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Abstract: <p>This document is a summary of the work realized during the 1st year of the project in Code Porting and IPv6 Repository sub-activities.</p> <p>The main objective of Code Porting sub-activity has been the study, test and porting of the code to IPv6. During this year the work has been concentrated in PHP and MRTG.</p> <p>The second sub-activity, the IPv6 Repository, has been successfully concluded. It consists in a tool installed in the project web site that allows the storage of all the knowledge and experiences acquired in the project facilitating the dissemination of the project results.</p>

Keywords: <p>Code Porting, IPv6, IPv6 Repository, Linux, MRTG, PHP.</p>

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Revision	Date	Description	Author (Organization)
v0.1	17/12/2002	Integration of Code Porting contribution	Jesús Muñoz (nGn)
v0.2	17/12/2002	Integration of IPv6 Repository contribution	Jesús Muñoz (nGn)
v0.3	10/01/2003	Adaptation to deliverable template	Jesús Muñoz (nGn)
v0.4	20/01/2003	Summary, Introduction and Conclusions	Jesús Muñoz (nGn)
v0.5	25/02/2003	Final Review	Jordi Palet (Consulintel)

Executive Summary

This document is a summary of the work realized during the 1st year of the project in Code Porting and IPv6 Repository sub-activities.

The main objective of Code Porting sub-activity has been the study, test and porting of the code to IPv6. During this year the work has been concentrated in PHP and MRTG.

The second sub-activity, the IPv6 Repository, has been successfully concluded. It consists in a tool installed in the project web site that allows the storage of all the knowledge and experiences acquired in the project facilitating the dissemination of the project results.

The document is organized as follows:

- Firstly an introduction where both sub-activities objectives are explained.
- Secondly a section where the Code Porting sub-activity is described in detail.
- The third part of the document is focused in the IPv6 Repository, where the utilization of the developed tool is explained in detail.
- And lastly, a brief section about conclusions and future works to be done in the second year of the project.

Table of Contents

1.	<i>Introduction</i>	6
2.	<i>Code Porting</i>	7
2.1	<i>Description</i>	7
2.2	<i>Activities</i>	7
3.	<i>IPv6 Repository</i>	9
3.1	<i>Description</i>	9
3.2	<i>Using the IPv6 Repository</i>	9
3.2.1	Access to the Private Area.....	9
3.2.2	Registering a New Application.....	10
3.2.3	Registering a New Document.....	11
3.2.4	Searching by Keywords.....	12
3.2.5	Applications List.....	13
3.2.6	Documentation List	15
3.2.7	System Administrator	16
3.2.7.1	Categories	17
3.2.7.2	Applications and Documentation	17
3.2.7.3	Keywords.....	18
4.	<i>Summary and Conclusions</i>	19
5.	<i>References</i>	20

Table of Figures

Figure 3-1:	Screen for Accessing the IPv6 Repository.....	9
Figure 3-2:	Main Screen Inside IPv6 Repository	10
Figure 3-3:	Screen for Registering a New Application	11
Figure 3-4:	Screen for Registering a New Document	12
Figure 3-5:	Screen for Searching Applications and Documents	12
Figure 3-6:	Screen for Linking the Application List of Every Category	13
Figure 3-7:	List of Applications Inside a Category.....	13
Figure 3-8:	Screen of Documents Associated to an Application	14
Figure 3-9:	Screen of Link to the Document List of Each Category.....	15
Figure 3-10:	Listing of Documents from a Category	15
Figure 3-11:	Listing of Applications Related with a Document	16
Figure 3-12:	Administration Screen.....	17
Figure 3-13:	Categories Maintenance.....	17
Figure 3-14:	Documents Maintenance.....	18
Figure 3-15:	Modifying Documents	18

1. INTRODUCTION

This document offers a general sight about two sub-activities within WP4: Code Porting and IPv6 Repository.

Code Porting is an activity that consists on studying and porting of applications running under IPv4 to IPv6 with the objective of testing its performance and problems that may appear in the future developing new applications or new languages.

During the first year, the work has been concentrated on PHP porting including the main functions, testing the right performance of those already ported and porting those that weren't. A set of documents with the source code of all the studied and ported libraries has been concluded.

Actually it is working on a first application, MRTG, developed in PERL to measure the network traffic in an SNMP capable interface. Once the MRTG Code Porting is completed we'll continue with other tools considered interesting from the project perspective.

The 2nd activity is the IPv6 Repository. The main objective is to develop a tool, fitted to the work organization of the partners in order to do a library of source code, documents and acquired experiences regarding IPv6.

The tool has been developed and integrated totally in the project web site. During the remaining project time the objective is to add value to the IPv6 Repository, maintain it and collect all the applications, experiences and possible documents that might arise from the Euro6IX progress.

2. CODE PORTING

2.1 Description

This activity consists in porting existing application to facilitate its use in IPv6 networks.

