SEVENTH FRAMEWORK PROGRAMME

Information & Communication Technologies
Secure, dependable and trusted Infrastructures

COORDINATION ACTION

Managing Emerging Threats in ICT Infrastructures

Grant Agreement no. 216331

D1.1: Online portal with support for virtual communities

Abstract: This document discusses the online collaboration platform of the FORWARD project. For the implementation of the platform, different tools have been evaluated, and the most suitable have been selected.

Contractual Date of Delivery	30/04/2008
Actual Date of Delivery	06/05/2008
Deliverable Security Class	Public
Editor	Manolis Stamatogiannakis
Contributors	Kallia Marakomihelaki Manos Athanatos
Quality Control	Christopher Kruegel

The FORWARD Consortium consists of:

Technical University of Vienna	Coordinator	Austria
Institut Eurécom	Principal Contractor	France
Vrije Universiteit Amsterdam	Principal Contractor	The Netherlands
ICS/FORTH	Principal Contractor	Greece
IPP/BAS	Principal Contractor	Bulgaria
Chalmers University	Principal Contractor	Sweden

Contents

List of Figures

Chapter 1

Introduction

This deliverable details the work performed in the context of Task 1.1 of the project. The goal of Task 1.1 is to provide an operational online platform and infrastructure for managing the working groups. In order to support different working groups, this platform has to provide support for online communities, by providing features such as:

- A mechanism to define logic categories or groups, and a way to assign users to one or more of these categories.
- A mechanism to support communication between users. This mechanism should support sending messages to all users or only to members of a particular group. Also, chat facilities and message boards (with support for different threads) must be available.
- A mechanism to support work flow by allowing to allocate tasks to users, monitor their progress, and hold virtual meetings.
- A mechanism to manage the resources and documents, and to quickly search and browse these resources.

The working groups of FORWARD will be able to start their collaborative work as soon as the online collaboration platform of this task is up and running. The FORWARD working groups were established during the *1st FORWARD Workshop* [1] which took place in Lindholmen Science Park, Goteborg, Sweden on 17th and 18th of April 2008. The establishment of the working groups was the second objective of work package (WP) 1.

The rest of this document is structured as follows: In Chapter 2, we discuss the aforementioned requirements and we identify the software components that can be used to build a collaboration platform adhering to them. In the process, a few additional requirements are identified. In Chapter 3, we analyze the specific implementations for the software components we identified and outline the overall setup of the *FORWARD Online Collaboration Platform*. Finally, in Chapter 4, we

summarize the current setup of the platform and outline possible future extensions to it.

Chapter 2

Background and requirements

2.1 Collaborative software

With the professionalization of science during the 19th century, there was a revolution in the scientific cooperative work, which became an increasingly important aspect of scientific research [32]. Much later, in 1968, J.C.R. Licklider was the first to propose using computers for enhancing scientific collaboration. In his article "*The Computer as a Communication Device*" [38] he wrote:

> *"To appreciate the importance the new computer-aided communication can have, one must consider the dynamics of "critical mass", as it applies to cooperation in creative endeavor. Take any problem worthy of the name, and you find only a few people who can contribute effectively to its solution. Those people must be brought into close intellectual partnership so that their ideas can come into contact with one another. ... There has to be some way of facilitating communication among people without bringing them together in one place."*

However, it wasn't until the late 1980s when the proliferation of the personal computer and the local area networks made Computer Supported Cooperative Work (CSCW) a commonplace [26]. At this period of time Johansen [27] identified the different forms of computer-assisted collaboration and introduced the CSCW matrix, which appears in Figure 2.1. The CSCW matrix categorizes the collaborative software (also called *groupware*) according to the time and space where the collaborating parties act.

The CSCW matrix can be used to identify the types of software we can use to build the *FORWARD Online Collaboration Platform*. The platform's primary focus should be software for asynchronous-remote collaboration. This is because the parties involved in FORWARD are geographically dispersed across Europe. They also belong to different domains, which makes synchronous-collaboration difficult. So, the primary components of the *FORWARD Online Collaboration Platform* should be software from the lower right cell of the CSCW matrix.

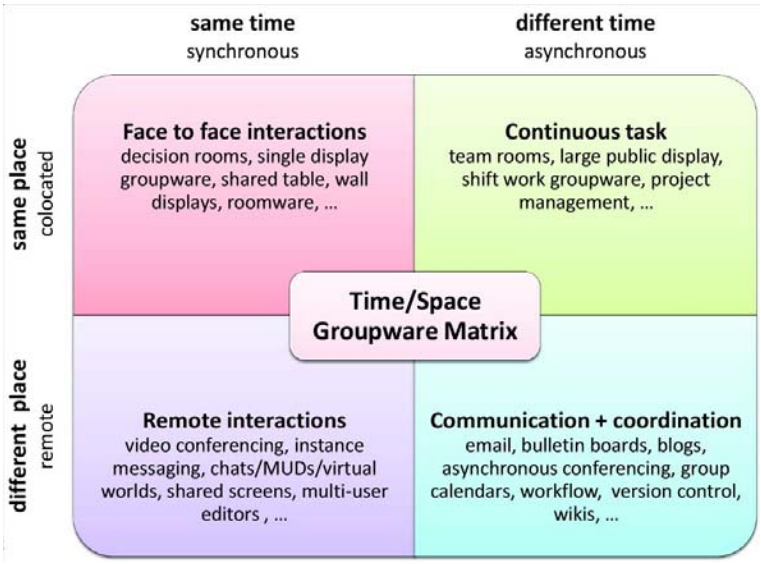

Figure 2.1: The CSCW matrix

For the rare cases where synchronous-remote collaboration is required, a normal (non-computer-assisted) teleconference session is usually adequate. However, using some more sophisticated tools from the lower-left cell of the CSCW matrix may prove beneficial and may enhance the productivity of the session.

