What is Kaleidoscope

- It is a **Network of Excellence** in technology-enhanced learning
- 23 countries, 76 research units, 800 researchers
- Supported by the **European Commision**, under the IST priority of the 6th Framework Programme
- It includes:
  - Backbone Activities
    - Academia-Industry Digital Alliance, Advanced Training Activities, Shared Virtual Laboratory, Virtual Doctoral School, Users Group
  - Special Interest Groups
  - European Research Teams
  - Jointly-Executed Integrated Research Projects
What is a Grid for Learning

- It is an enabling architecture based on three pillars:
  - Grid
  - Semantics
  - Educational Modelling
- It allows the definition and the execution of learning experiences
  - ... obtained as cooperation and composition
  - ... of distributed heterogeneous actors, resources and services
- Learning Grid is a Special Interest Group of Kaleidoscope
  grid.noe-kaleidoscope.org

Grid + Semantics + Learning Design

- Grid provides:
  - transparent access to distributed services and resources
  - service orientation, dynamicity, interoperability among heterogeneous environments, security and trust, ubiquity
  - distributed collaboration and virtual organizations features
- Semantics allows:
  - to make explicit the knowledge about resources and services of the infrastructure, of communities and of individuals
  - automatic negotiation, discovery and composition of services allowing personalization
- Learning Design allows:
  - to model different learning theories in a machine understandable way in order to be interpreted and combined
  - to exploit distributed, service-oriented e-learning environments to construct learning experiences
Scenarios for a Learning Grid

- Parallel Computing Cooperative Learning
- Collaborative Research Environment
- Collaborative Lab
- Analysing Information from Collaborative Learning Teams
- Networking Course by e-Learning
- Immersive Virtual Reality
- Virtual Laboratory
- Field Trip
- English Plan
- How to Elaborate a Business Plan

Scenario 1
Parallel Computing Cooperative Learning

- Goal:
  - teaching a programming course on parallel algorithms

- Teachers:
  - assign to groups of students the building of a distributed system with some requirements
  - monitor the group work, access learners documents and code, give hints and suggestions
  - share training material, sample code, sample services
  - assess group and individual progresses

- Learners:
  - build interoperable services and make them available on the Grid
  - may invoke services made by other students also from different organizations
  - may share services, documents and code
  - may express feedback on services, documents and code shared by other peers

- Learning methods:
  - peer learning and tutoring, reciprocal teaching, project or problem based learning
Scenario 2
Collaborative Research Environment

- **Goal**
  - To let student and researchers cooperate in an “enhanced” digital library
- **It takes its inspiration from** Citeseer, a digital library which organizes scientific literature, allowing flexible searching and citation statistics
- **The use of a Grid makes it possible to extend the digital library with new forms of collaborative activities**
  - comments, reviews, summaries, videos, prototypes, code, …
- **Virtual organizations can be defined**
  - research students and their supervisor(s), a research group, a whole lab, …
- **Services can be personalized according to users**
- **It constitutes a new and useful way of supporting research activities**
  - … allowing to easily organize and access all sort of documentation/information
  - … and to assess individual and group progress

Scenario 3
Collaborative Lab

- **Goals:**
  - improving the communication level and coherency in collaborative activities
  - overcoming the lack of visibility of students activities to the group and to the teachers
- **Teachers:**
  - can view the activity of students and groups in the lab (who is working on which part of the training material, with whom, getting which results, …)
  - can distribute training materials and tasks to people and groups
  - can actively gather the results of students works (answers, solutions, reports, …)
  - can navigate through these results, and make them visible to the group, if needed
- **Learning methods:**
  - One-to-one training where one can benefit from a view of the others’ activity
Scenario 4
Analysing Information of Collaborative Teams

- **Goal**
  - Provide students and tutors with valuable knowledge on the collaborative learning activity
- CSCL applications generate huge amounts of events in log files
- Log files must be processed to provide feedback to users
- This scenario uses the computational power of a Grid to provide timely feedback
- **Offered Features:**
  - Structuring of the events (task performance, group functioning, scaffolding)
  - Generating two types of log files based on time and workspace
  - Partitioning log files in chunks of arbitrary size processed in parallel
  - Storing Grid processing results in a database to compute statistics