As a broad view of what will be done in the code porting, a variety of languages and applications that are under GPL license will be ported, and kept under the open-source terms. In that way we hope that facilitate the implication of new users and programmers on the development of applications using IPv6.

This three-year sub-activity is focused in the following:

- **MRTG.** It is a program written in PERL that is used to register and measure traffic in any kind of SNMP capable interface. The porting would consist on adapting the mentioned application for SNMP with IPv6 support.
- **DTD.** Will define a DTD that will enable the communication of data structures between IPv6 applications.
- **PHP.** Porting PHP interpreter for web server introducing IPv6 structures to the network utilities and adapting several functions to this new data definitions. There are some functions already ported so will identify the rest and port them.
- **Webalizer.** It is a tool very often used for generating statistics of web sites visits. The porting of this tool will allow the analysis of the records generated by the web servers in IPv6, promoting some new analysis of the application like the identification of the country or region of the user. Actually this tool only analyzes the IPv4 addresses. The idea is to use all the possible introduced improvements by IPv6. The IPv6 multicast and anycast addresses have a special treatment too.
- **Graphic trace router.** The idea is to develop an application in order to follow the path of the IPv6 packages geographically in a map. This application, similar to standard traceroute, will help network administrators and users to figure out the route followed by the IP packets.

2.2 Activities

MRTG code porting is an activity now in process using [perl5.005_55-v6-19990721.diff.gz](http://perl5.005.55-v6-19990721.diff.gz) package from KAME Project at [ftp://ftp.kame.net/pub/kame/misc/](http://ftp.kame.net/pub/kame/misc/), and there are not main considerations to do about XML DTDs.

About PHP code porting, we have not only ported the code, besides we have developed two applications including ported functions. The first is a couple of PHP pages, server-page and client-page, making use of all these functions to demonstrate their correct performance.

The second application is oriented to real scenarios considering a further real application to show the possible use of this code. In this case we updated a log registry each time a connection from a PHP client page occurs. Using sockets connections from web pages is not a common practice in web development but is one available option.

- **PHP.** For these applications we need the following functions, located at ext/sockets/sockets.c into PHP source code directory:

For client side:

```
socket_create  
socket_connect  
php_set_inet_addr6 (2)  
socket_write (1)  
socket_close (1)
```

For server side:

```
socket_bind  
socket_listen (1)  
socket_accept  
socket_read (1)
```

⁽¹⁾ no change needed.

⁽²⁾ only for internal use of socket_connect.

In these functions we include the use of AF_INET6 to decide if struct sockaddr_in or struct sockaddr_in6 is required. AF_INET6 and struct sockaddr_in6, needed to manage IPv6 addresses, are already support in PHP 4.2.2.

These functions were included in PHP sockets module in PHP 4.2.2 version running on Apache web server 1.3.22 and to use it is required to configure PHP activating sockets module, that is not available by default, and restart Apache web server.

3. IPV6 REPOSITORY

3.1 Description

The main objective of this sub-activity is to build a big library about IPv6, which contains a number of documents, software libraries and applications developed by the Euro6IX project and about IPv6 in general.

The development has been done initially in ASP and later in PHP. The IPv6 Repository has been integrated in Euro6IX Web Site.

There are two kinds of access levels, a public and a private one. The last one is only for Euro6IX partners.

The task has been concluded. During the rest of the project the contents will be maintained and some new functionalities might be developed.

3.2 Using the IPv6 Repository

3.2.1 Access to the Private Area

In order to enter to the private area, is necessary to introduce the login and password.

