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**PRIORITY 2**  
**INFORMATION SOCIETY TECHNOLOGIES**



**SIXTH FRAMEWORK  
PROGRAMME**

**FLOSSWORLD**

**Free/Libre and Open Source Software: Worldwide  
Impact Study**



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## **Disclaimer**

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# Chapter 1

## Executive Summary

This report shows the main results of the analysis performed, in the context of the FLOSSWorld project, of some quantitative aspects of libre (free, open source) software in Croatia. The sources of the analysis have been an exhaustive data retrieval of several facts related to libre software in that country (such as a list of Linux user groups, magazines focused on libre software, etc.) and a detailed, quantitative data mining of libre software development sites (forges).

The development and wide-spread implementation of Free/Libre Open Source Software in Croatia is not very prominent yet. Its introduction is in an early stage, and currently, there is not a big libre software community in the country. Therefore, the results in this report are not as complete as in other studies performed during the FLOSSWorld project, but still represent a valuable information.

This study found one Croatian local forge named *Linux.hr*, from which it has not been possible to obtain neither the total number of registered users nor the total number of hosted projects. Despite of this drawback, 7 projects out of a total of 11 projects found, fulfilled the requirements needed to perform the analysis. There are 6 different committers in *Linux.hr*, and all of them cooperate in more than one project. We cannot tell if they are real people or organizations. However, all of them together generated 12400 lines of code that are hosted in the forge.

Looking at the worldwide development community, it seems that a great number of Croatian users are reunited around SourceForge. More than a 1200 users and 104 projects were identified as Croatians in SourceForge.

The *Linux.hr* forge stores 14 mailing lists and it is noticeable that just 2% of the contributors generate most of the traffic of the list. Just 24 people out of 1200 have ever written more than 10 messages.

A total of 19 Croatian-driven Source Code Management systems were found (12 from SourceForge and 7 from *Linux.hr*). It is remarkable that almost 90% of the Croatian projects hosted in SourceForge do not have a Source Code Management system.

The Croatian developers prefer international forges to national one as there is a limited benefit from using local services within the context as small as Croatia is (population 4.4 mil.). First, the developer community is too small for service providers to develop forges for such a small market. Second, the developer community is too small for developers to set focus on local and not international community. Third, most of the developers and users do not use localized software and services, so localized services are not high priorities in development.

## Chapter 2

# Introduction

Within the context of the FLOSSWorld project, this report is devoted to the quantitative study of libre software development in Croatia. The information presented here is based mainly in public data found in the repositories of libre software projects hosted in the analyzed area, in SourceForge (the largest hosting site for libre software projects) and in a survey completed with the help of the partners in FLOSSWorld.

The data found in repositories (usually identified by the local partners in the project) has been downloaded, stored in a database, and later carefully mined and analysed (using a semi-automatic process that has been complemented by human validation). Most of the data used was obtained from source code, source code management systems and mailing list archives. In addition to repositories in the region, SourceForge has also been analyzed, as the largest hosting site, worldwide, for libre software projects. The details of the methodology used are specified in a separate document, also produced by the FLOSSWorld project, the “Methodology report”.

This documents shows the main results produced by this methodology. Before that, this chapter introduces the region studied and discusses some details about the methodology itself.

### 2.1 Details of the considered region

**Geographic area.** Croatia, officially the Republic of Croatia (Republika Hrvatska), is a country in Europe in the crossroad of the Mediterranean and Central Europe. Its capital is Zagreb and the Croatian is the national language. The population is estimated in 4,555,000 people and the estimated GDP is \$69,834 billion (\$14,368 per capita).

**Map.** Figure 2.1 shows the location of Croatia



Figure 2.1: Map: Croatia in Europe

**Time zone.** The Croatian timezone<sup>1</sup> is Central European Time (UTC+1), this time zone is shared with 31 Central European countries and 12 African countries<sup>2</sup>.

