

SEVENTH FRAMEWORK PROGRAMME

Information & Communication Technologies
Trustworthy ICT

NETWORK OF EXCELLENCE



A European Network of Excellence in Managing Threats and Vulnerabilities in the Future Internet: *Europe for the World*[†]

Deliverable D2.1: Web Site

Abstract: This document discusses the features of the SysSec project website and the methods used for its development. Additionally, possible future enhancements are highlighted.

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Editor	Manolis Stamatogiannakis
QMC Reviewer	Herbert Bos

The SysSec consortium consists of:

FORTH-ICS	Coordinator	Greece
Politecnico Di Milano	Principal Contractor	Italy
Vrije Universiteit Amsterdam	Principal Contractor	The Netherlands
Institut Eurécom	Principal Contractor	France
IPP-BAS	Principal Contractor	Bulgaria
Technical University of Vienna	Principal Contractor	Austria
Chalmers University	Principal Contractor	Sweden
TUBITAK-UEKAE	Principal Contractor	Turkey

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This document aims to detail the creation of the public SysSec website which was the main objective of Task WP2.1 of the project. The SysSec website can be accessed from <http://www.syssec-project.eu/>.

This is the first task of the *Dissemination Workpackage* (WP2), which has the objective to maximize the impact of the project by making its activities and results visible and accessible to a broader stakeholder community, which, in turn will benefit from them. An effort will also be made to communicate the results of SysSec and the level of excellence achieved also to the general public.

More specifically, with our work in the context of WP2 we aim:

- to make SysSec's contributions to the advancement of the state of the art in systems security evident.
- to make the SysSec contributions accessible to a wider audience (in principle, to the general public) in order to contribute to the awareness raising initiatives of EU organizations.
- to contribute to policy making activities.
- to maximize the impact of the project by spreading the excellence beyond the partners and by disseminating the results to the appropriate stakeholders.

The Task WP2.1 concerned the creation, management and update of the SysSec web site. Websites are arguably the most *persistent* means of dissemination for EC-funded projects. With proper promotion (e.g., through the websites of the consortium members) they can help the project to remain visible and make its output available to the public long after the formal conclusion of the project.

We expect that the SysSec website will be a major dissemination mechanism towards SysSec's stakeholder community. Additionally, with the integration of *social networking features* to the website we hope that the website will actually contribute to attracting interest from more stakeholders, thus building a *stronger community* around SysSec. Additionally, the website will feature a *private* consortium-only area which will be used as the major collaboration tool among the partners.

1.1 Document outline

In the following Chapters, we will describe the SysSec website as it was at the time of delivery of this document. In Chapter 2 (page 9) we initially present the content and features of the SysSec website and then describe how the site can be updated using a web browser.

Next, in Chapter 3 (page 23) we describe the tools we used to build the site and why we chose them. We also briefly present the principles that the site is based on and the *web standards* that the SysSec website adheres to. Closing the chapter we present the hardware and network infrastructure we use to run the site.

Finally, in Chapter 4 (page 29) we summarize the website setup and outline possible future enhancements. The presented enhancements are features that are not essential for the website to carry out its purpose, but could be useful to add during the course of the project.

Website contents and update

2.1 SysSec website timeline

At the official project launch date (September 1, 2010) a banner was already welcoming visitors of the SysSec website. Additionally, a draft template (see Figure 2.1) was presented during the kickoff meeting.

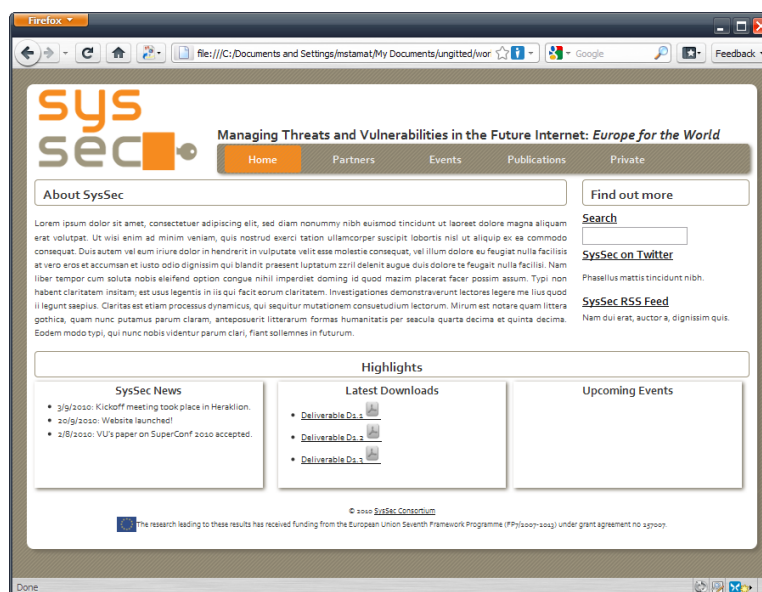


Figure 2.1: SysSec draft website template.

The template tentatively used a logo based on one of the designs drafted by Michalis Polychronakis from FORTH. Federico Maggi from PoliMi also presented some additional logos during the kickoff meeting. After discussion it was decided to use the design in Figure 2.2 as the official logo of the

project. The main arguments in favor of this design were its *minimalistic design*, *distinct colors* and the overall *clear-cut rendering* of the project name.