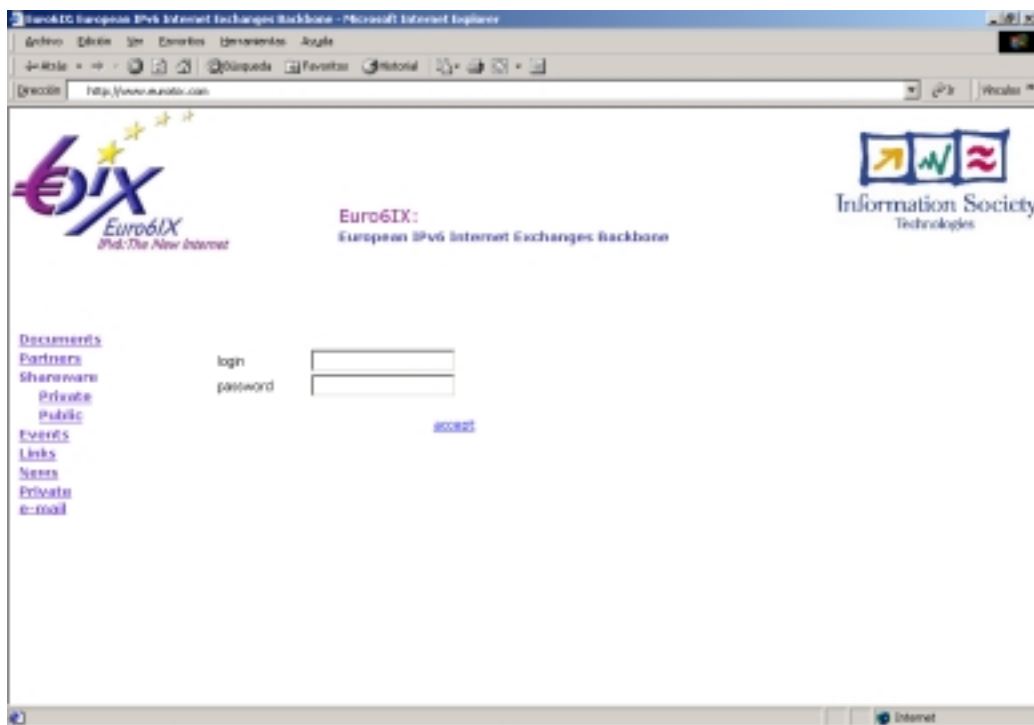


Figure 3-1: Screen for Accessing the IPv6 Repository

Once the login and password are correctly introduced, a list of categories will be presented. For each category you can have the available number of documents and applications.

The categories are the most important element in the Shareware Repository. The administrator should define public and private categories. If a new document or applications is registered in a public category, this will be public, and if is registered in a private category, this will be only for private use.

The administrator manages the configuration of the Shareware Repository. He may add, modify or delete Categories or any other parameter.

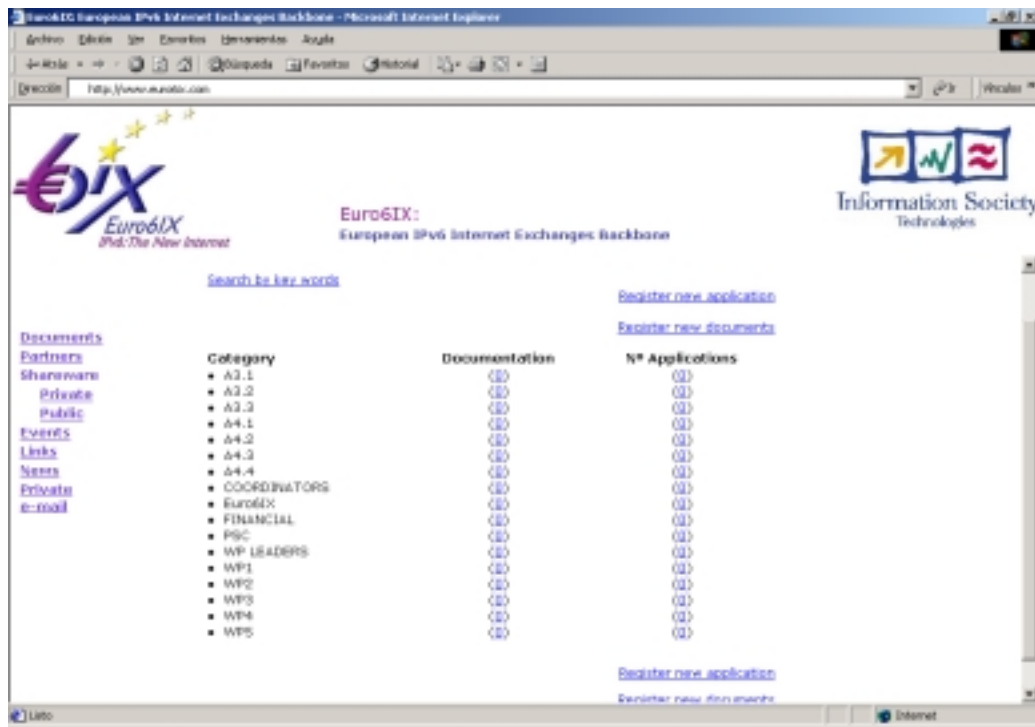


Figure 3-2: Main Screen Inside IPv6 Repository

3.2.2 Registering a New Application

New applications can be added to the Shareware Repository through this option.

Is necessary to fill in: Category, Name of application, Version, URL (if there is a web site where the application is available), e-mail, Description, and the file must be uploaded to the server. We also may select related words that become keywords for doing a search.

If a private category is selected, the application will be private, in the other hand, if a public category is selected, the application will be public.

The screenshot shows a web browser window titled "Euro6IX European IPv6 Internet Exchanges Backbone - Microsoft Internet Explorer". The address bar shows "http://www.euro6ix.com". The page features the Euro6IX logo on the left and the Information Society Technologies logo on the right. The main heading is "Euro6IX: European IPv6 Internet Exchanges Backbone". Below this is the "New Application" form. The form includes a left sidebar with links: Documents, Partners, Shareware, Private, Public, Events, Links, News, Private, and e-mail. The main form fields are: Category (a dropdown menu with "WP1" selected), Name, Version, URL, e-mail, Description (a text area), Upload file (a button labeled "Upload"), and Select word to relate (a dropdown menu with options: Enet, A2.1, A2.2, A3.1, A4.1, A4.2, A4.3, A4.4, deliverable, and Euro6IX). The status bar at the bottom shows "Lito" and "Internet".