**Internet top level domain** The Croatian TLD<sup>3</sup> (Internet Top Level Domain which is *.hr*) is an important indicator for information gathering. When recovering information from email addresses, if a developer or user has a Croatian TLD, we can reasonably assume that she is from Croatia.

[Both the description of the geographic area and the map were obtained in the Wikipedia<sup>4</sup>]

## 2.2 Summary of results

The Croatian FLOSSWorld partners have identified one forge that could be considered as a Croatian local forge, *Linux.hr*<sup>5</sup>. This forge has been spidered in order to identify the projects it contains. However, we could not obtain an estimation of the number of registered users and projects in it. The world's most popular forge, SourceForge, has been added to the table as many Croatian developers and Croatian-driven projects have been found there. In Table 2.2 the number of registered users at SourceForge should be understood as the estimation of developers in SourceForge, identified<sup>6</sup> as Croatian. The 104 projects in SourceForge that are identified as Croatian-driven have a majority (i.e. more than 50%) of Croatian developers in their teams. Table 2.2 lists these numbers, including SourceForge for completeness.

Forge	Forge name
<a href="http://www.linux.hr/">http://www.linux.hr/</a>	HULK / Linux.hr

Table 2.1: Croatian forges

Forge	Registered Users	Registered Projects
Linux.hr	ND	ND
Sourceforge	1,286	104

Table 2.2: Registered users and projects in Croatian forges (data April-May 2007). SourceForge has been included for completeness (data June, 2006).

It is important to point out that not all registered users are active developers in the forges. Many of them could register and never join a development project, for instance. Projects, as well, may not make use of all development-related tools offered by the forges (and therefore, some kinds of data sources, may offer no data at all). This fact is clearly revealed in the summary table 2.3, where the number of SCM (CVS/SVN) repositories, committers, commits, mailing lists, software releases and size of the software is given.

Forge	SCM repos	Committers	Commits	MailingLists	Releases	SLOC
Linux.hr	7/11	6	758	7	9	12,445
SourceForge	12/104	14	2,750	ND	ND	ND

Table 2.3: Information sources that could be extracted from Croatian forges (April-May 2007).

<sup>1</sup>Methodology report - Chapter Methodology - Section Global forge's analysis

<sup>2</sup>List of time zones based on [http://en.wikipedia.org/wiki/List\\_of\\_time\\_zones](http://en.wikipedia.org/wiki/List_of_time_zones)

<sup>3</sup>Methodology report - Chapter Methodology - Section Global forge's analysis

<sup>4</sup><http://en.wikipedia.org/wiki/Croatia>

<sup>5</sup><http://www.linux.hr/> In fact, this is the website of the Croatian Linux Association, which is the national Linux Users Group: HULK.

<sup>6</sup>Methodology report - Chapter Methodology - Section Global forge's analysis

The next section describes the set of difficulties arisen during the data retrieval process. These difficulties explain the *ND* (No-Data) value that appears in some cells of the table 2.3.

In the results shown in table 2.3 the field *SCM repositories* (Source Code Management repositories) presents the number of non empty repositories and the number of total repositories found (including both empty and non empty repositories<sup>7</sup>). Field *Releases* shows the number of software releases which could be analysed and the number of total software releases found. For SourceForge the results presented are the number of non empty SCM repositories.

Figure 2.2 shows the number of SCM repositories, mailing lists and software releases identified and analysed.