2.2 Analysis of the online platform requirements

The requirements for the *FORWARD Online Collaboration Platform* have already been outlined in Chapter 1 of this document. In this section, we will review these requirements one-by-one and we will identify options we have for fulfilling each requirement.

It is important to note that most of the participants of the FORWARD working groups will not be members of the organizations that make up the FORWARD consortium. Also, their commitment to the FORWARD working groups objectives will be limited to a time period of about 18 months. These facts imply an additional requirement, perhaps equally crucial than those stated in Chapter 1:

- The chosen components of the *FORWARD Online Collaboration Platform* should require minimum training of the users. Any required training should not require physical presence.

If our choice of components contradicts this requirement, we may end up with a perfectly functional and fully-featured online platform that will remain under-used and will cause the working groups to function sub-optimally.

2.2.1 User communication mechanisms

Requirement: *A mechanism to support communication between users. This mechanism should support sending messages to all users or only to members of a particular group. Also, chat facilities and message boards (with support for different threads) must be available.*

Regarding communication between users, we will discuss synchronous and asynchronous communication separately. With synchronous messaging, users have to be online simultaneously in order to communicate. On the other hand, in asynchronous messaging, the messages are stored and the recipients of the message are able to read it the next time they go online.

2.2.1.1 Asynchronous communication

Asynchronous communication is perhaps the most common form of communication between users in Computer Supported Cooperative Work. The most common implementations of asynchronous messaging between users are *online-forums* and *email*.

Online-forums are web based message repositories where users may login and post their messages for other users to read or to answer. They are functionally similar to *Usenet Newsgroups* [44], however, the underlying technical implementation is different. Also, unlike Usenet Newsgroups, which are organized in a global hierarchy, online-forums operate in isolation.

Modern online-forum implementations feature forum categories, forum permissions, threading of discussions and message moderation. Also, many online-forums mark the ”hot” and updated discussion threads so that the user knows what has changed since his last visit to the forum. Implementations of online-forums may be either standalone (e.g., phpBB [13]) or modules of a groupware suite or web content-management-system (e.g., phpNuke [15]).

The downside of online-forums is that they require the user to visit the forum website in order to check for new posts. To overcome this problems, many online-forums provide email notifications for new posts or a web syndication mechanism [22]. However, email notifications tend to be annoying (especially if there are many of them) and the vast majority of users are not familiar with web syndication [34].

On the other hand, email is perhaps the most common form of asynchronous communication. Group messaging using email is supported by means of emailing lists that are supported by specialized software [6, 19]. Such software is installed at a mail server and in its most basic form simply relays the incoming emails to the mailing list subscribers. Typical features of mailing list software include moderation of posts, mail-digesting in order to reduce the number of emails and web accessible archiving of messages.

We believe that the use of email and mailing lists for the asynchronous communications of FORWARD would have a number of advantages. Most importantly,

there is no need for training the users to use mailing lists. Also, email protocols [20] provide support for synchronizing the emails for offline use. While offline support is not a requirement for the *FORWARD Online Collaboration Platform*, we believe that is a very desirable feature, especially since many of the people involved with the project travel a lot and spend much time offline. Additionally, with the web-based archiving feature of the mailing list software, mailing lists can be essentially viewed as online-forums with the difference that posting of new messages is done using email. Finally, another advantage of mailing lists is that, in contrast to the online-forums, limited action is required from the user in order to retrieve the posted messages.

To sum up, while both online-forums and email can be used to implement asynchronous communication for the *FORWARD Online Collaboration Platform*, email (with the support of mailing list software) has a number of additional advantages and is, therefore, preferable.

2.2.1.2 Synchronous communication

Different software solutions can be used for the synchronous communication of users. The *Internet Relay Chat* (IRC) [35] is a popular protocol for creating chat rooms and hosting virtual meetings. In general, IRC follows the client-server model. Clients connect to a centralized server and all chat messages are first transmitted to the server and subsequently relayed to the clients that have joined the same *channel*[1]. Channels may also be password protected, thus allowing for *private chats*.

For FORWARD, it would be possible to have an IRC server for serving the required synchronous communication, however, we believe that this solution would not be optimal. The reason is that IRC has a following mostly in the software developer community, so it has to be expected that the majority of the participants of FORWARD are unfamiliar with its use.

Another option for facilitating synchronous communication would be the use of *Instant Messaging* (IM) protocols and software. IM is by far more popular than IRC among all classes of computer users. While many of the IM solutions still rely on centralized servers to relay messages, just like IRC, the communication paradigm used is slightly different. In IM, communication occurs between established contacts, i.e., one has to know the IM handle of a person in order to start an online chat. Also, modern IM solutions offer much more than a simple text-chat service. Many of them include support for audio and video conferencing, file transfers and shared workspaces. These advanced features could prove very useful in order to enhance interaction.

Fears that IM would reduce productivity led business to be originally wary towards IM [39]. However, a study showed that only a 13% of IM conversations included some personal topic and only 6.4% were exclusively personal [37]. With

[1]The term ”channel” is the preferred over ”chat room” in the IRC lingo.

business starting to embrace IM as a low-overhead form of internal communication, a new form of IM emerged: *Enterprise Instant Messaging* (EIM). In EIM, the clients connect to an privately hosted IM server in order to minimize the risk of leaking business secrets and (in some cases) also to eliminate the need to connect all computers to the Internet.

