

Evaluation of Virtual Organisation Support Tools

Mario Gay, (USI-SUPSI), Eric Jaminet (SUPSI), Gabriele Moroni (USI-SUPSI), Roberto Nunnari (SUPSI)

Summary

The goals of this AAA/SWITCH¹ project were: to assess of the needs of members of virtual organizations (VO), to identify similar evaluations of VO support tools within the Swiss academic community, to gain an insight on the products available and to select a tool to be suggested when required by users.

The analysis of users' needs revealed researchers the category to be mostly interested in VO support tools. The most urgent requirements of VO members are: document sharing, organization of on-line meetings and management of distributed projects.

The investigation also indicates that the Swiss universities and universities of applied sciences provide their users an array of VO support tools and are currently looking for more advanced tools.

The overview of the products pointed out that the number of tools available, both open-source and commercial, is vast. The extensive offer of products and their short life-cycle are signs that this market is far from being consolidated.

The in-depth examination of a sample of these products made it possible to explore their features and quality. However, it wasn't possible to select a single product which could at the same time maximize independency from vendors, quality, confidentiality, integration of features as well as minimize costs.

A possible approach to overcome this problem could be for the Swiss academic community to carry out the adaptation of an open-source tool or a series of open-source, together with further evaluation of new products.

1 Survey of similar projects

About 40 people belonging to ASIUS, FID (committees of the Universities' and Universities of applied sciences' heads of IT services), and AAA/SWITCH project coordinators were asked about collaborative projects and initiatives, tools currently in use and required together with their satisfaction in using such tools.

In all respondents' organizations one or more VO support tools are officially in use. Some organizations have adopted a comprehensive approach. For instance:

- EPFL has built a set of tools around a common LDAP-based authentication. The following tools are routinely made available to users: document management, sharing and publication tools, distributed software development tools, calendaring tools, collaborative editing and blogging tools.
- UNISG makes available to internal and external users groupware tools based on the Lotus Domino platform.
- UNIBAS make available tools for videoconferencing, document management and sharing, discussions and a commercial tool for collaborative work as well.
- At FFHB a system for knowledge sharing based on an e-learning platform has been developed².

An evaluation of synchronous collaboration tools is underway among a group of Swiss universities (ETHZ, UNIZH, UNIFR). The results of this study are expected to be available during the first months of 2009.

2 Survey about potential users and tools currently being used

757 SUPSI (University of Applied Sciences and Arts of Southern Switzerland) employees were asked about tools for VO support in use and needs not fulfilled by such tools. The following are the results of the survey:

- 36 people answered the questions asked;
- 16 employees formulated 33 requirements;
- 28 requirements involved collaborations with external partners;
- the 28 requirements could be grouped using the following categories:
 - document sharing (8)
 - on-line meetings (5)
 - distributed projects management (5)
 - knowledge sharing (4)
 - distributed software development (3)
 - collaborative editing of documents (2)
 - other (1)
- 19 out of 28 requirements were not satisfied or only partially satisfied by current tools:
 - document sharing (7)
 - on-line meeting (4)
 - distributed project management (4)
 - collaborative editing of documents (1)
 - knowledge sharing (1)
 - distributed software development (1)
 - other (1)
- the 19 requirements partially or not satisfied by current tools came from employees working in the following fields:
 - research (16)
 - administration (2)
 - internal services (1)

Although the small number of respondents doesn't make it possible to draw general conclusions, it was highlighted that:

- there is a need for distributed collaboration tools;
- collaborative tools are needed mostly for:
 - document sharing,
 - on-line meetings,
 - project management.

The tools mentioned in the two surveys performed have been included in the list of tools to be evaluated.

3 Definition of criteria for evaluation

Three groups of information have been recorded for each evaluated tool:

- general information (name, producer, version etc.)
- information about the evaluation process (reviewer, date, depth of the evaluation etc.)
- information about functionality
- technical requirements (operating systems, underlying database etc.)
- “commercial” information (business model, availability of support, prices etc.)
- judgment/conclusions about the product

The full list of criteria is shown in appendix 1.

The terms “VO support tools” or “collaboration tools” mean different things to different people.

