

# Collaborative environments

Philippe d'Anfray\*  
Philippe.d-Anfray@cea.fr

December 6, 2010

## 1 To collaborate ?

Internet allows for more and more real time communication among geographically distributed users thus contributing to the construction of virtual workspaces:

- e-mail, interactive web sites;
- content and knowledge management systems;
- software forges;
- visio conferencing softwares;
- sharing of equipment, databases;
- social networks, ...

To collaborate here refers to a collective mode of interacting closely related to information and communication technologies. Alas the “frontiers” of these collaborations might be difficult to define. Communities are formed for various goals:

- long term (operation of large scientific instruments, exploitation of simulation results, ...);
- middle term (research projects);
- short term (experiments, urgent computing,...);
- occasional (workshops, ...).

Facing very different time scales we have needs in terms of ”durability” and ”reactivity” while dealing with a large number of communities that may (or may not) overlap themselves.

To collaborate also means pooling, federation and sharing of resources with (at least) two well known issues:

- heterogeneity (hardware, OS, languages, protocols, ...);
- governance (authentication, controlling the use of resources,...).

and (hopefully) answers:

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\*Aristote Association, *e-laboratory* working group, <http://www.association-aristote.fr>

- middleware;
- virtual organizations (VO's).

but the “frontiers” of these answers do not match the “contours” of research centers or companies.

Lastly the toolbox of the researchers seems impossible to define *a priori*. Many tools are specific to a given activity, others might be imposed within a specific project. Anyway community (Open Source) or experimental tools are not “off the shelf” products. Security policy and work environment (workstation, software tools,...) must allow for the integration of collaboration tools (which is often not the case).

## 2 Collaborative environments

According to the above presentation, we will briefly discuss the five key points for building collaborative environments with better quality image and sound and minimal delay:

1. Service infrastructure.
2. (Enterprise) Portal.
3. Tools (as local clients).
4. Virtual spaces.
5. and... Real spaces.

### 2.1 Service infrastructure

Here the ideas come from Grid infrastructures. Originally designed for an aggregation of computing or storage resources, Grid technologies (i.e. middlewares) are now becoming service oriented and include a social dimension with the management of virtual organizations (e.g. see Datagrid then Egee then EGI). The infrastructure must allow for:

1. user authentication and access control;
2. identification of available resources;
3. localization of these resources, seamless transfer of data;
4. accounting (and “billing”).

### 2.2 (Enterprise) Portal

An enterprise portal provides a community of users with a unified web-based access point to a set of services and resources.

- available information, tools and services can be customized by the portal administrator **and** by the users;
- the portal can also host application-specific portlets that can be accessed through a web interface.

The portal will allow to manage communities across organizational boundaries using Single Sign On authentication. Portlets are a way to offer access to applications without prior installation and learning. Most portals use the java portlet specifications JSR-168 or JSR-286 (GridSphere, Liferay, uPortal, Jetspeed, ...).

### 2.3 Tools (as local clients)

The development of distributed applications is a very complicated task and we would like to focus on the client side which is the most important part for the users. Within our framework:

- applications will benefit from the service infrastructure (secured and optimized);
- an application may be available as a “portal version” (portlet), which might be somewhat limited but allows for immediate use.

On top of existing applications, new customized clients (e.g. for sound, video, ...) will be easily developed, integrated and ready to use even for non specialist users.

### 2.4 Virtual spaces

Those new workspaces will exist through permanent virtual spaces.

- this is not a limited “rendez-vous” place like in classic videoconferencing scenario;
- users will meet together in this space:
  - where they can see each other and interact;
  - where they can launch distributed applications;
  - where they can place and retrieve objects, ...

The connection may be permanent (telepresence).

### 2.5 Real spaces

The virtual space will only be meaningful as a combination of especially designed real spaces:

- typically this is not the place where you usually do videoconferencing and which is neither your office nor a real working place.
- users will meet together in this space:
  - where audio, video, ... devices should reflect the virtual space (the “plurality” of real connected locations);
  - where equipment allows work on shared applications and instruments ...

Interactions between participants should be close to “virtual presence”.

### 3 Existing platforms

Both EVO <http://evo.caltech.edu> and AccessGrid <http://www.accessgrid.org> are widely used in research communities. AccessGrid is a better example here because:

- it implements the concept of permanent virtual rooms;
- it realizes the basic features of a service infrastructure:
  - (virtual) space management, user management (authentication, ...) and data transfer;
  - best use of network infrastructure (multicast).
- there is a world-wide community providing “venue servers”, bridges (for unicast-multicast connections), services (Global Quality Assurance Program), reflectors and software (plugins and portlets).

Especially for musical and multimedia performances it would be a great step forward to integrate existing well known software like Pure Data in a AccessGrid like infrastructure. Such a platform would be of a great interest for many communities of users that do not usually share their knowledge and experiences.

### 4 To conclude

Design, creation and maintenance of collaborative environments require:

- a service infrastructure:
  - (some kind of) Virtual Organization support;
  - automatic data transfers, optimized use of network, ...
- an access portal (providing SSO, web access, client integration,...);
- a framework for developing applications with focus on the client side.
- permanent virtual spaces;
- suitable real spaces;

All those points are studied within the *e-laboratory* group which has been created as part of the Aristote Association activities. Although the first discussions have been held among representatives of research organizations it appears clearly that needs for the arts community are similar. Furthermore they often use the same physical infrastructure (typically network access points, ...).

The “service infrastructure” which enables the creation of permanent virtual spaces has to be shared by all potential members of a collaborative project.

AccessGrid already provides the basic features for such an infrastructure and is why we are interested in finding collaboration to improve, extend, support and deploy this technology, improving its quality and performance to respond to a large range of uses in art, education, science and industry