Figure 3-3: Screen for Registering a New Application

3.2.3 Registering a New Document

Through this option new documents can be added to the Shareware Repository.

Is necessary to fill in: Category, Name of application, Version, URL (if there is a web site where the document can be found), e-mail, Description, and the file must be uploaded to the server. Is also possible to select related words that will be used as keywords for doing a search.

If a private category is selected, the document will be private, in the other hand, if a public category is selected, the document will be public.

The screenshot shows a web browser window titled "Euro6IX: European IPv6 Internet Exchanges Backbone". The page features the Euro6IX logo on the left and the Information Society Technologies logo on the right. The main content area is titled "New Document" and contains a form for registering a new document. The form includes fields for "Category" (a dropdown menu with "IPv6" selected), "Name", "URL", "e-mail", and "Description". There is an "upload file" button and a "Select word to relate" dropdown menu with options: A3.1, A3.2, A3.3, A4.1, A4.2, A4.3, A4.4, deliverable, Euro6IX, and ipns. A note at the bottom states: "URL where the application's file will be available".

Figure 3-4: Screen for Registering a New Document

3.2.4 Searching by Keywords

This is the most easy and quick way to do a search, for documents and applications.

Several keywords can be simultaneously selected to do the search.

Two check buttons allow making the search just for applications, just for documents, or both. Is mandatory to check at least one.

The screenshot shows the "Search by key words" interface on the Euro6IX website. It includes a text input field for entering search terms, a "Search" button, and a dropdown menu with the same list of keywords as in Figure 3-4: A3.1, A3.2, A3.3, A4.1, A4.2, A4.3, A4.4, deliverable, Euro6IX, and ipns. Below the search area, there are two checkboxes: "Search documents" and "Search applications", both of which are currently unchecked.

Figure 3-5: Screen for Searching Applications and Documents

As a result of the search, those applications and/or documents that are related with the selected keywords will be displayed.

3.2.5 Applications List

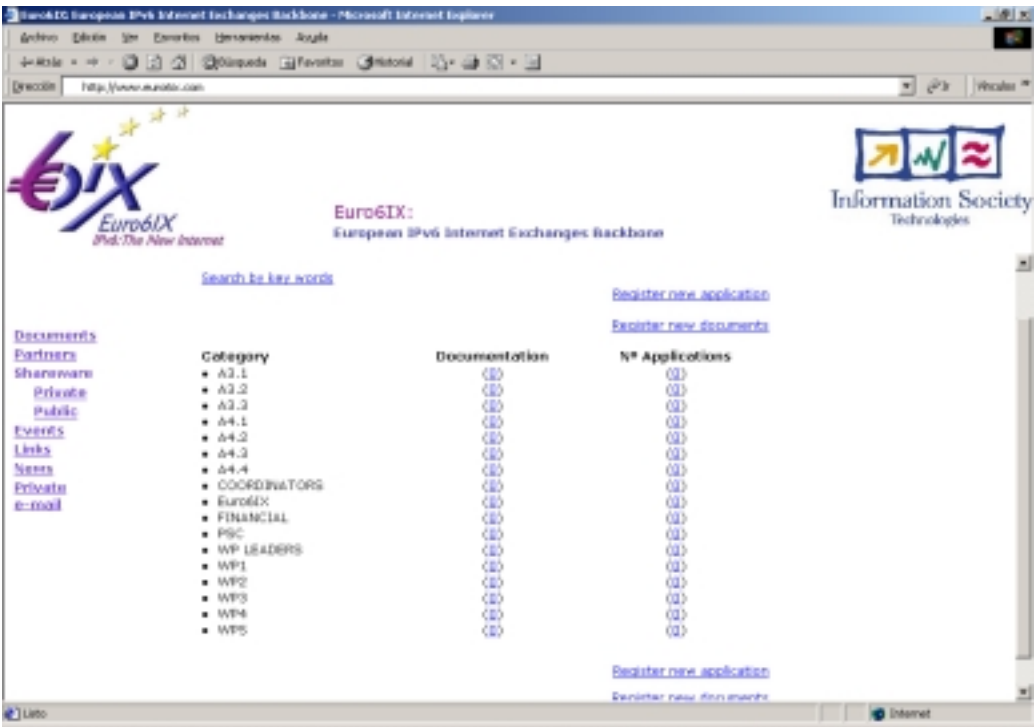


Figure 3-6: Screen for Linking the Application List of Every Category

The applications list of a given category can be displayed by clicking in the link with the number of applications to this category.