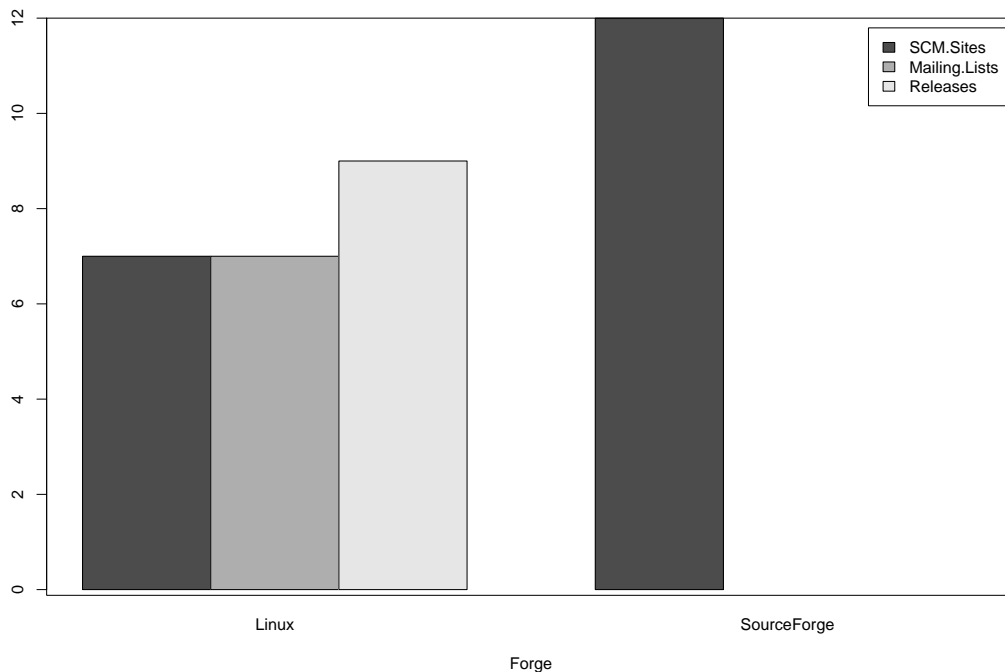


Figure 2.2: SCM repositories, mailing lists and software releases found in forges

## 2.3 Problems and constraints found

The development and wide-spread implementation of Free/Libre Open Source Software in Croatia is not very prominent yet. The Croatian community was an early adopter community in the latter part of the 90's and early 00's, when the community globally was much smaller, but it did not grow rapidly with time. Nevertheless there is a relevant adoption of free software in Croatia<sup>8</sup>

However, It is remarkable that the Croatian Government is making big efforts in the introduction of FLOSS in schools and public institutions. On the 12th of July 2006, the Croatian government released a comprehensive document covering the use of Free and Open Source Software within government bodies<sup>9</sup>.

<sup>7</sup>Empty repository: There is a valid SCM account for this project, but no commit has ever been made

<sup>8</sup>Statistically, Croatians are among top users of Firefox, <http://www.xitmonitor.com/en-us/browsers-barometer/firefox-september-2006/index-1-2-3-52.html>

<sup>9</sup>This document is named "Open Source Software Policy" at it is available in English from: <http://www.>

FLOSS introduction in Croatia is slow and is still in an early stage. This situation was the real problem when analysing FLOSS in Croatia, and not technical issues themselves.

## 2.4 Methodology details

The team could find just one Croatian forge. Local FLOSSWorld partners helped to identify it. This small forge (*Linux.hr*) did not have a GForge based web page, which is a requisite for our Spider Tool to work. So it was analysed by hand.

Besides, the team managed to obtain and identify some data about Croatian projects in SourceForge.

1. CVSanaly<sup>10</sup>: CVSanaly was used to retrieve data from Sourceforge's SCM in search of Croatian activity. In the case of *Linux.hr* forge we used it to analyse all the repositories previously downloaded by hand.

## 2.5 Contributions

This report has been drafted by the GSyC/LibreSoft team of the Universidad Rey Juan Carlos (Madrid, Spain, coordinated by Jesus M. Gonzalez-Barahona). The URJC team performed the data retrieval, mining and analysis, and produced its final version. In addition to the general collaboration by all partners, Croatian FLOSSWorld partners have contributed specifically (MI2<sup>11</sup> and CARNET<sup>12</sup>) by providing information about libre software developing sites, feedback about the drafts of the report, much other useful information, and generic help with issues specific to their region (including assistance with language issues). The coordinator of FLOSSWorld (UNU-MERIT) has also provided specific assistance and feedback during all the stages of preparation of this report.