According to the surveys, users need tools for the following (partially overlapping) purposes:

- document sharing (DS)
- on-line meeting (OM)
- distributed project management (PM)
- collaborative editing of documents (CE)
- knowledge sharing (KS)
- distributed software development (SD)

The evaluation grid therefore shows which evaluation criteria are relevant for each of the abovementioned application areas.

4 Selection of the tool for documenting the results

There are a number of sites on Internet that compare Wiki³, CMS⁴ and discussion forum⁵. These sites allow browsing products, comparing them and contributing to the reviews. Even though the implementation of such a tool for the current project would help the maintenance of the collected data, the effort would go beyond the resources allocated to the project.

The outcome has been therefore documented using standard word processing software and spreadsheet programs. The report and the evaluation criteria are available at the site <http://si.supsi.ch/index.php?page=vo-tools-e>. The complete evaluation grid has been made available for updates to all interested parties through Google Docs. Access can be requested writing to collab@ti-edu.ch.

5 First evaluation and selection

An initial list of virtual organization support tools has been collected by browsing many sources, including Web sites and Gartner reports. A very high number of tools emerged from this activity and it quickly became clear that it would have been impossible to perform an exhaustive review of all tools available. Further to discarding from the list tools with insufficient documentation or those that are clearly not well maintained, we selected about thirty products, and tried to build a representative sample.

Depending on the availability of demo installation, the availability of good documentation and the work needed to perform local test installation, the project staff approached the review of the tools in different ways. The review of some tools is based on documentation only, while for other tools it has been possible to use demo installations and, whenever feasible, the most promising tools have been locally installed and tested.

The progress of the review and the results have been regularly discussed among project members. This allowed for building a know-how about the tools and a common understanding on this matter.

It has been observed that products improve, disappear or are merged at a fast pace. The results of the project could therefore soon become obsolete.

Since an evaluation of synchronous collaboration tools is underway at other Swiss universities, no such tools have been included in this study in order to make the two efforts complementary.

6 In depth evaluation and selection

Many tools emerged from the previous phase that could be considered worth to elaborate on more deeply. Given the limited time and resources, only five tools have been selected for a more comprehensive evaluation. This selection is a representative sample of the available tools and their main characteristics.

| Tool | Open-source / closed-source | Hosted / on-site | Free / requiring payment |
|-------------------------|--------------------------------|---------------------|-------------------------------|
| TWiki | Open-source | Hosted and on-site | Free and requiring payment |
| Google Apps | Closed-source | Hosted | Free |
| Novell Teaming | Closed-source | On-site | Requiring payment |
| Open-Xchange | Open-source | Hosted and on-site | Free and requiring payment |
| Microsoft Office Groove | Closed-source | Hosted and on-site | Paid |

6.1 TWiki

TWiki⁶ is an open-source project maintained by a lively community of developers. Beside the main Wiki functionality, the 400+ add-ons ranging from calendar to authentication modules extend it. TWiki and the related add-ons are maintained by a lively community.

Twiki is not straightforward to use for the casual user and it also appears relatively difficult to install and maintain. It is therefore suggested for collaboration among groups of computer-skilled users.

6.1.1 Functionality

Results from the first phase of the evaluation

TWiki strengths are in the areas of collaborative editing, document sharing and knowledge sharing. A number of additional modules can make available additional functionalities.

Collaborative editing

TWiki pages are called 'topics'. Topics can become a 'document', a 'thread' or be 'structured', depending on the tags used in any particular page.

A TWiki installation is composed by Webs. Usually each Web is dedicated to a different subject or project. Webs can be nested and can therefore inherit settings such as access rights or notifications. Predefined topics contain also configuration settings.

Users can edit topics in three ways: using a WYSIWYG editor, editing HTML code or using Wiki tags.

Document sharing

Documents may be uploaded in TWiki installations and access rights can be precisely defined. Versions of topics and uploaded documents are tracked and different versions of topics or text documents can be compared.

Other functionalities

A wide range of add-ons make available functionalities ranging from calendar to project management or issues tracking.