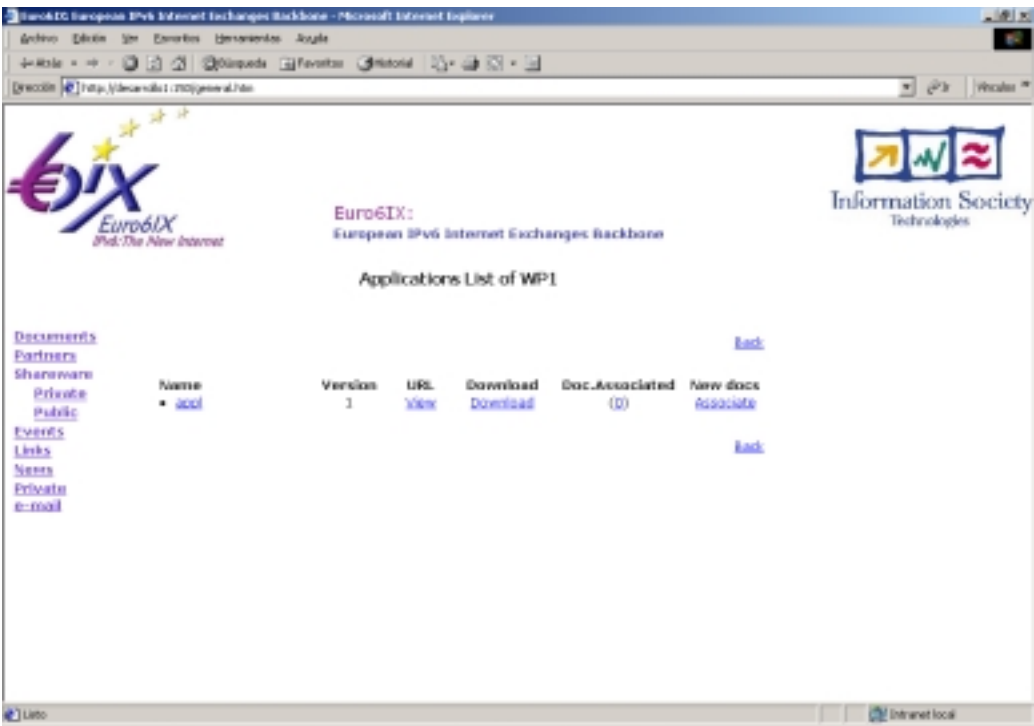


Figure 3-7: List of Applications Inside a Category

Is also possible to display a list of all applications in this category. In this example there is only one application.

The information available for each application is: Name of application, Version, URL, Download Application, Documents Associated, and the possibility of associating new documents.

Clicking in appl, more information about that application will be displayed.

When a “-“ is displayed in the column “*Download*”, it means that the user has not uploaded the application. Instead the URL will be available for the Download of that application from the original site.

Is also possible to see the number of documents associated to this application and is possible to associate new documents.

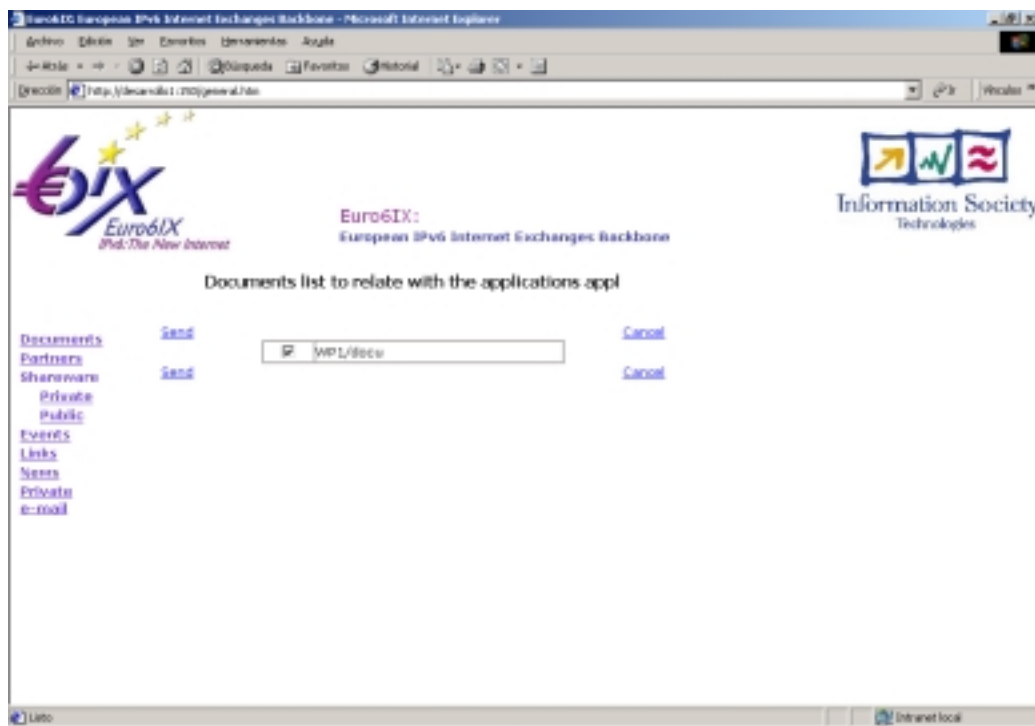


Figure 3-8: Screen of Documents Associated to an Application

The documents that are going to be related should be selected; after a click in the “Send” issued, will return to the list of categories.