Figure 2.2: The official SysSec logo.

After the kickoff meeting FORTH made further improvements on the website template and finally launched the SysSec website on **September 23, 2010**. The site received a minor template in early October in order to accomodate multi-level content menus.

2.2 Public website sections

The public sections of the SysSec website aim to:

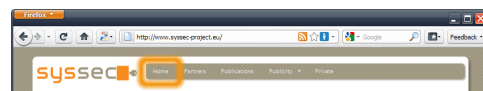
- provide information about the project and its goals.
- make public the results produced by the project, such as papers, organized events, talks etc.
- help interested parties to get in touch with the SysSec consortium and community.

Following, we will describe each of the sections and highlight how they contribute to the realization of these goals.

2.2.1 Home Section

The primary goal of the *Home* section is to provide a general overview of SysSec and its goals. Since this is the default landing page of the website, it also provides the latest news on the project.

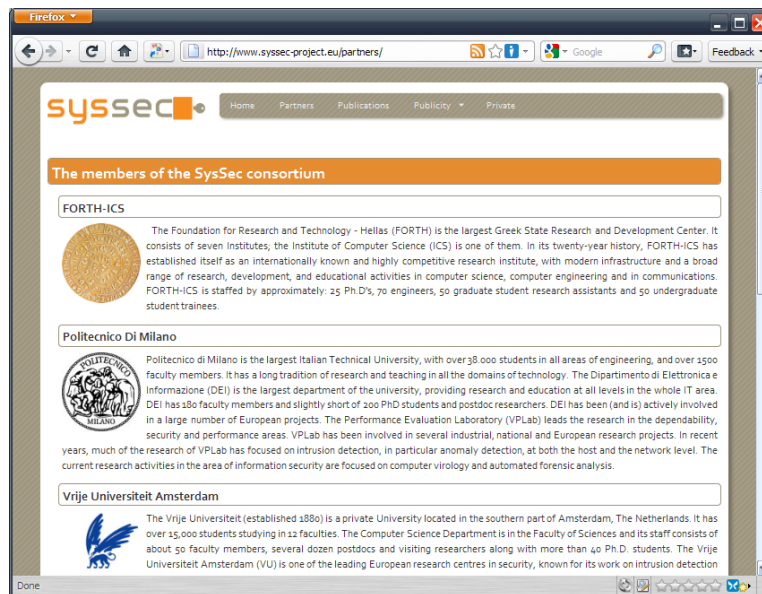
As Figure 2.3(a) shows, the *Home* section uses a two-column layout. The larger left part is used to provide the overview of the project. The right part of the layout is used to show the latest SysSec news and to encourage visitors to subscribe to the *dissemination mailing list* of the project. The displayed news are pulled in realtime from the SysSec Twitter feed. More information on the Twitter integration to the website can be found later in Section 2.4.



2.2. PUBLIC WEBSITE SECTIONS



(a) Website home page.



(b) Partners section.

Figure 2.3: Public sections of SysSec website

2.2.2 Partners Section

The *Partners* section (Figure 2.3(b)) provides information on the members of the SysSec consortium, aiming to get the visitor known to them and also to make their position evident as leaders in the systems security research in Europe. This is very important for the consortium of a *Network of Excellence*.

For each partner a general organization overview is provided which is followed by details on their SysSec related activities. Next each partner's description their logo is displayed.



2.2.3 Publications Section

The *Publications* section (Figure 2.3(c)) is used to make available to the public the documents published by SysSec. Currently it contains a single page with the list of the conference papers that have been funded by SysSec. As the list of published documents will expand both in length (i.e. more conference papers) and in diversity (i.e. inclusion of deliverables) it is expected that more pages will soon be added to this section.

In its current state, the title of each paper is added to the page as soon as its acceptance notification is received. The download link is added later when the text of the paper has been finalized (*camera ready version*). All publications in this section are associated with anchor links.

When a visitor reaches the page from a link that contains an anchor, the corresponding paper will be highlighted as shown in Figure 2.3(c). This way of linking a publication is preferred because it is less obtrusive to the user than a direct link to the pdf file, which in many configurations results in the document being loaded “inside” the browser and is considered a major distraction. It is also less beneficial to the dissemination of the project results because it does not let the user browse through the other SysSec publications.