Scenario 5
Networking Course by e-Learning

- **Goal:**
  - Teaching basic concepts about computer networks
- **Learners:**
  - can access training material thorough different devices
  - can have the training material adapted on the basis of the used device
  - can use network simulations that run remotely to experiment network configurations and have data presented according to device properties
  - can use cooperative network design services to consolidate the work made locally by comparing it with other students
  - can contact a teacher and submit him the work made
- **Learning Method:**
  - ubiquitous, active and social Learning
- **Grid technology facilitates:**
  - the communication between heterogeneous devices
  - the collaborative use of remote resources
Scenario 6
Immersive Virtual Reality

- **Goal:**
  - teaching water table and aquifer behaviour through an e-Learning platform

- **Learners:**
  - can connect to the platform through PDA or home computer
  - can access introductory learning material to gain initial knowledge on the topic
  - can use a dynamically generated set of services that, according to their user profile and current device capabilities create an immersive virtual reality experience
  - can be informed about the requirement of special equipment like gloves and glasses and about the nearest locations where such immersions are possible
  - can reach these locations in order to go deeper on the aquifer behavior and on characteristics of water through immersive experiences
  - can meet other students in the virtual sites and interact with them

- **Learning Method:**
  - inductive/experimental, collaboration

Scenario 7
Virtual Laboratory

- **Goal:**
  - providing a virtual environment to perform scientific experiments (chemistry, physic, ...)

- **Teachers:**
  - assign to groups of students the experiment to be performed
  - lead the students in their work providing answers to questions
  - check intermediate experiment results suggesting changes and improvements
  - evaluate individual and group progress customizing the running experiment

- **Learners:**
  - set up the experiment environment choosing instrumentation, simulations, computer facilities, ...
  - define the work flow between the involved parties
  - share results with other group, discuss about them and compare them with other results
  - disconnect and reconnect being informed of the current status of the experiment

- **Learning methods:**
  - conversational process providing collaborative, experiential and contextualised learning
Scenario 8
The Field Trip

- **Goal:**
  - supporting students, equipped with PDAs, in an archeological field trip

- **Learners:**
  - can gather information under the form of photos, videos, text notes, audio comments, etc.
  - can access digital libraries and documents necessary for their work
  - can let remote services to automatically index this content using appropriate meta data
  - can store produced material remotely and share it with other learners
  - can exploit remote services to provide 3D reconstructions of photos
  - can use semantic based searching and location services to contact other students with similar interests or other students who are geographically near

- **Teachers:**
  - can evaluate student progress toward learning goals

- **This scenario uses the typical Grid approach in combination with mobility and knowledge based services**
Scenario 9
The English Plan

- **Goal:**
  - To support students in an immersion program consisting of a trip to New-York

- **Learners:**
  - have to send daily reports to the teacher through the PDA
  - can use a remote pronunciation testing service
  - can access on-line dictionaries and documentation, chats and forums
  - can collaborate to create virtual scenarios reproducing activities that have taken place or
    are planned to be held next involving remote teachers
  - can access an “Evaluators Virtual Network” via a voice authentication mechanism and
    perform an official remote exam

- **Learning method:**
  - Immersion program

Scenario 10
How to Elaborate a Business Plan

- **Goal**
  - Improving a business plan before a meeting with partners
    (while flying to a meeting a business man has to complete parts of a business plan)

- **Learner-Worker**
  - can access to the corporative resources that he needs adapted to the device used
  - can download on his PDA a course about business plan
  - can seek further advice by connecting to a service that allows him to locate a tutor
  - can discuss with the tutor via a video-conference service
  - can access a profitability simulator service to match the economics data of his business plan
    and to complete his work

- **Learning method**
  - Learning by doing
The Learning Grid SIG

- The Program
  - Definition of challenging scenarios for distributed service-oriented e-learning
  - Analysis of technologies for creating distributed service-oriented e-Learning environments
  - Analysis of languages and frameworks for the dynamic composition of distributed e-learning resources and services
  - Consolidation of the research in the “Grid Technologies for TEL Handbook”

- The Newsletter
  - It surveys projects and new technologies
  - It reports news and events
  - It publishes scientific papers

The Web Site

grid.noe-kaleidoscope.org

www.noe-kaleidoscope.org