3.2.6 Documentation List

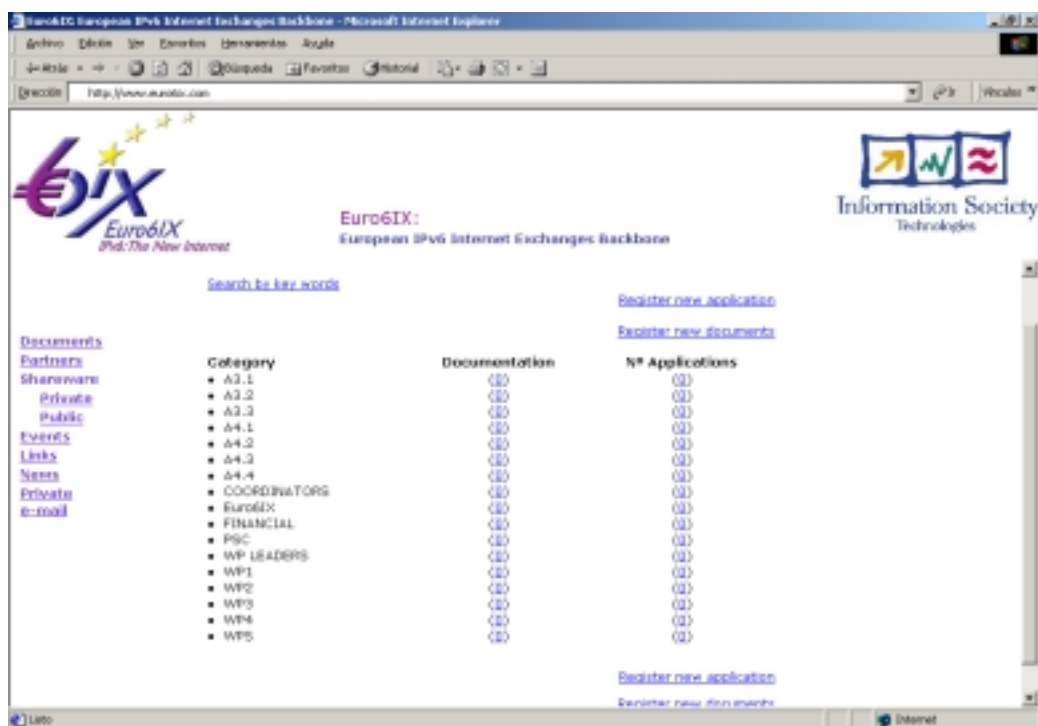


Figure 3-9: Screen of Link to the Document List of Each Category

The documents list of a given category is displayed by clicking in the link with the number of documents of this category.