For the synchronous communications required in the context of FORWARD we believe that IM is an excellent solution. This is because of the excellent set of features it provides and also its huge user-base: the top-3 IM protocols accounting for over 100M users each [43]. The huge user-base is largely due to the fact that nowadays computers usually come with at least one IM client installed. So, it would be reasonable to assume that most persons involved in FORWARD are already familiar with some sort of IM. The use of EIM in FORWARD was also considered, but finally it was concluded that the synchronous communications in FORWARD would not be frequent enough to justify setting up and maintaining a dedicated IM server. In order to safeguard the privacy of conversations, it was suggested to either use a privacy IM-plugin like *Off-The-Record messaging* [10, 31] or use an IM protocol with built-in privacy features like Skype[2] [17, 28, 29]. To sum up, any synchronous communications in FORWARD will be facilitated through the existing public IM services with a preference to those services that offer enhanced privacy features.

2.2.1.3 Communicating the results of FORWARD

In the previous paragraphs, we described ways to facilitate the communication needs of the users participating in the FORWARD working groups. However, while not explicitly stated in the specifications of the *FORWARD Online Collaboration Platform*, it is also important to establish a communication channel between the working groups and the public (scientific community, industry, policy makers). This channel will be used to communicate any *intermediate results* of the working groups and also getting feedback on those results. The role of this channel will be complementary to the role of the the project web site, which will be used to publish the *final results* of the working groups in the form of the defined project deliverables.

This communication channel could have the form of additional mailing lists where the working groups will announce the results of their work and interested parties will be invited to subscribe. Another solution for the working groups to communicate with the parties interested in their work would be the use of *blogs*. Blogs are websites maintained by individuals or groups with regular entries of commentary and descriptions of events, usually focused on a particular subject [41].

[2] Analysis of the Skype binaries and generated traffic revealed that interception of a conversation is possible through a man-in-the-middle attack [30]. However, to carry out the attack, one has to either be Skype Inc. or trick all participants into using a modified Skype binary. One also has to control the Skype supernode used for the conversation. So, while Skype does not offer perfect privacy, it is considered safe enough for most purposes.

Most blog software provide support for the reader to leave his comments on a post, which encourages interaction with the author.

Based on our experience from previous European projects, we decided to opt for the later solution. Announcement mailing lists tend to be under-utilized, with only a few major announcements being sent. This is mostly out of fear that regular announcements will be perceived as spamming by the recipients. On the other hand, a blog may be very active because you can make posts even for minor things without fear of spamming people. In essence, the argument that we previously expressed in 2.2.1.1 in favour of the mailing lists is now reversed. The reason is that now we address people that are not committed to FORWARD in any way.

Another disadvantage of the mailing lists is that they do not encourage interaction with the working groups: rarely will someone make some substantial comment in response to a sent announcement. This is because most users perceive their role in an announcement list as purely passive. Finally, announcements sent to a mailing list are more difficult to propagate with word-of-mouth than those posted on a blog. The reason is that in addition to direct comments on a blog, it is also usual for bloggers to use their personal blog to discuss and elaborate their thoughts on posts of other blogs.

2.2.2 Task management

Requirement: *A mechanism to support work flow by allowing to allocate tasks to users, monitor their progress, and hold virtual meetings.*

An important aspect of collaborative work is the coordination and monitoring of tasks. In computer supported cooperative work, the coordination of tasks is usually provided as part of a *Project Management Software Suite*. Most such software suites (*Trac* [23], *Microsoft Project* [8], etc) also include many additional features such as resource management and calendaring.

The main issue with project management suites is that too many different implementations exist. Wikipedia alone lists more than three dozens of such software [42]. So it is highly unlikely to find an implementation that most of the FORWARD users would be familiar with. Therefore, training will be required for the users, which contradicts the implicit requirement we identified at the beginning of this section.

Also, we should note that most project management suites are tailored for use in a corporate environment. In such environments, a more strict task work flow is usually required. This is because the types of project objectives in corporate environments are usually quite different from the objectives of a Coordination Action such as FORWARD. So, while these suites can be used in the *FORWARD Online Collaboration Platform*, they would not provide any substantial advantage that would justify their required learning curve.

In the search of a tool that would require short or no learning period and would also be more flexible to use, we turned to a private *Wiki*. A wiki is a web site

site that can be modified or contributed to by users using simplified markup language [33, 45]. Despite their simplicity, wikis have proven to be very flexible in practice, largely because anyone can grasp the basics of editing merely in minutes.

For managing tasks and the work flow using a wiki, one can create a separate page per group of tasks. Then, each person having an assigned task can go and edit the respective part of the page with the latest updates on its progress. Wikis usually have some features that make this process easier: there is a shortcut for automatically placing a time-stamp next to your update, you can visually compare two different versions of a wiki page to see what has changed (see Figure 2.2), you can use full-text searching for finding your assigned tasks, etc. While this scheme is not as sophisticated as a specialized project management suites, it is substantially easier to use. Our belief is that its ease of use and its versatility (see Section 2.2.3 below) make the use of a wiki a good choice for facilitating the needs of FORWARD.