6.1.2 Usability

TWiki is powerful but not particularly user-friendly. For instance, access to extended functionality is available through the inclusion of carefully crafted text strings in topics. Its use is therefore suggested to users with good computer skills.

6.1.3 Cost

Being TWiki an open-source project, its source code is free. There are companies that offer training, support and hosting. Exploiting the possibilities offered by TWiki requires that a know-how about it is built.

6.2 Google Apps

6.2.1 Summary

Google Apps⁷ includes a suite of tools hosted on Google's infrastructure. Google Apps can be used for sharing information, collaborative editing, Web publishing and communication. The tools are easy to use but their functionality is limited and they are partially not well integrated.

Google Apps seems to be suited for small collaborations without specific needs and privacy requirements. Google Apps is continuously evolving and therefore is worth following it closely.

6.2.2 Functionality

Results from the first phase of the evaluation

Google Apps' strengths are the areas of document sharing and collaborative editing and document sharing.

Google Docs

Google Docs allows for storing documents on Google's infrastructure, editing them through a Web browser and sharing them. It is possible to:

- structure the document store using folders;
- perform searches and save them;
- manage the versions of documents;
- concurrently modify documents;
- publish documents Internet and republish them after modification.

The supported document types are:

- texts;
- spreadsheets;
- presentations.

It is not always possible to upload binary files. Some popular documents formats are automatically converted to one of the three supported document types.

Document sharing

The author of a Google Docs document can make it available for reading or modification to other registered users. It is possible to use groups to ease the management of access rights. It is also possible to send automatic notifications in the event that documents are modified.

Document versioning

All versions of the documents are available. In the case of text documents it is possible to compare different versions.

Text documents

The data format underlying Google Docs text documents is HTML. Compared to standard word processing applications, formatting and structuring capabilities are limited.

Spreadsheets

The functionality of Google Docs spreadsheets are limited compared to standard spreadsheet applications.

Presentations

Again, the functionality of Google Docs presentations are limited compared to standard applications. It is possible to perform remote presentations tied to Google Talk instant messaging sessions.

Calendar

Google Calendar allows for sharing of calendar with other users. It is possible to import event from Microsoft Outlook and other systems. Notifications of events can be sent through SMS, e-mail or pop-ups.

Electronic mail

GMail is a well known Web-based e-mail system. GMail is organized around the concept of labels and searches, in opposition to traditional e-mail folders. It is integrated with Google Talk and offers huge storage space.

Google Talk

This Web-based instant messaging system can also be used for file transfer and voice messaging.

Google Sites

Google Sites allow for the publishing of documents on the Web. Reading and modifying the documents can be restricted to other Google Docs users or can be open. Possible contents of Google Sites are: Web pages, calendars, pages containing gadgets, lists (simple databases), file stores.

6.2.3 Usability

Google Apps are exclusively accessible through Web. The user interface is generally simple (partly because the functionality is limited) but is not consistent over the different applications. The language of the user interface can be selected but Swiss regional settings are not available.

6.2.4 Cost

Google Docs Standard Edition is free but there isn't any guarantee of uptime, support, migration tool or APIs.

The Premier Edition costs USD 50 for each user, a certain level of uptime is guaranteed and assistance, migration tools and APIs are available.

The Education Edition, likely the Standard Edition, is free but a certain level of uptime is guaranteed.

6.2.5 Privacy

Google adheres to the 'Safe Harbor' framework⁸. Two additional documents relevant for the privacy of documents stored in Google Docs are Google's general privacy policy⁹ and the Google Docs specific privacy policy¹⁰. Some clauses in these documents (such as "We may combine the information you submit under your account with information from other Google services or third parties in order to provide you with a better experience and to improve the quality of our services.") seem to be too elastic. The location of data could also conflict with Swiss laws. The privacy issue deserves a closer scrutiny, which is beyond the scope of this project.

6.3 Novell Teaming

6.3.1 Summary

Novell Teaming¹¹ is a Web-based product for collaboration allowing for document sharing, collaborative editing and distributed project management. It has several strong points, such as graphical user interface suitable for expert and entry-level users, versatility and maturity. Teaming costs include the purchase of a dedicated server infrastructure and relatively expensive licenses (based on the number of users).

