshop is organized for the 6th time to support community of researchers, developers, practitioners as well as current and potential grid users who work in the fascinating field of grid technologies and their applications. It will cover:</p> <ul style="list-style-type: none"> • current advances in grid systems and grid applications; • overview of the main European and national grid projects; • grid tutorials. <p>http://www.cyfronet.krakow.pl/cgw06/</p>	Cracow, Poland

When	What	Where
Oct 26, 2006	<p>Workshop on the Next Generation in Technology Enhanced Learning</p> <p>In conjunction with The eChallenges e-2006 Conference.</p> <p>The main conference is intended to bridge the Digital Divide by sharing knowledge, experience, lessons learnt and good practice in thematic areas including Networked Business, eGovernment and eDemocracy, Technology Enhanced Learning, Collaborative Working Environments, eHealth, GRID, Knowledge Management, Smart & Virtual Organisation and International IST Collaboration.</p> <p>http://www.echallenges.org/e2006/default.asp</p>	Barcelona, Spain
Oct 30-Nov 2, 2006	<p>The 2nd International Conference on Semantics, Knowledge and Grid (SKG2006)</p> <p>The 2nd International Conference on Semantics, Knowledge and Grid (SKG2006) is to bring together researchers and practitioners in areas of knowledge and intelligence, semantics, and grid computing to share their visions, research achievements and solutions to real applications, to resolve the challenge issues and to establish worldwide cooperative research and development.</p> <p>http://www.culturegrid.net/SKG2006</p>	Guilin, China
Nov 2-3, 2006	<p>International Symposium on Grid computing, high-performance and Distributed Applications (GADA'06)</p> <p>In conjunction with OnTheMove Federated Conferences (OTM'06).</p> <p>GADA'06 intends to cover a broader set of disciplines, although grid computing will keep a key role in the set of main topics of the conference. The objective of grid computing is the complete integration of heterogeneous computing systems and data resources with the aim of providing a global computing space. The achievement of this goal is involving revolutionary changes in the field of computation, because it enables resource-sharing across networks, being data one of the most important ones. Thus, data access, management and analysis within grid and distributed environments are also dealt as main part of the conference.</p> <p>http://www.cs.rmit.edu.au/fedconf/gada2006cfp.html</p>	Montpellier, France
Nov 5-9, 2006	<p>The 5th International Semantic Web Conference (ISWC '06)</p> <p>To foster the exchange of ideas and collaboration, the International Semantic Web Conference brings together researchers in relevant disciplines such as artificial intelligence, databases, distributed computing, web engineering, information systems, and human-computer interaction.</p> <p>http://iswc2006.semanticweb.org</p>	Athens, Georgia, USA

When	What	Where
Nov 6, 2006	<p>2nd International Semantic Web Policy Workshop (SWPW'06)</p> <p>In conjunction with ISWC'06.</p> <p>Policies are pervasive in web applications. They play crucial roles in enhancing security, privacy and usability of distributed services, and indeed may determine the success (or failure) of a web service. However, users will not be able to benefit from these protection mechanisms unless they understand and are able to personalize policies applied in such contexts. For web services this includes policies for access control, privacy and business rules, among others.</p> <p>This workshop will bring together researchers interested in the field in order to discuss and analyze important requirements and open research issues in this context, focusing on policies in general and their integration into trust management frameworks, as well as on approaches to increase system cooperation, usability and user-awareness of policy issues.</p> <p>http://www.l3s.de/~olmedilla/events/2006/SWPW06/</p>	Athens, Georgia, USA
Nov 13-15, 2006	<p>Workshop on Technology Enhanced Learning in Working Context</p> <p>This Workshop aims to address the main issues on Technology Enhanced Learning and Training in Working contexts. This domain is yet quite few represented in research, despite it is a really important challenge to accompany actors of professional learning and training: apprentices, experts, trainers, policy makers. The Workshop aims at exploring the potential and / or effective impact of new technologies on the processes of learning and training in professional contexts. It will allow to identify models of learning and training, and conceptual tools which support the design, use and evaluation of TEL in a range of different contexts.</p> <p>http://www.noe-kaleidoscope.org/group/wstelpro/</p>	Grenoble, France
Nov 27-Dec 1, 2006	<p>Middleware for Service-Oriented Computing Workshop</p> <p>Part of the ACM/IFIP/USENIX 7th International Middleware Conference.</p> <p>Service-Oriented Computing (SOC) is an emerging computing paradigm utilizing services to support the rapid development of distributed applications in heterogeneous environments. While the immediate need of middleware support for Service-Oriented Architectures (SOA) is evident, current approaches and solutions mostly fall short by primarily providing support for the Enterprise Application Integration aspect of SOC only and do not address other important aspects. Furthermore, non-functional properties (like dependability and security) and Quality of Service (QoS) need to be addressed in terms of integrated middleware support. The Workshop will address these issues.</p> <p><i>Paper submission Deadline: August 10, 2006</i></p> <p>http://www.dedisys.org/mw4soc/</p>	Melbourne, Australia