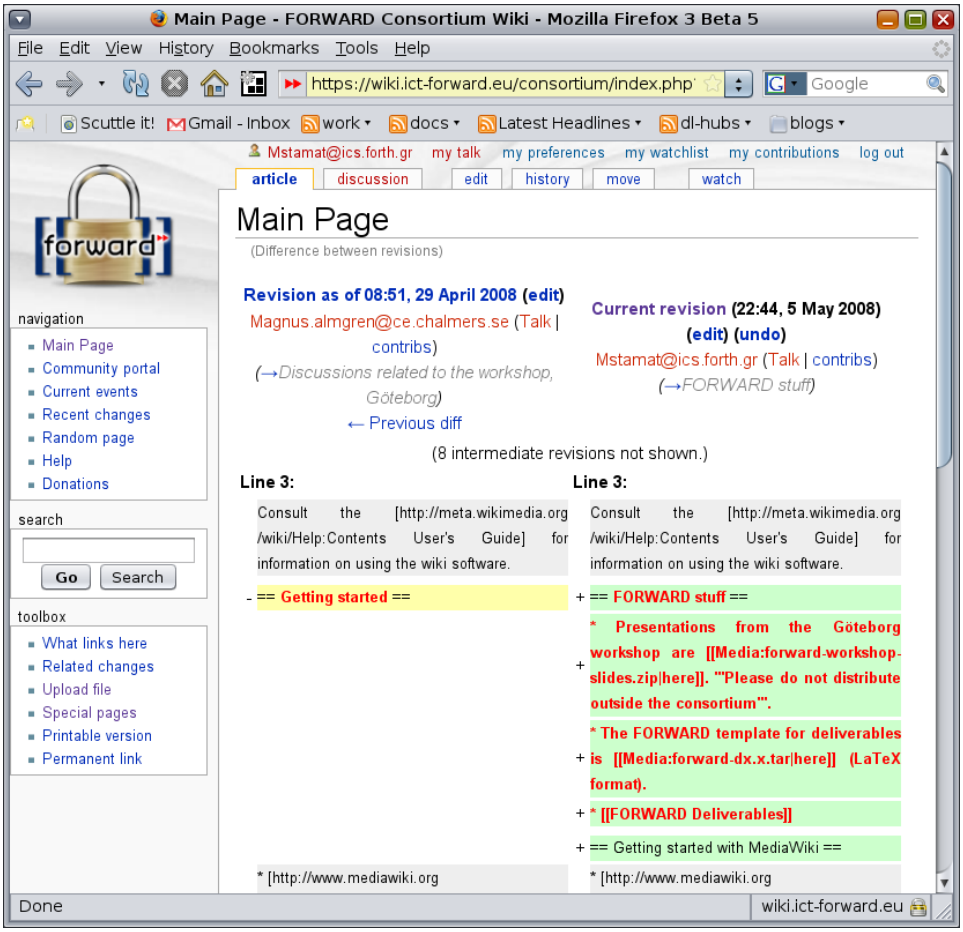

Figure 2.2: Visual display of differences in two versions of a wiki page

Finally, the virtual meetings requirement is satisfied by the use of IM that we proposed in 2.2.1.2 above.

2.2.3 Documents and resource management

Requirement: *A mechanism to manage the resources and documents, and to quickly search and browse these resources.*

File and resources management tools exist both as independent web applications and as modules of web application suites. If we use some groupware software suite for the *FORWARD Online Collaboration Platform*, it is very likely that it will have integrated some sort of file management and search facility.

On the other hand, if we decide to build the *FORWARD Online Collaboration Platform* out of independent software components, we will have to find a way to facilitate this requirement. An option is to use a fully fledged *Document Management System* (DMS) (e.g., Knowledge Tree [5]). Except for storage of documents, DMS systems also provide features such as fine-grained access authorization, full-text indexing and search, versioning, etc. However, the setup and user training overhead of DMS systems makes them more appropriate for long-term use in a corporate environment. For documents and resource management in the scale of FORWARD, the use of a fully-fledged DMS would probably be overkill.

Another solution would be the use of a multi-user, web-based file browser (e.g., AjaXplorer [2]). Web-based file browsers mimic the functionality of local file systems, allowing users to organize the documents in a directory hierarchy. They are simple in functionality, usually providing little less that some authorization mechanism. However, because they follow a paradigm that users are already familiar with, they are very easy to use and practically require no training.

A final option would be to use the wiki we discussed previously in 2.2.2 in order to store and organize the documents. The use of the wiki has the advantage that files and resources will be kept in the same place as their associated tasks. So, there will be less burden for the users in order to find the document or resource they want. Also, wikis retain all the different versions of uploaded files, which saves the users from having to manually keep track of them. Finally, in addition to storing documents, a wiki can also be used as multi-user editor to prepare them. We believe that using a wiki to store and manage documents for FORWARD is a good choice that provides a good balance between features and ease of use.

2.2.4 User-group defining mechanisms

Requirement: *A mechanism to define logic categories or groups, and a way to assign users to one or more of these categories.*

Most multi-user web applications come with their own mechanism to define groups and categories for use within the application. If we use some groupware

suite for the *FORWARD Online Collaboration Platform* that contains all the components we require, then this requirement applies directly to this suite.

Problems arise if we decide to use separate applications for each identified component. This would mean that we would have to create the user groups and categories once in each application, and, subsequently, we would have to manually synchronize any changes we make. This process would be both tedious and error-prone.

To overcome this problem, the groups should be defined in a *directory service*. Today, the most common directory service is LDAP [36]. LDAP directories allow to store user profile data, organize them in a hierarchy and in arbitrary groups and query the directory for users matching specific data. Also, LDAP directories support user authentication against a password associated with each user's profile. Each user profile may include arbitrary attributes that can be either text (e.g., email address) or binary (e.g., photo of the user).