Despite the cost, Novell Teaming appear to be a mature and flexible product and therefore can be taken in consideration for significant interorganizational collaborations.

6.3.2 Functionality

Results from the first phase of the evaluation

Novell Teaming is strong in the areas of document sharing, project management, collaborative editing, and knowledge sharing.

Personal and shared workspaces

A personal workspace is made available to each Novell Teaming user. The personal workspace may include the following tools:

- blog;
- calendar;
- personal file folder;
- address management;
- pictures gallery;
- task management;
- search engine;
- favorite links management.

It is up to the site administrator to decide which tools are visible to the end users.

The users may rearrange the layout of the personal workspace, set the language of the user interface and hide the unwanted tools.

A shared workspace is a virtual space made available to a group of users. In addition to the tools available in personal workspaces, a shared workspace can contain:

- discussions;
- Wikis;
- milestone management tools;
- workflow.

The document stores make available versioning, check-in and check-out of documents.

6.3.3 Usability

Novell Teamwork can be exclusively accessed through a Web interface. The interface is intuitive and easy to use because at first use only a minority of functionalities are visible but additional functionalities can be made visible by a few mouse clicks. The layout of the user interface can be easily customized by the users.

6.3.4 Cost

Although Novell applies an important educational discount to the list prices, the costs for Teamwork are not negligible: about CHF 22 for each user for the purchase of the license and about CHF 5.50 for the software maintenance. In addition, a suitable server must be included in the cost estimation.

6.4 Open-Xchange

6.4.1 Summary

Open-Xchange¹² is a collaboration product available for both in-house installation and as a hosted service. A 'community' edition with limited functionality is available as well.

The Web-based user interface mimics Microsoft Outlook and allows for editing and sharing of documents, contacts, calendars, tasks. Discussion forum and e-mail are also part of the product.

This product position itself as a cheaper replacement of Microsoft Exchange. Universities which benefit from academic discounts would probably go for the original Microsoft Exchange.

6.4.2 Functionality

Result from the first phase of evaluation

Open-Xchange strength is document sharing.

Description of the functionalities

Open-Xchange makes available the following basic functionality:

- e-mail;
- calendars (personal and shared);
- contacts (personal and shared, link to events, tasks and projects);
- tasks (personal and shared, progress monitoring)

and the following advanced collaboration tools:

- portal (overview of messages, events, tasks and projects);
- document sharing (central store, access management, versioning, locking, WebDAV access);
- projects (tasks, milestones, Gantt charts, roles);
- discussion forum: internal and external users, archiving, access management.

6.4.3 Usability

The Web-based user interface is intuitive and easy to use, especially for Microsoft Outlook users. The portal gives an useful overview and it is easy to customize.

6.4.4 Cost

Four versions of Open-Xchange are available:

- Open-Xchange Appliance Edition: for small to medium organizations (academic price is EUR 270 for 10 users and EUR 27 for each additional user);
- Open-Xchange Server Edition: for bigger organizations (academic price is EUR 510 for 25 users and EUR 15 for each additional user);
- Open-Xchange Hosting Edition: for Internet service providers;
- Open-Xchange Server Community Edition: free and unsupported.

6.5 Microsoft Office Groove

6.5.1 Summary

Microsoft Office Groove¹³ is a collaboration system that allows teams to collaborate and communicate with or without a server infrastructure, online or offline. Groove used to be an

independent application but after acquisition by Microsoft is more and more integrated in Microsoft Office and its future as a product is not clear.

Office Groove (client-only version) is suited for small collaborations that needs a fast set up and are limited in time.

6.5.2 Functionality

Result of the first phase of the evaluation

Office Groove's strengths are in the field of document sharing and, to a lesser extent, collaborative editing and knowledge sharing.

Versions

Microsoft Groove 2007 is available in three versions with similar functionalities but different architectures:

- Office Groove 2007: client component, offers collaboration features even without the server component;
- Office Groove Server 2007: server component, allows for a centralized management of Groove workspaces;
- Groove Enterprise Services: hosted service provided by Microsoft.