When	What	Where
Dec 3-6, 2006	<p>The 23rd annual conference of the Australasian Society for Computers in Learning in Tertiary Education</p> <p>In conjunction with the 1st International LAMS conference. The focus of the LAMS conference is on designing for the future. Where will Learning Design take us now? How is LAMS shaping up? What are the challenges for individuals and organisations? Importantly they want to capture the experience of those who have used LAMS and share some of the lessons learnt in higher education, the K-12 sector, vocational and professional education.</p> <p>http://www.ascilite.org.au/conferences/sydney06</p>	Sydney, Australia
Dec 4-6, 2006	<p>The 4th European Conference on Web Services (ECOWS 2006)</p> <p>The European Conference on Web Services (ECOWS) is the premier conference for both researchers and practitioners to exchange the latest advances in the state of the art and practices of Web Services.</p> <p>http://www.ifi.unizh.ch/ecows06/</p>	Zurich, Switzerland
Dec 4-7, 2006	<p>The 4th International Conference on Service-Oriented Computing (ICSOC'06)</p> <p>The 4th International Conference of Service Oriented Computing (ICSOC'06) follows on the success of three previous editions in Amsterdam (2005), New York City (2004), and Trento (2003). Today ICSOC is recognized as the main conference for service oriented computing research and covers the entire spectrum from theoretical and foundational results to empirical evaluations as well as practical and industrial experiences.</p> <p>http://www.icsoc.org/</p>	Chicago, USA
Dec 18, 2006	<p>International Workshop on Semantics in Virtual Organizations and Web Services</p> <p>In conjunction with the 2006 IEEE/WIC/ACM International Conference on Web Intelligence (WI'06).</p> <p>Virtual organizations and web services have caught enormous research efforts over the last few years and become a new research field. It has been increasingly recognized that semantic issues and semantic description frameworks play an essential and crucial role in the semantic grid and the semantic web. Focusing on the research and applications in the fields of virtual organizations (the semantic grid) and web services, this workshop is intended to provide researchers an idea-exchange forum for their initial studies and practices in semantic and conceptual modelling based approaches to VO and WS constructions and development.</p> <p>http://www.dur.ac.uk/w.w.song/SVO&WS2006-main.html</p>	Hong Kong, China

CALL FOR PAPERS

2nd International ELeGI Conference *on* Advanced Technology for Enhanced Learning

24th October 2006

Hotel Torre Catalunya, Barcelona (Spain)



The ELeGI⁷ Scientific Committee invites authors to submit their original and unpublished works, innovations, ideas, problems that require solutions, position papers, case studies, etc, in the field of advanced technology for enhanced learning. Researchers are invited to present their research results. Practitioners and consultants are invited to present case study papers and innovative solutions. Organisations are invited to present software-based solutions, case studies, innovative ideas and designs.

This year the ELeGI conference will be joined to the eChallenges Conference (25-27 October 2006, Barcelona), in order to increase its visibility and attract more participants from outside the Consortium – but it will be possible to register for the ELeGI conference alone.

TOPICS

The current trend is for Technology Enhanced Learning (TEL) models and practices to evolve from content centred to a learner centred approaches. In the new vision, the learner plays an active and central role in the learning process. Rather than stressing the memorization of information, learning activities are aimed at aiding the learner in the construction of an autonomous, functional base of knowledge and skills. In keeping the learner at the centre of the learning process, personalisation/individualisation (creating and adapting learning paths according to the learner's previous knowledge, preferences, skills, preferred learning style), and collaboration (with other students, teachers, tutors, or experts) become important aspects for technologies to support, through the creation of an appropriate context. In the "learning society" humans are at the centre of a long-life learning process which is clearly a social, constructive phenomenon. Hence, e-learning becomes a central issue that requires new Learning Environments able to support this new pedagogical approach, providing realistic simulations, interactions, conversations, collaborations and enhanced presence in dynamic Virtual Communities.