Because of its wide deployment, LDAP is supported by many web applications as a user authentication and management back-end. The support comes either in the core of the web application or as an add-on module. With the lack of other viable alternatives to provide a common user-grouping mechanism, the LDAP support becomes a requirement to any standalone web-application that we selected for the implementation of *FORWARD Online Collaboration Platform*.

Chapter 3

The FORWARD online collaboration platform

3.1 Summary of the identified components

In the previous chapter, we discussed the different components that will be used to create the *FORWARD Online Collaboration Platform*, according to the requirements we have set. The identified components were:

- A web server and web site for the platform to run on.
- A wiki for coordinating tasks and managing documents and resources.
- Instant messaging (IM) for holding virtual online meetings.
- Mailing lists for facilitating asynchronous communication between the members of the FORWARD working groups.
- Blogs for communicating to the community any intermediate results of the working groups.
- An LDAP server that will be used for defining user groups and providing a common authentication back-end.

The main web applications required for the *FORWARD Online Collaboration Platform* are the wiki and the blogs. We decided that it would be good for the ease of use of the platform to run one of the most popular implementation for each of these components. For this reason, we opted not to use an all-in-one groupware suite. In the remaining sections of this chapter, we will detail our components of choice.

3.2 The FORWARD website

The FORWARD website is the central point of reference for the project. Through the website the members of the working groups and the public will be able to navigate to all of the *FORWARD Online Collaboration Platform*. It is accessible through `http://www.ict-forward.eu` and its front page can be seen in Figure 3.1. The `ict-forward.eu` domain has been leased for a period of 5 years.

The website runs on the *Linux 2.6* kernel [21] and the *Apache 2.2* web server [3]. The dynamic pages are generated using the *Django web framework* [18, 16]. The pages comply to the *XHTML 1.0 Strict* standard [40] and have been tested to render correctly with the latest versions of all popular web browsers. The web server also supports dynamic pages in *PHP* [12], which is a requirement for many web applications. Finally, the web server is supported by a separate SQL server that runs *MySQL 5.0* [9]. All the software is regularly updated in order to be immune to known (and patched) security vulnerabilities.

3.3 The FORWARD wiki

The wiki implementation we chose for the *FORWARD Online Collaboration Platform* is *MediaWiki* [7]. MediaWiki was originally written for use by Wikipedia [24], a free online encyclopedia that is comprised of articles contributed and updated by its community of readers. For this reason, MediaWiki is perhaps the most widely used wiki software. Chances are that many of the members of the FORWARD working groups will have used it at some point in time (e.g., to make some minor or major contribution to Wikipedia). Also, MediaWiki supports LDAP as an authentication back-end.

However, MediaWiki has a few shortcomings. Out of them, the one that affects FORWARD the most is its limited features for restricting access to specific pages. Fortunately, because in FORWARD we want to have different access rights per working group, we can overcome this restriction by setting up multiple instances of the software. After discussion, it was decided to setup the following instances:

- A *Consortium Wiki* for internal use by the FORWARD consortium. It is required to be a member of the consortium to either read or write in this wiki. It is accessible from `http://wiki.ict-forward.eu/consortium/`.
- A *FORWARD Wiki* for the consortium to publish items that do not fit well in the main FORWARD website or the blog. A screenshot of this wiki can be seen in Figure 3.2. It is accessible from `http://wiki.ict-forward.eu/forward/`.
- One wiki per working group. Each of those wikis will be readable/writable only by the members of its working group as well as from the members of the FORWARD consortium. The URLs for the wikis of the three working groups defined so far are:

Figure 3.1: The FORWARD website front page.

- Smart Environments working group:
  `http://wiki.ict-forward.eu/smart-environments/`
- Malware & Fraud working group:
  `http://wiki.ict-forward.eu/malware-fraud/`
- Critical Systems working group:
  `http://wiki.ict-forward.eu/critical-systems/`