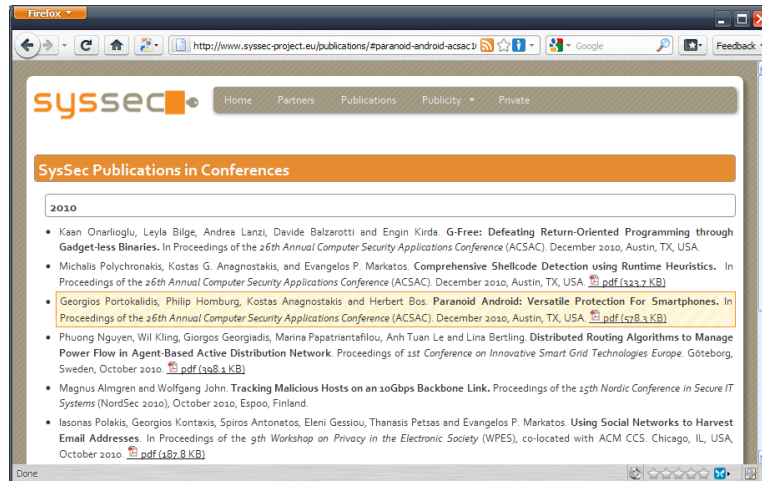


2.2.4 Publicity Section

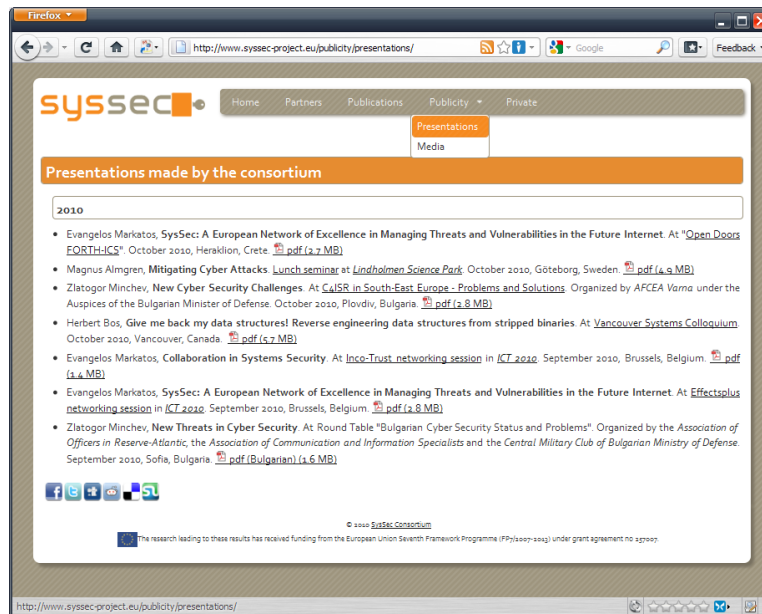
The final public section of the SysSec website contains information for the remaining dissemination actions of the consortium. Because these actions can be quite diverse, this section has been structured in two levels from the launch of the website.



2.2. PUBLIC WEBSITE SECTIONS



(c) Publications section. A paper has been highlighted because the url contains an anchor link: <http://www.syssec-project.eu/publications/#paranoid-android-acsac10.pdf>



(d) Publicity section. The drop-down menu appears expanded allowing access to the two pages of the section (*Presentations* and *Media*).

Figure 2.3: Public sections of SysSec website

As we can see in Figure 2.3(d), at the time of writing of this document the section is comprised by two pages. The *Presentations* page details the talks, seminars and presentations made by the consortium to promote the project. The *Media* page lists the references to the project found online and in traditional media.

The contents of this section can help the visitor learn more about the project without having to consult the more technical-oriented documents in the *Publications* Section.

2.3 Website *Private Area*

The private area of the website is intended as a platform that will help the partners synchronize their actions and collaborate.

For several months during the writing of the project proposal, the consortium had been collaborating using the *Subversion version control system* [12]. Subversion (SVN) proved very convenient for making concurrent edits to the consortium shared files. Additionally, most partners already had credentials for the shared SVN repository. For these reasons and in order to avoid fragmentation it was decided to stick with the exclusive use of the *SysSec SVN Repository* as a collaboration platform.

However, because a Subversion client is not always available it was decided to integrate access to the repository in the *SysSec* website. The *Private Area* of the *SysSec* website is the web frontend to the *SysSec SVN Repository* and is shown in Figure 2.4.

The *Private Area* gives the partners read-only access to all revisions of the project files. Most of the Subversion read-only operations, like showing the differences between text files (*svn diff*), showing who contributed each line of a text file (*svn blame*) etc, are also supported. Moreover, the same credentials are used.

There are also some extra features that are provided. During browsing the modification time and revision information are displayed for each file and directory. This makes it very easy to spot where other partners have been working and provide contributions. Also, the *Private Area* provides the capability to collectively download all the files of a directory in the *GNU tar* archive format.

In general, the lack of write-access through the browser is perhaps the only missing feature of the website *Private Area*. Otherwise it has been proved very convenient and has been used by the consortium even in cases where a Subversion client is available.