'Client' version

All data is stored on each PCs used by the team members and it is constantly synchronized through peer-to-peer mechanisms. Data stored and transmitted is always ciphered.

| Advantages | Disadvantages |
|--|---|
| Infrastructure not needed | Possible synchronization problems (peer-to-peer architecture) |
| Flexibility (users can create and customize workspaces) | Centralized backup difficult to implement (data on each PC) |
| Integration with Microsoft Office and Microsoft SharePoint | Risk of uncontrolled proliferation of workspaces |
| Data encryption | |

'Server' version

Microsoft Groove Server 2007 offers a centralized management and integration with Microsoft Active Directory but requires up to 3 servers for large installations.

| Advantages | Disadvantages |
|--|--|
| Centralized management (users, permissions, backup policies) | Standalone product will disappear in the future |
| Optimized synchronization (push/pull) | 64-bit architecture only |
| Integration with Microsoft Active Directory | Installation not straightforward |
| | Expensive hardware infrastructure for large installation |

6.5.3 Functionality

Workspaces

Users can create shared workspaces which can contain one or more of the following components:

- notes and drawings;
- calendars;
- documents and SharePoint documents;
- instant messaging tools;
- problem tracking tools;
- image galleries;
- forms and lists;
- meeting planner tools.

6.5.4 Usability

The Office Groove user interface is simple and easy to use. It is quite seamlessly integrated in the Microsoft Office suite of programs. Users may create workspaces even without the intervention of an administrator. This is an advantage for users but may result in an uncontrolled proliferation of workspaces.

6.5.5 Cost

The 'client' version of Office Groove is included in the Enterprise version of Microsoft Office and can therefore be considered 'free' for Swiss academic users where a Campus contract has been signed. It must be noted that external partners would have to buy Microsoft Office Enterprise in order to be able to join Groove teams.

The 'server' version is also included in the Microsoft Campus agreement. Hardware costs are not negligible: a large installation requires up to three servers.

The price of the hosted version was not available on the Web at the moment of writing.

7 Conclusions

7.1.1 Commercial versus open-source tools

The quality of commercial tools is definitely higher than the quality of open-source products. This is clearly visible by using products such as Cisco WebEx WebOffice and 5Point Teamspace. Commercial tools tend also to integrate more features into the same product than open-source

The real cost of open-source tools is difficult to estimate but it can be assumed that for large installations it is lower than the cost of their commercial counterpart.

A disadvantage of commercial tools is the risk of being locked on a proprietary product both in the case of software installed locally and software-as-a-service.

An authentication mechanism compatible with SWITCHaai is still hard to find on both open-source and commercial tools. Open-source make it possibly however to adapt products to work with SWITCHaai.

7.1.2 On-premises versus hosted services

Several commercial tools are offered as service hosted on a provider's servers (software-as-a-service). This might raise confidentiality concerns (trust, different regulations in different countries) in case of sensitive data. The continuity of the service could also be an issue.

7.1.3 Suggestions

Despite initial expectations, the preliminary survey and the evaluations showed that is not possible to select a single tool able to cover all needs. This because (a) the needs of different group of users focus on different areas (document sharing, collaborative software development, on-line meeting and so on); (b) the tools tend to concentrate their strong points on a single area or on a limited set of areas.

In the short term, for collaboration among members of small virtual organizations without confidentiality constraints the use Cisco WebEx WebOffice (if funding available) or Google Docs is recommended. For larger virtual organizations or projects dealing with sensitive data the most suitable tool among the ones evaluated is Novell Teaming.

In the long run, a viable option could be to select an open-source tool or a set of open-source tools and invest resources to further develop them (for instance for mutual integration and SWITCHaai compatible authentication). This would overcome data confidentiality issues and dependencies from vendors and possibly reduce the overall costs.