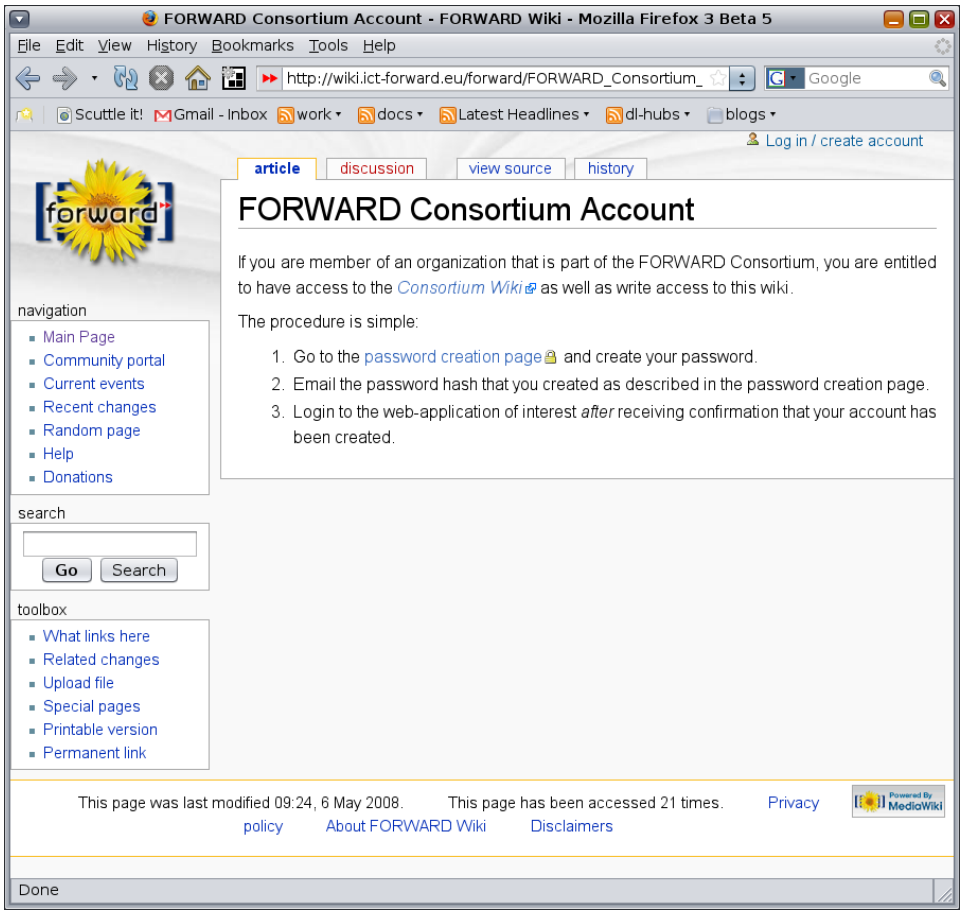

Figure 3.2: The FORWARD wiki.

Each instance of MediaWiki restricts access by allowing only users of specific groups (defined in the FORWARD LDAP directory) to read and/or modify its pages. Finally, we should mention that for making software maintenance and updates easier, all the MediaWiki instances share the same installation files and most of their configuration. Also, in order to automate the process of creating new MediaWiki instances, we have created a custom shell script.

3.4 The FORWARD mailing lists

Because maintaining a separate mail server for FORWARD is a tedious and time-consuming task, it was decided to use the existing email infrastructure of FORTH in order to host the FORWARD mailing lists. The following lists have been created:

- Smart Environments working group: smart-environments@ict-forward.eu
- Malware & Fraud working group: malware-fraud@ict-forward.eu
- Critical Systems working group: critical-systems@ict-forward.eu

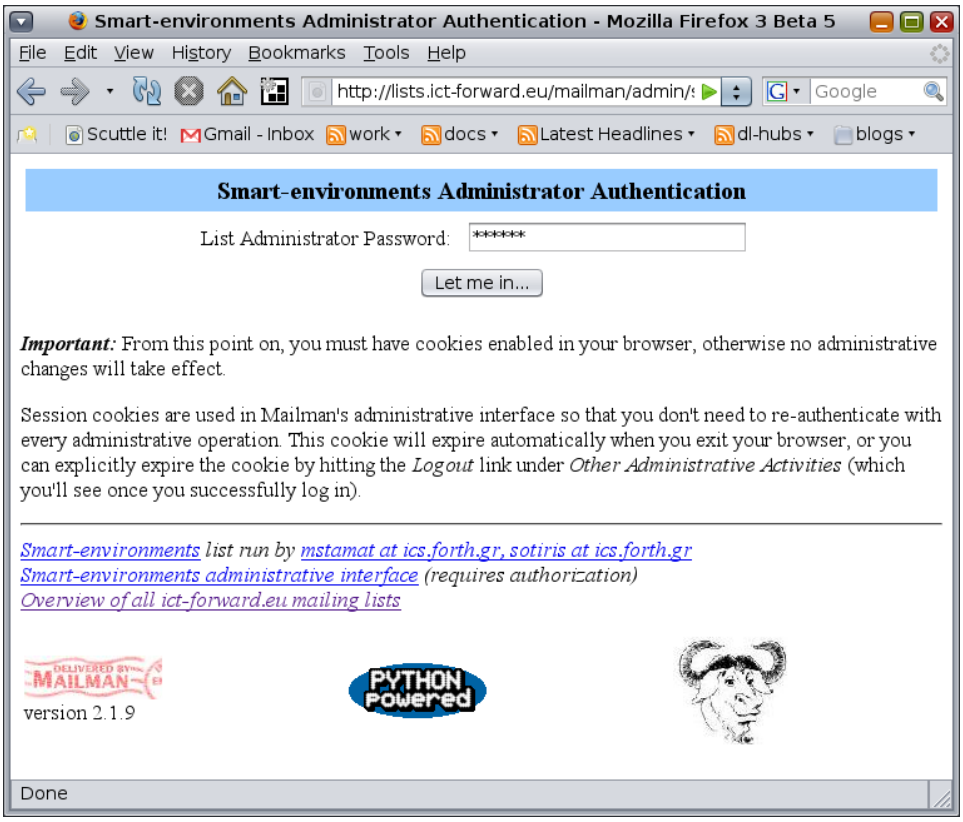

Figure 3.3: Login page of the FORWARD mailing lists administrative interface.

The mailing list software that is used to support the mailing lists is Mailman [19]. Mailman offers a web interface to administer and moderate the lists. The login screen of the administrative interface can be seen in Figure 3.3. It also offers automated archiving of the list email.

3.5 The FORWARD blogs

The chosen blog software for the *FORWARD Online Collaboration Platform* is *WordPress* μ [25] (WPMU). WPMU is the software used by `wordpress.com`, a very popular free blog hosting site with hundreds of thousands of blogs. It is also used to host the blogs of Le Monde and Harvard University.

Its main advantage is that it natively supports multiple users. The actions that a user can perform on a each blog are restricted by his assigned role for this blog. The designated administrators of each blog are responsible for assigning roles to other users, approving posts and moderating comments. WPMU is also very easy to use, as it features a WYSIWYG[1] editor for editing the posts. Finally, it also automatically provides web syndication feed [22] for the posts and the comments of each blog.