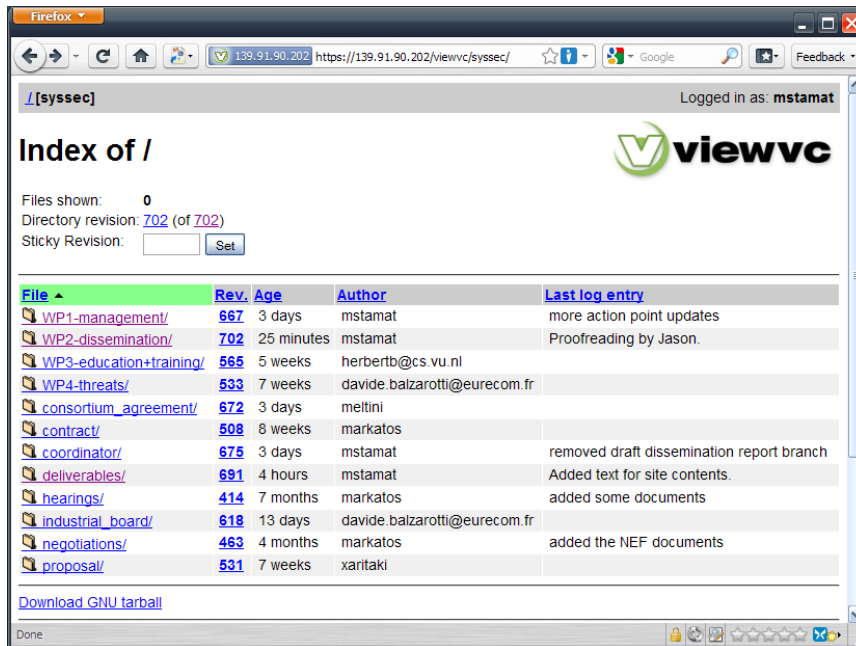


Figure 2.4: Private Area.

The *Private Area* allows partners to browse through all the revisions of the project files.

2.4 Integration with Social Networks

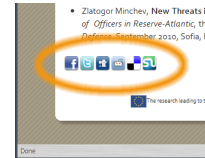
Social networks[21] can be seen as electronic *aggregators* of someone's personal interests and provide a fairly easy way to subscribe/unsubscribe to various information sources. For this reason, social networking plays an increasingly important role in the dissemination of all kind of information. On the other hand, the traditional mailing lists are much more cumbersome to subscribe/unsubscribe and have been regularly associated with spam. As a result, in the recent years many people have become quite wary towards joining mailing lists, e.g., to receive SysSec news, while on the other hand they are quite comfortable with using a social network to receive exactly the same news.

Additionally, notifications received through social networks could be seen as the electronic equivalent of *word of mouth*. E.g., if a user receives a notification that a colleague of his “likes” SysSec, he will probably consider finding out more about the project. This makes social networks a notably good medium for the dissemination of information.

For these reasons, the SysSec consortium decided to explore the use of social networking as a dissemination medium complementary to its *dissemination mailing list*. Towards this ends, a SysSec presence was established in

two of the most popular social networks: *Facebook* and *Twitter*. This should help us *evaluate* the use of social networking for future projects as well.

Moreover, we have added a *social toolbar* at the bottom of each page on the SysSec website which allows visitors to easily share the content with their social network contacts. The location of the bar at the bottom of the page can be seen on Figures 2.3(a) and 2.3(d). Apart from Facebook and Twitter, the bar supports sharing our pages on *Digg* and *Reddit* (social news websites), *Delicious* (a social book-marking service) and *Stumbleupon* (a social web recommendation service).



2.4.1 Twitter

Twitter[18] is social networking microblog that enables users to communicate with short messages called *tweets*. Users are able to “*follow*” other users which results in the tweets of the followed user being displayed in their personal message feed. As of April 2010 it has over *100 million users*[22].

The Twitter profile of SysSec¹ can be seen on Figure 2.5(a). It has been integrated to the SysSec website in the form of the *news feed* of the *Home* section (Figure 2.3(a)). Twitter is also used to produce the *RSS feed* of the website. RSS feeds can be used to deliver timely information to interested parties and let them continue using the RSS aggregator of their choice (e.g., Google or their favourite email client with RSS support).

At the time of writing of this document, our profile had *21 followers*. While this number appears small, it still hides good potential. Researchers [24] have shown that when a tweet is retweeted, it will eventually reach an average of 1000 users, irrespectively of the number of followers of the original poster. So, what is really important is not to have dozens of followers, but to have a few followers that consistently find your tweets interesting enough to retweet.

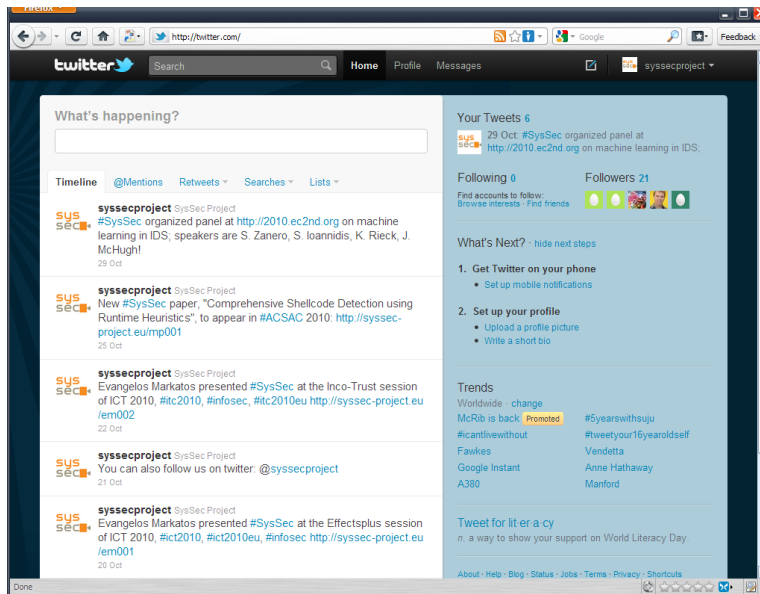
2.4.2 Facebook

Facebook[4] is the most popular social network site and website. It was launched in February 2004. Facebook is much more complex than Twitter as it works as a social platform that allows many independently developed applications to run. Its richer content makes it appealing to a much larger audience. As a result, by mid 2010 Facebook had more than *500 million active users*[26].