⁷ ELeGI is an EU-funded Integrated Project that aims to facilitate the emergence of a European GRID infrastructure for e-Learning (<http://www.elegi.org/>)

The 2nd ELeGI Conference will be mainly focused on but not limited to:

- recent advances in TEL research, both from pedagogical and technological points of view;
- new pedagogical approaches for learning and e-learning, learner models and knowledge representation;
- TEL innovative application in GRID-Aware e-learning environments;
- theoretical and practical aspects of TEL in order to valorise those applications that can actualize learner centred approach;
- design and pedagogical issues of emerging architectures;
- Service Oriented Architectures for e-learning.

PROGRAMME

Tuesday 24 October 2006: ELeGI Conference - full day

CONFERENCE CHAIR

- Pierluigi Ritrovato CRMPA - University of Salerno
- Hugh Davis UOS – University of Southampton

INTERNATIONAL SCIENTIFIC COMMITTEE

- Rosa M. Badia CEPBA – BSC
- Theo Dimitrakos SRC- BT Group Chief Technology Office
- Domenico Laforenza CNR – ISTI
- Miltiadis Lytras CEID – University of Patras

PROGRAMME COMMITTEE

- Colin Allison University of St. Andrews
- Kazys Baniulis Kauno Technologijos Universitetas
- Sonia Benhamida Centrale Recherche SA (Ecole Centrale Paris)
- Herve Biauasser Centrale Recherche SA (Ecole Centrale Paris)
- Marc Eisenstadt The Open University
- Julian Gallop Council for the Central Laboratory of the Research
- Debra Haley The Open University
- Paul Held Friedrich – Alexander Universitaet
- Sonia Hetzner Friedrich – Alexander Universitaet
- Alain Krief Facultes Universitaires Notre-Dame de La Paix
- Giuseppe Laria CRMPA
- Philippe Lemoisson Centre National de la Recherche Scientifique
- Rosa Michaelson University of Dundee
- Fred Neumann Friedrich – Alexander Universitaet
- Toni Paradell ATOS Origin
- Christian Schmid Ruhr-Universität Bochum
- Athanassios Skodras Hellenic Open University

- Thanassis Tiropanis Athens Information Technology
- Stuart Purdie University of St Andrews
- Saverio Salerno CEMSAC
- Tim Storer University of St Andrews
- Sofia Tsekeridou Athens Information Technology
- Bill Vassiliadis Hellenic Open University
- Julia Wells ATOS Origin
- Konrad Wulf Universitat Stuttgart

PAPER SUBMISSIONS

Authors are invited to submit papers together with a brief abstract (100-150 words) and around 10 keywords that reflect the content. Authors can submit their works as WORD or PDF files; details of both formats to the following address: <http://www.inderscience.com/www/authorguide.pdf>

Submission implies the willingness of at least one of the authors to register and present the paper. Please email your papers to miano@cemsac.it and pierri@diima.unisa.it with "ELeGI Conference - Paper submission" in the subject of the email.

The selected papers will be published in a special issue of IJKL, <http://www.inderscience.com/ijkl>

IMPORTANT DATES

- **Submission Deadline:** 10 September 2006
- **Notification of acceptance:** 30 September 2006
- **Early registration:** 30 September 2006
- **Conference:** 24 October 2006

REGISTRATION FEES

- **Standard registration fee (after 30 September 2006) 150 EUR**
- **Early registration fee (30 September 2006) 100 EUR**
- **Early registration fee for students 30 EUR (payment on site)**

The registration fee is per person and will covers copy of the Conference proceedings, coffee breaks, lunch breaks.

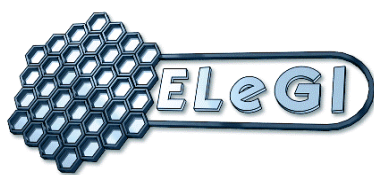
LOGISTIC INFORMATION

All the information about accommodation and local transport will be soon provided.

The closest airport is Barcelona.

Please contact **Meritxell Camarasa** for further info:

- email: meritxell.camarasa@atosorigin.com
- Phone: +34 93 486 1818
- Fax: +34 93 486 0766



European Learning Grid Infrastructure



Next generation in Technology Enhanced Learning

ELeGI - Kaleidoscope Learning GRID SIG joint workshop

Abstract

The current trend is for Technology Enhanced Learning (TEL) models and practices to evolve from content centred to a learner centred approaches, as adopted by the ELeGI and Kaleidoscope partners proposing this workshop.