The creation of a separate blog for each working group has been postponed. This is because it still is not clear how often the working groups will be able to post to their blogs. However, these blogs can be created in WPMU any time it is requested by the working group leaders. The two blogs that are operational at this time are:

- `http://blogs.ict-forward.eu/`: This blog is actually an index for providing links to all the FORWARD blogs.

- `http://blogs.ict-forward.eu/forward/`: This blog is maintained by the members of the FORWARD consortium. It contains the latest news from the project and also updates on upcoming and recent security related events. A screenshot of this blog is depicted in Figure 3.4.

3.6 The FORWARD LDAP server

The *FORWARD Online Collaboration Platform* uses *OpenLDAP* [11], the standard LDAP implementation for Linux. For managing the LDAP directory, the phpLDAPadmin [14] web interface is used. Access to this web interface is restricted only to the FORTH's internal network.

Despite the fact that LDAP works on the background, there are cases that the end users of the *FORWARD Online Collaboration Platform* need to interact with it. These cases regard the initial choice and the changing of users' passwords. In order to facilitate these needs, we created a *password change page* (see Figure 3.5) by reusing some of the phpLDAPadmin source code.

The password change page does not directly update the password stored in the LDAP directory. Instead, it creates an encrypted password hash that can be then be submitted (usually by email) to the FORWARD LDAP administrator for replac-

[1] WYSIWYG is an acronym for "What You See Is What You Get". It refers to computer editors in which the content during editing appears very similar to the final (e.g., printed) product.

Figure 3.4: The FORWARD blog.

ing the existing password. This way, we avoid distributing plain-text passwords through email.

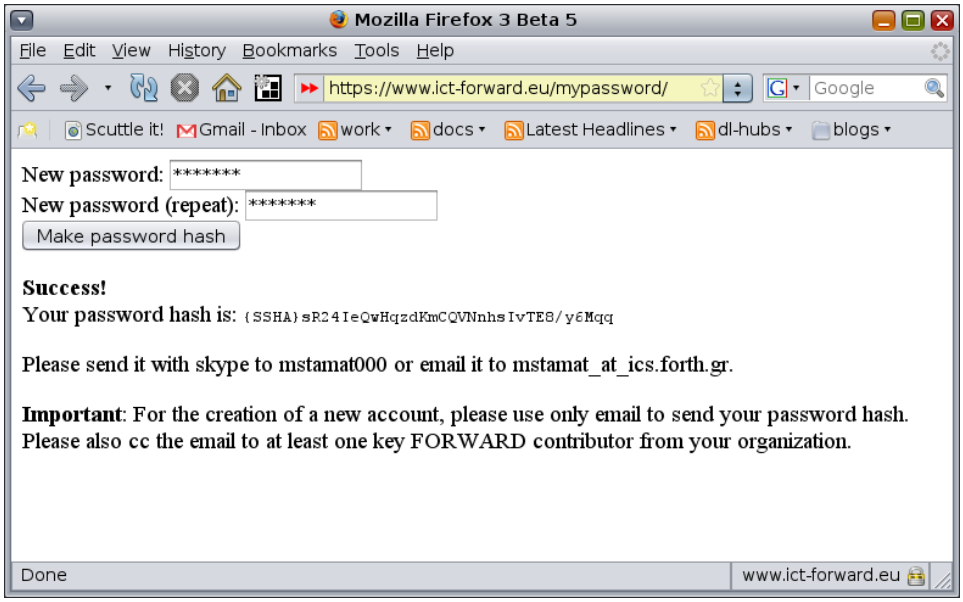

Figure 3.5: The FORWARD password-hash creation page.

3.7 Hardware and hosting

The partner responsible for setting up, hosting and maintaining the *FORWARD Online Collaboration Platform* is FORTH. Most components of the platform are hosted on a recently purchased server. The hosting server features two Intel Xeon CPUs running at 3.2GHz and a total memory of 2GB. It is connected to the Internet through FORTH's Gigabit connection to the the GRNET[2] backbone. The server has two disks arranged as RAID-1 for fault-tolerance.

To minimize the risk from cyber-threats against the server, it is protected by both hardware and software firewalls. The firewalls restrict access to services other than HTTP. As an additional security measure, the databases required for the various web applications of the *FORWARD Online Collaboration Platform* are located on a separate server. Access to the database server is even more restricted. Daily rsync backups are performed for both servers.

The physical security of the FORWARD collaboration server is also taken seriously. It is hosted in FORTH's newly built data-centre. The data-centre is fitted with industrial-strength air conditioning, automatic fire-extinguishing system and UPS supported by an external power generator. The same facilities are used to sup-

[2]GRNET is the Greek NREN.

port the EGEE grid node located in FORTH, which is one of the largest computing clusters in south-eastern Europe.

As we have already mentioned in Section 3.4, the FORWARD mailing lists are supported by FORTH's central mail server. This server is dedicated for serving FORTH's mail traffic and is physically located in a separate data-center than FORWARD 's collaboration server. The server is under close scrutiny from FORTH's network administrators to guarantee the uninterrupted delivery of emails.

Chapter 4

Conclusions

In this document, we discussed the Online Collaboration Platform that we prepared for use by the working groups of FORWARD. Given the functional requirements of this platform, we considered several software components to satisfy them. A major consideration for choosing the components of the platform was their ease of use and the potential familiarity of the working group members with the software. The setup of the platform was subsequently detailed.