The much larger potential audience in Facebook led to the consortium’s decision to also establish a SysSec presence there. As a result, a SysSec page

¹ Our Twitter profile can be accessed on <http://twitter.com/syssecproject>

2.4. INTEGRATION WITH SOCIAL NETWORKS



(a) SysSec Twitter Page



(b) SysSec Facebook Page

Figure 2.5: SysSec presence in social networks

was created on Facebook² which can be seen on Figure 2.5(b). Since the consortium wouldn't like to invest additional effort in producing Facebook-specific content, a Facebook application called *RSS Graffiti*[11] has been installed to synchronize its contents with the contents of our Twitter page.

The larger user base of Facebook has helped our page reach more people than our Twitter profile. At the time of writing, the page had 93 *fans*. More interestingly, the latest statistics provided by Facebook indicated more than 100 visits within a week. This makes us conclude that our Facebook page has the potential to attract additional interest for the activities of the project through its course.

2.5 Updating the Website

The contents of the SysSec website can be easily updated using a web browser. This feature is provided by the CMS we use. More details about it will be discussed later in Section 3.2. In this section we will focus on its use in order to update the website contents.

After authentication, the website editor is presented with the *Site Administration Panel* shown in Figure 2.6(a). Through this panel all of the website's modules can be configured.

The contents of the site are updated through the *CMS module* which appears highlighted in Figure 2.6(a). By following its Pages link, the *page hierarchy panel* (shown in Figure 2.6(b)) is displayed. The panel allows the website editor to restructure the website menu by using *drag & drop* on the items. Additionally with a single-click the editor may hide a page from the navigation menu or take it offline.

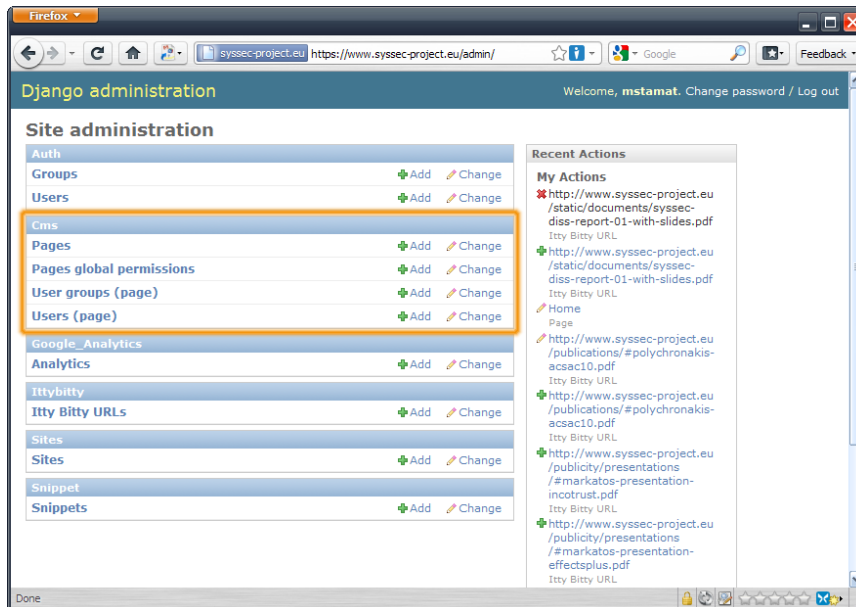
When the author chooses to edit a page the *Page Options* interface is displayed (Figure 2.6(c)). This interface allows the editor to change the page contents and also set most page-specific options such as its name in the hierarchy (*slug*), title and search engine optimization meta tags.

The actual content of the page is encapsulated in *Content Plugins*. Content Plugins produce HTML output which is placed in designated locations in the template called *placeholders*. In the second highlighted area in Figure 2.6(c) we can see the plugins used for the *Home* section of the SysSec website. Some plugins are specialized for interfacing with a specific data source, e.g., Twitter.

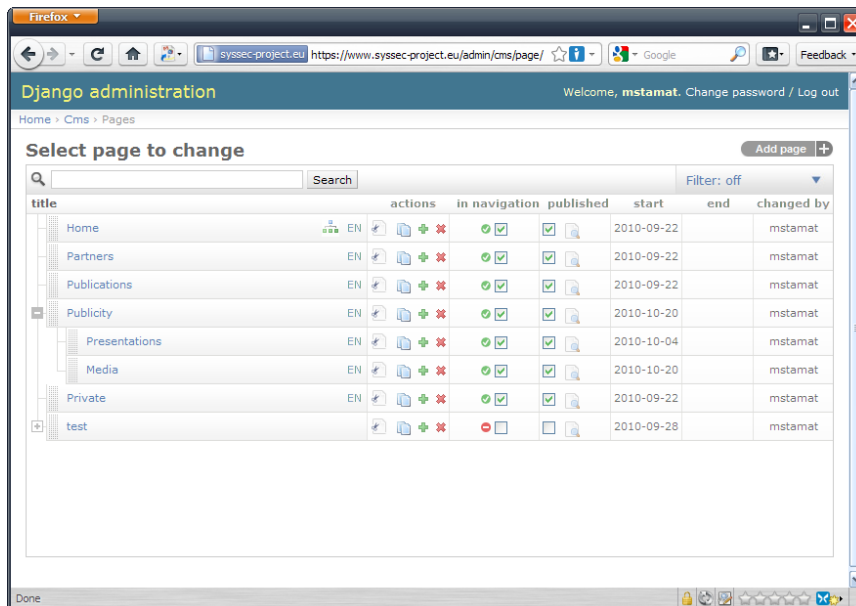
However, the most commonly used plugin is the *Text Plugin* which is used to edit and then display html formatted text. The text is stored to and retrieved from the website database. For editing it, a graphical editor is provided which is shown in Figure 2.6(d). The editor encourages semantic-based html formatting. I.e. the contents are marked according to their