8 References

1. AAA/SWITCH. Available at: <http://www.switch.ch/aaa/> [Accessed March 20, 2009].
2. Bettoni M, Schiller G, Bernhard W. Weak Ties Cooperation in the CoRe Knowledge Network. In: *Proc. of the 9th European Conference on Knowledge Management*. Southampton, UK: Southampton Solent University; 2008.
3. WikiMatrix - Compare them all. Available at: <http://www.wikimatrix.org/> [Accessed January 12, 2009].
4. The CMS Matrix - cmsmatrix.org - The Content Management Comparison Tool. Available at: <http://www.cmsmatrix.org/> [Accessed January 12, 2009].
5. ForumMatrix - Compare Them All. Available at: <http://www.forummatrix.org/> [Accessed January 16, 2009].
6. TWiki - the Open Source Enterprise Wiki and Web 2.0 Application Platform. Available at: <http://twiki.org/> [Accessed February 3, 2009].
7. Welcome to Google Apps. Available at: <http://www.google.com/apps/> [Accessed January 15, 2009].
8. US-Swiss Safe Harbor Framework. Available at: <http://www.export.gov/safeharbor/> [Accessed January 14, 2009].
9. Google Privacy Policy. Available at: <http://www.google.com/intl/en/privacypolicy.html> [Accessed February 4, 2009].
10. Google Docs Privacy Policy. Available at: <http://www.google.com/google-d-s/privacy.html> [Accessed January 7, 2009].
11. Novell Teaming. Available at: <http://www.novell.com/teaming/> [Accessed January 5, 2009].
12. Open-Xchange. Available at: <http://www.open-xchange.com/> [Accessed December 2, 2008].
13. Groove Home Page - Microsoft Office Online. Available at: <http://office.microsoft.com/en-us/groove/default.aspx> [Accessed December 5, 2008].

9 Appendix 1: Evaluation Criteria

| Criteria | Notes |
|----------------------------------|--|
| Company | |
| Product | |
| Web site | |
| Reviewer | Member of the project group who reviewed the product |
| Evaluation date | |
| Version evaluated | |
| Quality of evaluation | 1: based on documentation only 2: based on documentation and demo site 3: test with real case of utilization |
| Document management | Basic functionality for document management |
| Document version control | Locking, version numbering etc. |
| WebDAV access | Possibility to interact with the document store through the WebDAV protocol |
| Document search | |
| Workflow | |
| Microsoft Office integration | |
| Databases | Possibility to create (simple) databases |
| Relational databases | Possibility to create relational databases |
| Database export | |
| Database import | |
| Contact management | Management of addresses |
| Outlook contacts synchronization | |
| Task management | Possibility to define task and assign them to users |
| Time tracking | Possibility to assign time spent to task |
| Problem tracking | |
| Calendar | |
| Source code management | Inclusion of source code management such as CVS or Subversion |
| Wiki | |
| Blogging | |
| E-Mail | |

| | |
|--|--|
| Instant messaging/chat | |
| Discussion forum | |
| Audio conference | |
| Video conference | |
| Whiteboard | |
| Application sharing | |
| Feature selection/disabling | Possibility to hide unneeded features from users |
| Language selection | Possibility to select the language of the user interface |
| Languages | |
| Authentication types | Authentication mechanism, such as LDAP, internal database, Shibboleth |
| Virus scanning | Scanning of loaded documents |
| Client operating system | |
| Server operating system | |
| Server programming language | |
| Server DBMS | |
| Business model | Commercial, open source etc. |
| Deployment | Available for on-premises installation, hosted (software-as-a-service) |
| Support availability | |
| Price (10 users/year) | |
| Price (20 users/year) | |
| Price (100 users/year) | |
| Price (200 users/year) | |
| Price (1000 users/year) | |
| Overall impression | Subjective overall judgment on a scale from 1 to 5 |
| Suitability for document sharing (DS) | Subjective judgment on a scale from 1 to 5 |
| Suitability for on-line meeting (OM) | Subjective judgment on a scale from 1 to 5 |
| Suitability for distr. project management (PM) | Subjective judgment on a scale from 1 to 5 |
| Suitability for collaborative editing (CE) | Subjective judgment on a scale from 1 to 5 |
| Suitability for knowledge sharing (KS) | Subjective judgment on a scale from 1 to 5 |
| Suitability for distr. software development (SD) | Subjective judgment on a scale from 1 to 5 |