The existing platform covers the defined functional requirements. Of course, we are ready to make it better wherever room for improvement is identified. An improvement we are currently investigating is eliminating the manual intervention required whenever a user changes password. The current procedure is detailed in Section 3.6. However, since most users rarely change their passwords, we consider the automation of this process more as polishing of the platform than as a bug-fix. Another useful addition to the existing platform could be a CVS [4] repository for the collaborative editing of the project deliverables.

Closing, we should mention the major part of the *FORWARD Online Collaboration Platform* has been online from early on in the project. The FORWARD consortium members have been using it over the last several weeks. Any bugs and glitches that were identified have been fixed. As a result, the *FORWARD Online Collaboration Platform* is considered ready for use by the members of the FORWARD working groups.

Bibliography

[1] The 1st FORWARD workshop. http://www.ict-forward.eu/workshop/.

[2] AjaXplorer web based file browser. http://ajaxplorer.sf.net/.

[3] Apache HTTP server project. http://httpd.apache.org/.

[4] Concurrent Versions System. http://www.nongnu.org/cvs/.

[5] Knowledge Tree Document Management Software. http://www.knowledgetree.com/.

[6] Majordomo mailing list manager. http://www.greatcircle.com/majordomo/.

[7] MediaWiki. http://www.mediawiki.org/.

[8] Microsoft project. http://office.microsoft.com/en-us/project/default.aspx.

[9] MySQL Open Source Database. http://www.mysql.com/.

[10] Off-the-record messaging. http://otr.cypherpunks.ca/.

[11] OpenLDAP. http://www.openldap.org/.

[12] PHP Hypertext Preprocessor. http://www.php.net/.

[13] phpBB online-forum software. http://www.phpbb.com/.

[14] phpLDAPadmin: web-based LDAP browser to manage your LDAP server. http://phpldapadmin.sf.net/.

[15] phpNuke CMS. http://phpnuke.org/.

[16] Python Programming Language. http://www.python.org/.

[17] Skype. http://www.skype.com/.

[18] The Django web framework. http://www.djangoproject.com/.

[19] The GNU mailing list manager. http://www.list.org.

[20] The Internet Message Access Protocol. http://www.imap.org/.

[21] The linux kernel archive. http://www.kernel.org/.

[22] The RSS advisory board. http://www.rssboard.org/rss-specification.

[23] Trac project. http://trac.edgewall.org/.

[24] Wikipedia, the free encyclopedia. http://www.wikipedia.org/.

[25] Wordpress μ. http://mu.wordpress.org/.

[26] C. Allen. Tracing the Evolution of Social Software. http://www.lifewithalacrity.com/2004/10/tracing_the_evo.html.

[27] R. Baecker and W. Buxton, editors. *Readings in Human-Computer Interaction: A Multi-Disciplinary Approach*. Morgan Kaufmann Publishers, Inc., 1987.

[28] S. Baset and H. Schulzrinne. An Analysis of the Skype Peer-to-Peer Internet Telephony Protocol. In *25th IEEE International Conference on Computer Communications*, pages 1–11, 2006.

[29] T. Berson. Skype security evaluation. Technical Report ALR-2005-031, Anagram Laboratories, 2005.

[30] P. Biondi and F. Desclaux. Silver Needle in the Skype. In *BlackHat Europe '06*, March 2006.

[31] N. Borisov, E. Brewer, and I. Goldberg. Off-the-Record Communication, or, Why Not To Use PGP. In *Proceedings of the 2004 Workshop on Privacy in the Electronic Society*, October 2004.

[32] D. deB Beaver and R. Rosen. Studies in scientific collaboration Part I. The professional origins of scientific co-authorship. *Scientometrics*, 1(1):65–84, September 1978.

[33] Encyclopaedia Britannica Online. "wiki", May 2008. `http://www.britannica.com/eb/article-9404276/wiki`.

[34] J. Grossnickle, T. Board, B. Pickens, and M. Bellmont. RSS - Crossing into the Mainstream, October 2005. `http://publisher.yahoo.com/rss/RSS_whitePaper1004.pdf`.

[35] Internet Engineering Task Force. Internet Relay Chat Protocol. `http://www.ietf.org/rfc/rfc0977.txt`.

[36] Internet Engineering Task Force. Lightweight Directory Access Protocol. `http://www.ietf.org/rfc/rfc4510.txt`.

[37] E. Isaacs, A. Walendowski, S. Whittaker, D. Schiano, and C. Kamm. The character, functions, and styles of instant messaging in the workplace. In *Proceedings of the ACM CSCW '02 Conference*, November 2002.

[38] J. C. R. Licklider and R. Taylor. The computer as communication device. *Science and Technology*, pages 21–31, September 1968.

[39] Radicati Group. Instant messaging and SMS, market trends 2001-2004, 2001.

[40] W3C Consortium. XHTML: 1.0 The Extensible HyperText Markup Language. `http://www.w3.org/TR/xhtml1/`.

[41] Wikipedia. "blog". `http://en.wikipedia.org/wiki/Blog`.

[42] Wikipedia. List of project management software. `http://en.wikipedia.org/wiki/List_of_project_management_software`.

[43] Wikipedia. Popularity matrix of im protocols. `http://en.wikipedia.org/wiki/Instant_messaging_%26_messengers#User_base`.

[44] Wikipedia. "usenet newsgroups". `http://en.wikipedia.org/wiki/Newsgroup`.

[45] Wikipedia. "wiki". `http://en.wikipedia.org/wiki/Wiki`.