² Our Facebook page can be accessed on <http://www.facebook.com/pages/SysSec/167933426552257>

2.5. UPDATING THE WEBSITE



(a) Site administration panel. Highlighted is the section of the CMS module, which is used to edit content.



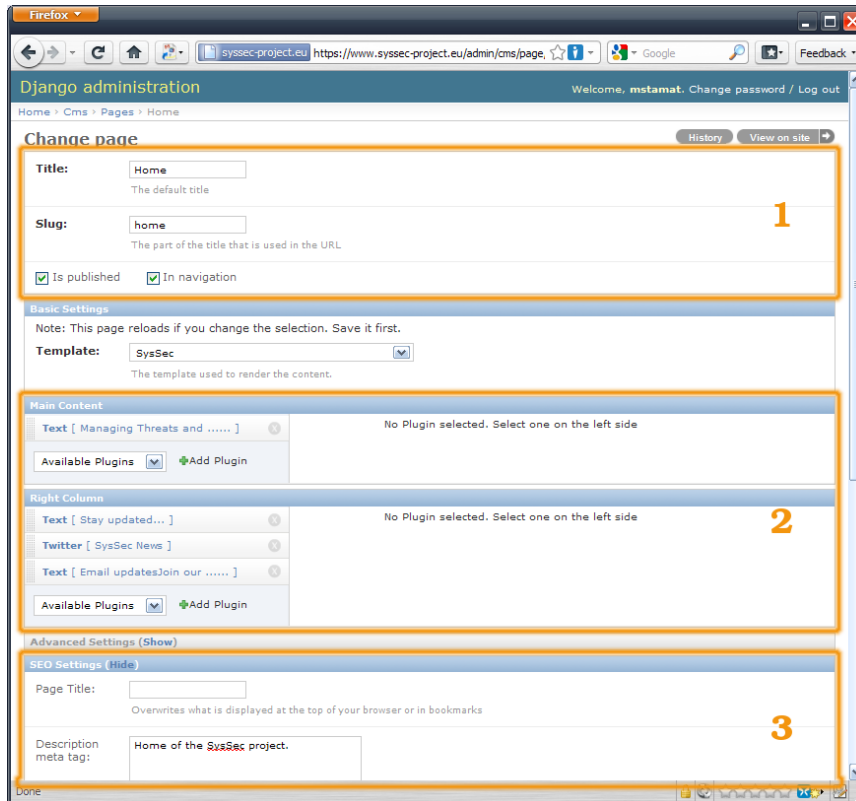
(b) Page hierarchy panel. The pages can be rearranged by dragging them and dropping them on their new location in the hierarchy tree.

Figure 2.6: Updating the SysSec website

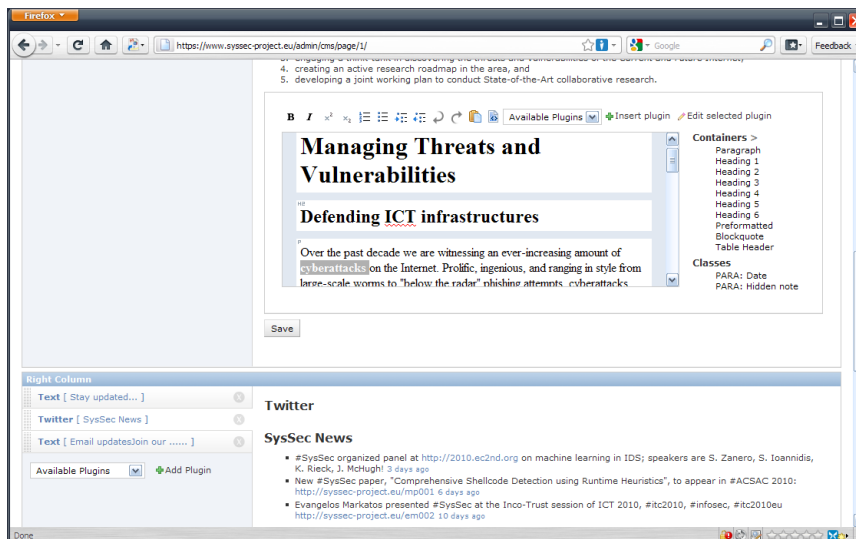
semantics on the page and their actual appearance is then controlled using CSS[2] stylesheets.

From its day-to-day use, we have found the website update mechanism very convenient and easy to use. Currently, the content of the website is updated by FORTH. If the need arises, it should be straightforward for other partners to contribute with only minimal training (if any at all).