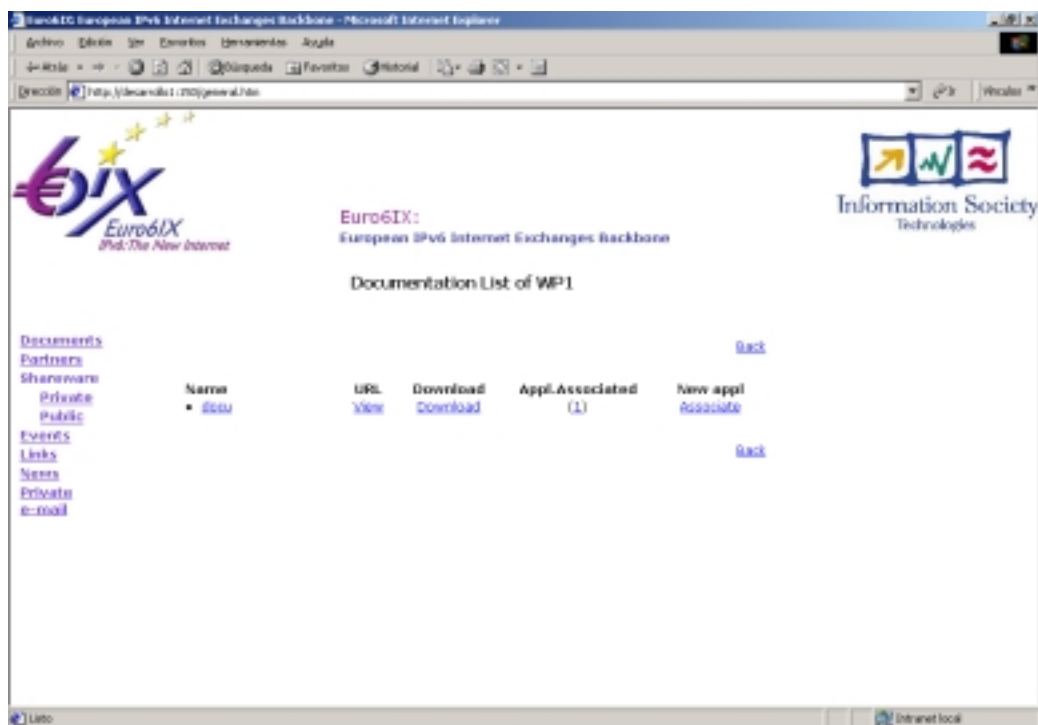


Figure 3-10: Listing of Documents from a Category

In this category a list of all documents is displayed. In this example there is only one document.

The information that available for each document is: Name of Document, Version, URL, Download Document, Applications Associated, and the possibility of associating new applications.

When docu is clicked, more information about that document will be displayed.

A “-” in the column “*Download*” means that the user has not uploaded the document for Download. So, instead, the URL must be used to download it from the original source.

The number of applications associated to this document will be displayed and also exist the option to associate new applications.

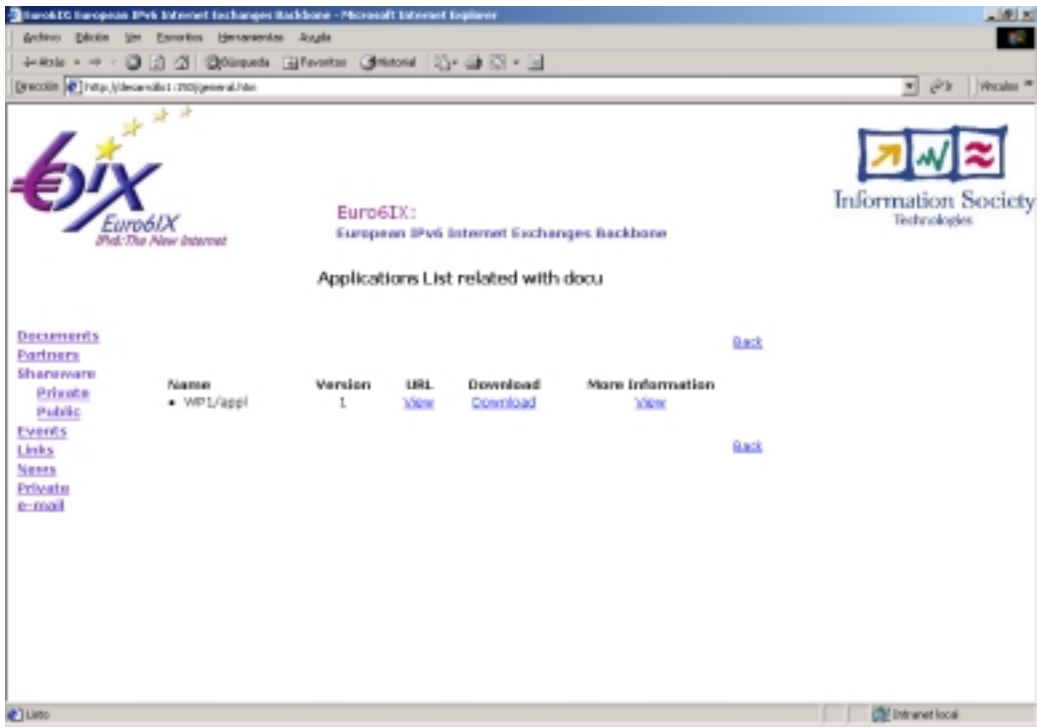


Figure 3-11: Listing of Applications Related with a Document

3.2.7 System Administrator

The administrator of the system is the responsible of the maintenance of the shareware repository.

There are four maintenance levels: Categories, Documentation, Applications, and Keywords.



Figure 3-12: Administration Screen

3.2.7.1 Categories

New categories, public or private can be added. Also is possible to modify or delete existing categories.

To include a new application or document, the appropriate category must be available. Otherwise the administrator needs to create it first.