In the new vision, the learner plays an active and central role in the learning process. Rather than stressing the memorization of information, learning activities are aimed at aiding the learner in the construction of an autonomous, functional base of knowledge and skills. In keeping the learner at the centre of the learning process, personalisation/individualisation (creating and adapting learning paths according to learner's previous knowledge, preferences, skills, preferred learning style), and collaboration (with other students, teachers, tutors, or experts) become important aspects for technologies to support, through the creation of the appropriate context. In the "learning society" humans are at the centre of a long-life learning process which is clearly a social, constructive phenomenon. Hence, e-learning becomes a central issue that requires new Learning Environments able to support this new pedagogical approach, providing realistic simulations, interactions, conversations, collaborations and enhanced presence in dynamic Virtual Communities.

The philosophy and approach behind **Grid** technologies show the right characteristics for fulfilling such requirements. Indeed, they allow us to access and integrate the different technologies, resources and contents that are required in order to realise the new paradigm. They are the most promising approach to realise an infrastructure that will allow learning process actors to collaborate, to take part in realistic simulations, to use and share high quality learning data and to innovate solutions of learning and training. The Grid will be able to support learning processes allowing each learner to use, in a transparent and collaborative manner, the resources already existing on-line, by facilitating and managing dynamic conversations with other human and artificial actors available on the GRID.

This **e-Challenges** workshop will follow a full day workshop hosted by the partners earlier in the week addressing the design and pedagogical issues of emerging architectures. The proposed workshop will be used to showcase the progress made in these projects and to stimulate outside interest and debate around the subject.

Description

ELeGI is an EU-funded Integrated Project that aims to facilitate the emergence of a European GRID infrastructure for e-Learning and to stimulate research into technologies to enhance and promote effective human learning. ELeGI supports and organises an annual international event in order to foster scientific cooperation and comparison of different approaches to Technology Enhanced Learning (TEL).

Kaleidoscope is a Network of Excellence which brings together European teams in technology-enhanced learning. Its goal is to integrate 76 research groups from around Europe, covering a large range of expertise from technology to education and from academic to private research. The Kaleidoscope **Learning GRID SIG** (Special Interest Group), in particular, deals with the exploration of GRID Technologies for effective human learning.

The ELeGI – Kaleidoscope Learning GRID SIG Joint workshop aims to bring together researchers, academics, professors, educational scientists and technologists in all areas of ICT and e-learning who are interested in exploring methodologies and systems for an effective learning based on the new technologies.

The workshop will primarily focus on the following aspects:

- Experience in use of existing grid applications within an educational context
- Instantiation of new pedagogical approaches in Grid-based solutions for learning
- Advanced service-oriented Grid based software architecture
- Virtual laboratories and Virtual Scientific Experiments for learning
- Learner models and knowledge representation
- Enhanced presence, collaboration and conversational processes in e-learning
- Semantic and knowledge based systems for learning
- Virtual Learning Organisations and Communities

Objectives

The main focus of the workshop is on exploring both theoretical and practical aspects of TEL in order to valorise those applications that can actualize learner centred approach. The contributors will present recent advances in TEL research, both from pedagogical and technological points of view, and their innovative application in GRID-Aware e-learning environments.

The proposed outcomes are:

- [1] to show the most innovative research results, applications and the best practices,
- [2] to summarize the current status of the relevant work
- [3] to identify trends for future researches in the field of the methodologies and systems for an effective learning and on the TEL.

Provisional Programme

- [1] "Application of Virtual Scientific Experiment Model in different educational contexts Authors: Anna Pierrri, Thanassis Tiropanis, Ioannis Christou, Sofia Tsekeridou, Bill Vassiliadis
- [2] "Efficient embedding of information and knowledge into collaborative learning applications" Authors: Santi Caballé, Thanasis Daradoumis, Fatos Xhafa, UOC
- [3] "L4All - A web-service based system for Lifelong Learners" Authors: Sara DE FREITAS, George MAGOULAS, Martin OLIVER, George PAPAMARKOS, Alexandra POULOVASSILIS, Ian HARRISON, Adrian MEE, London Knowledge Lab, U.K.
- [4] "How the ELeGI software architecture enables the creation and delivery of Adaptive Unit of Learning: a case of study based on the Torricelli law" Authors: Ritrovato, Gaeta, CRMPA
- [5] "The Grid Shared Desktop" Authors: Dugenie, Crubezy, Jonquet, Lemoisson, Breuker, Visser, Krief, Castillo-Colaux, Laurenço, Eisenstadt, Cerri, LIRMM, CNRS & Un. Montpellier II