2.5. UPDATING THE WEBSITE



(c) Change Page interface. The highlighted areas contain publishing options, the content plugins and the search engine optimization options respectively.



(d) Editing page contents through the graphical editor of a *Text Plugin*.

Figure 2.6: Updating the SysSec website.

In this chapter we will describe the tools and methods we used to design and implement the SysSec website. Additionally, we will give an overview of the hardware and network infrastructure we use to run the site.

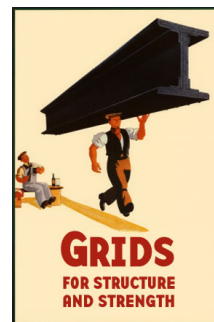
3.1 Website Design

3.1.1 Grid based design

Perhaps the first choice that had to be made for the website was to choose the primary colours that would be used. As is apparent from figures 2.2 and 2.3(a), the colours of the website were chosen to match the SysSec logo.

Subsequently, the visual layout of the website had to be created. For making this process and any future changes to the layout easier the *960 Grid System* [13] was used. The 960 Grid System is a CSS[2] framework that allows the rapid prototyping of *grid-based website designs* while working equally well when integrated into a production system.

In grid based designs, the visual blocks that comprise the website (e.g., menus, text boxes, information boxes, ads etc) are not placed on arbitrary positions. Instead they are laid out on predefined rigid positions on a grid. This may sound restrictive but in practice the resulting design is much more efficient in communicating its contents to the visitor. This is because placing the visual blocks of the website on a grid results in *clear visual paths* and *visual structure and balance* on the design. Additionally, a grid based design also ensures consistency between the



website pages and are much easier to update in order to accommodate any additional content.

The 960 Grid System produces supports design on grids with 12, 16 or 24 columns that are always 960 pixels wide. The reasons that make this number “magic” are:

- More than 99% of computers today have displays at least *1024 pixels wide*[19].
- 960 is the most *flexible number* which is smaller than 1024 so it makes a good base for a grid layout system. This is because it is divisible by a total of 26 integer numbers¹.

With the use of 960 Grid System we were able to *internally develop* the website draft (Figure 2.1) in a very short time and also modify it without much effort after the feedback we received during the kickoff meeting of the project. The result was a design which is *robust yet flexible and visually pleasing*.

3.1.2 Browser Compatibility and Web Standards Compliance

The SysSec website pages have been tested to comply with the *XHTML 1.0 Strict* standard [25], using the *W3C Markup Validator*[17].



The situation is more complicated with regards to *CSS* compliance. We have chosen to use *CSS3* for the SysSec website because it greatly simplifies the implementation of aesthetic elements such as rounded element corners, element shadows etc. Without *CSS3*, these elements have to be rendered as bitmap images and then included in the page, which degrades the semantic integrity of the produced *HTML* output.

However, the *CSS3* standard is currently a work in progress. As a result, many popular browsers still use vendor-specific *CSS* property names to implement its features².

So, while we have taken every care for our *CSS* code, it has been proved impossible to have *CSS3* code that both validates on the *W3C CSS Validator*[16] and works on all popular browsers. This made us take a more pragmatic approach and instead strive to have our pages render correctly with the latest versions of all popular web browsers. The use of *jQuery-ui*[7] (which was also the source of most intentionally invalid *CSS* lines[23]) played a major

¹ 960 is divisible by 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 30, 32, 40, 48, 60, 64, 80, 96, 120, 160, 192, 240, 320 and 480.

² E.g., for applying a rounded border on an *HTML* element the proposed *CSS3* property is *border-radius*. But instead Mozilla Firefox and Apple Safari still use the custom *-moz-border-radius* and *-webkit-border-radius* properties respectively.

role in this, as it provides user-interface components that have already been tested to work correctly on all major web browsers.

3.1.3 Progressive Enhancement

Much of the website user interface functionality makes use of JavaScript. This does not sound like a problem but surveys [20] have shown that approximately 5% of the users are browsing without JavaScript capabilities. This percentage could be even higher for the SysSec website because turning off JavaScript is quite common practice among security-conscious users.



For this reason, we have chosen to add JavaScript as a layer over the basic site functionality. This approach is known as *progressive enhancement*. With progressive enhancement, the SysSec website is able to provide an *acceptable experience to all* the visitors and *enhance the experience* when JavaScript is supported.

The mechanism we have used to implement progressive enhancement is based on the *jQuery* [6]. *jQuery* is a JavaScript Library that allows the easy manipulation of page contents after it has loaded in the user's browser. So, by default the SysSec pages will render correctly on any browser. If the browser supports JavaScript, a *jQuery* script is invoked that enables the enhanced features. This invocation is very fast, so it is transparent to the user.

3.2 Website hosting

3.2.1 Software stack

For serving the SysSec website we use a *LAMP software stack*:

- Linux 2.6 [15] as the operating system
- Apache 2.2 [1] as the web server
- MySQL 5.0 [9] as the database backend
- Python 2.5 [10] for dynamically compiling the web pages

The later components of the stack have been distributed between two servers. The first server is dedicated to running the *MySQL server*, while the second runs the *Apache web server* and generates the dynamic pages using the python-based *Django* [14] web framework.