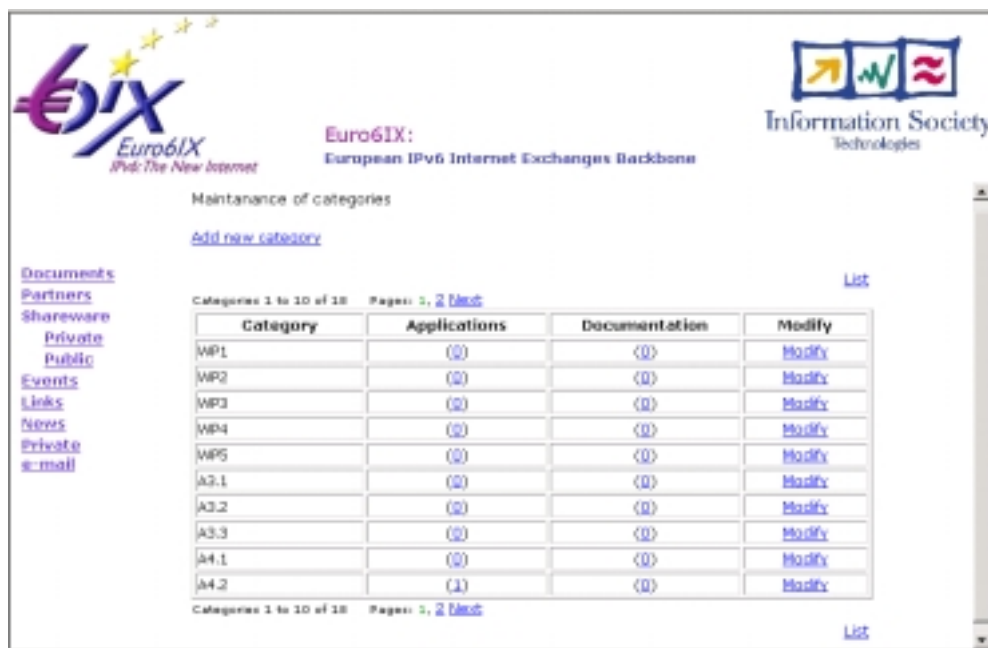


Figure 3-13: Categories Maintenance

3.2.7.2 Applications and Documentation

Through these maintenances, is possible to validate the applications and documents that have been proposed to include in the repository by any person external to the project.



Figure 3-14: Documents Maintenance

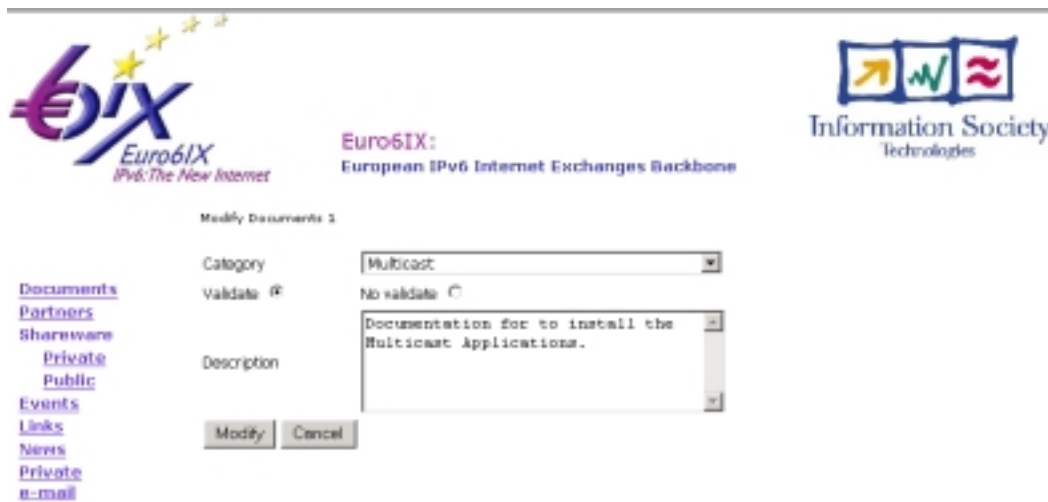


Figure 3-15: Modifying Documents

3.2.7.3 Keywords

Is possible to add new keywords for searching, but only the administrator can do it.

4. SUMMARY AND CONCLUSIONS

The sub-activities presented in this attached document take part in the group of developed activities in WP4, and are classified inside A4.2.

Activities work as complements of others, by contributing with the main objective of the project, which is to investigate and to get conclusions about the necessities and disadvantages of IPv6 porting. More concretely, the objective inside this WP is to study advantages, necessities and disadvantages of the new protocol inside the applications world. Activities fit into other important objectives such spreading the obtained results.

There exist many languages and applications that may be studied in this project; we have concentrated the work on PHP and MRTG.

The developed job in IPv6 Repository activity is related to the project objective: It is related with the dissemination of the results and knowledge gained within the project.

During the second year of the project, we'll keep investigating new applications and languages, and analyzing advantages and disadvantages of IPv6 with them.

The IPv6 Repository will be continuously maintained during the project lifetime.

5. REFERENCES

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<http://www.net-snmp.org>
<http://www.david-guerrero.com/papers/snmp/>
<http://www.cysol.co.jp/project/IPv6/>