Figure 3.1: The SysSec website software stack

Django itself is a generic web framework that provides an *Object-Relational-Mapper* (ORM) that allows accessing objects stored in a relational database (in our case *MySQL*) as Python objects. For serving and managing our pages we use *Django-cms* [3] a Content Management System built on top of django. An overview of the basic Django-cms features has already been provided in Section 2.5.

The benefit of the Django/Django-cms combo is that they provide a clear, well documented Application Programming Interface. They are much more compact than other solutions which makes tweaking and extending them much easier. This could prove useful in case we need to extend the functionality of the SysSec website beyond the basics. An additional benefit of this combo is the existing expertise of the consortium (specifically FORTH) on building and maintaining Django-cms sites.

Finally, we should mention that all the software components are regularly updated in order to be immune to known (and patched) security vulnerabilities.

3.2.2 Hardware and hosting

The SysSec website is hosted by FORTH on their premises in Heraklion. The hosting server features two Intel Xeon dual-core CPUs running at 2.66GHz and a total memory of 4GB. It is connected to the Internet through FORTH's Gigabit connection to the GRNET³ backbone. The server has two high-performance SAS disks (10k RPM) arranged as RAID-1 for fault-tolerance.

The server is protected by both software and hardware firewalls in order to minimize the risk from cyber-threats. As an additional security measure, the database server used by the SysSec website is located on a separate host with even more restricted access rules. Both hosts are internally and externally monitored. Finally, rsync backups are performed for both on a daily basis.

³GRNET is the Greek NREN.

It is also important that the hosts reside in a protected physical environment. They are located in one of FORTH's data-centres. For ensuring optimal operating environment, it is fitted with industrial-strength air conditioning with more than 240.000BTUs efficiency. In power emergencies, it is supported by a UPS power supply and an external power generator which is engaged automatically on power failure. Additionally, the data-centre features an automatic carbon dioxide fire-extinguishing system.

The same facilities are used to support the EGEE grid node located in FORTH, which is one of the largest computing clusters in south-eastern Europe that works on a 24h/7d basis. Since these facilities are able to withstand the demands and provide high availability to a large-scale infrastructure, we are confident that they will surely be able to provide the same kind of service to the SysSec website as well.

Conclusions and future enhancements

4.1 Possible enhancements

In this section, we will briefly outline additional functionality that could be added to the website in the future. In its current form, the SysSec website is fully capable of providing all of the functionality envisioned for it in the project description. In fact, it even provides additional features, such as the social networking integration, that was not foreseen in the project description but were later recognized by the consortium as potentially beneficial.

In this spirit, the consortium will continue investigating future opportunities that would enhance the SysSec website and help the project reach a larger audience. A few of the possible enhancements are described in the following paragraphs.

- *editorial workflow*: Currently the SysSec website is centrally maintained by FORTH. This scheme will work well as long as the rate of changes to the website remain relatively low. However, if at some point substantial changes (additions or updates) have to be made to the website, this scheme would probably prove inefficient. Adding more editors from other SysSec partners seems like the obvious solution to the problem. But it would also call for a coordinating mechanism in order to guarantee the consistency of their edits.

Fortunately, django-cms already features such a mechanism called *editorial workflow*. When this mechanism is turned on, any changes by an editor have first to be approved by an *editor in chief* before showing online. This process is similar to how, e.g., newspapers work and should help guarantee consistency in style and content quality for the SysSec website, irrespectively of the number of involved editors.

- *integrated indexing and search*: The hierarchical structure of the SysSec website makes it easy for the visitor to find the content he/she is

looking for. But if through the course of the project the site expands to cover, e.g., a few dozens of pages, the hierarchical structure may not be efficient enough. In this case, a solution that would help the visitors quickly find the content they looking for is the installation of a local indexing and search service.

A popular extension of the Django framework that adds support for indexing and search is *Haystack*[5]. Haystack does not implement this functionality itself. Instead, it interfaces with a separate backend that provides it. Which of the several supported backends would be the best for the SysSec website is an aspect that should be investigated at the time of installation.

- *photo gallery*: SysSec, as a *Network of Excellence* project, is expected to result through its course in several talks, seminars and other organized events. Merely listing these activities could leave the visitors of the SysSec website rather unimpressed. This would be in contrast with the fervor that the consortium works to make these events happen.

A way to prevent this from happening would be to show the visitors the actual “action” from the project through a *photo gallery* in the SysSec website. As one could imagine, there are numerous options to implement this functionality. Fortunately, *Lightbox*[8] one of the most popular web photo gallery solutions already has support for integration with django-cms. After adding a photo gallery, organizing lively SysSec events would also liven up the project website.

4.2 Conclusions

In this document, we discussed the SysSec website. We provided a description of its section and content and outlined the *social networking* features we have integrated. Moreover, we showed the process of updating the website through its intuitive *Administration Panel*.

Additionally, we provided an overview of the components and methodology we used to build the website. We also detailed its software and hardware hosting environment.

Closing, we should cite that at the time of writing of this document the SysSec website was already capable to provide the functionality requirements that had been laid out in the project’s description. However, in addition to the existing commitment to keeping the SysSec website running and up to date, the SysSec consortium will continue looking through the whole remaining course of the project for features that could be integrated to it in order to provide an enhanced experience to the visitors.

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