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e-hrvatska.hr/repositorij/dokumenti/downloads/Open\\_Source\\_Software\\_Policy.pdf Some more info: <http://www.newsforge.com/article.pl?sid=06/08/11/1855229>

<sup>10</sup>Methodology report reference - Chapter Tools - Section CVSanaly

<sup>11</sup>Multimedia Institute MI2, <http://www.mi2.hr>

<sup>12</sup>Croatian Academic Research Network, <http://www.carnet.hr/>

## Chapter 3

# Results

### 3.1 General data

Local partners delivered very useful information about Linux User Groups (LUGs), developers, communication media, platforms and communities.

There is a summary in table 3.1.

Region	Communities	Developers	Lugs	Media	Projects	Platforms
Croatia	2	23	3	0	3	0

Table 3.1: Data collected by Croatian partners

We found two FLOSS communities in Croatia. One of them is the Ubuntu Croatian community and the other one is related to local software projects and not specially linked to a specific GNU/Linux distribution. The following table shows the basic data of these two communities:

Community name	web	mailing list
Ubuntu-hr	<a href="http://www.ubuntu-hr.org">http://www.ubuntu-hr.org</a>	<a href="mailto:ubuntu@ubuntu-hr.org">ubuntu@ubuntu-hr.org</a>
Lokalizacija.linux.hr	<a href="http://lokalizacija.linux.hr">http://lokalizacija.linux.hr</a>	<a href="mailto:lokalizacija@linux.hr">lokalizacija@linux.hr</a>

Table 3.2: Relationship of Croatian communities

The team identified and obtained information from three different LUGs. Two of them are local to small areas and the third has a national scope. This national LUG (HULK) has around 950 members and it is located in Zagreb<sup>1</sup>. The Web pages of these LUGs, are written in Croatian. Monteparadiso Hacklab, one of the local groups, features an article about the FLOSSWorld project. The following table shows basic data for these LUGs:

Lug name	web	size
HULK	<a href="http://www.linux.hr/">http://www.linux.hr/</a>	950
Rilinux	<a href="http://www.rilinux.hr/">http://www.rilinux.hr/</a>	n/a
Monteparadiso Hacklab	<a href="http://www.fazan.org/">http://www.fazan.org/</a>	n/a

Table 3.3: Relationship of Croatian lugs

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<sup>1</sup><http://en.wikipedia.org/wiki/Zagreb>

Additionally, Linux.hr also has forums<sup>2</sup>. No forum is development dedicated, but there is one dedicated to programming under Linux<sup>3</sup>.

Unfortunately, we did not find any journal or similar media dedicated to FLOSS in Croatia. Neither could we find FLOSS platforms.

## 3.2 SCM information

This section shows information about the evolution of CVS repositories in projects from *Linux.hr*. This way, it is possible to identify the *project manager* in each project. *Linux.hr* is a small forge, and it has only seven projects with a CVS repository. But it is still possible to observe that, as expected, almost all the developers work in more than one project, being *Kost* the most active developer in the forge. There are also some projects with just one developer, for example that is the case of *scom* on which just *Kost* is working. The following tables present numbers regarding the relation of project, committers and commits.

Project Name	Committer	Number of commits
fakebo	dpavlin	149
si3d	kost	129
si3d	dlah	90
fakebo	kost	73
fakebo	ravilov	51
bag	dpavlin	45
droper	kost	44
xplsisnjsp	kost	42
multiseti	kost	40
bag	mnalis	38
si3d	arturoea	31
si3d	ravilov	11
scom	kost	9
fakebo	mnalis	4
xplsisnjsp	ravilov	2

Table 3.4: Relation of projects, committers and number of commits

Project name	Number of committers	Number of commits
fakebo	4	277
si3d	4	261
bag	2	83
xplsisnjsp	2	44
droper	1	44
multiseti	1	40
scom	1	9

Table 3.5: Relation of projects, number of committers and number of commits

<sup>2</sup><http://www.linux.hr/modules/newbb/index.php>

<sup>3</sup><http://www.linux.hr/modules/newbb/viewforum.php?forum=8>

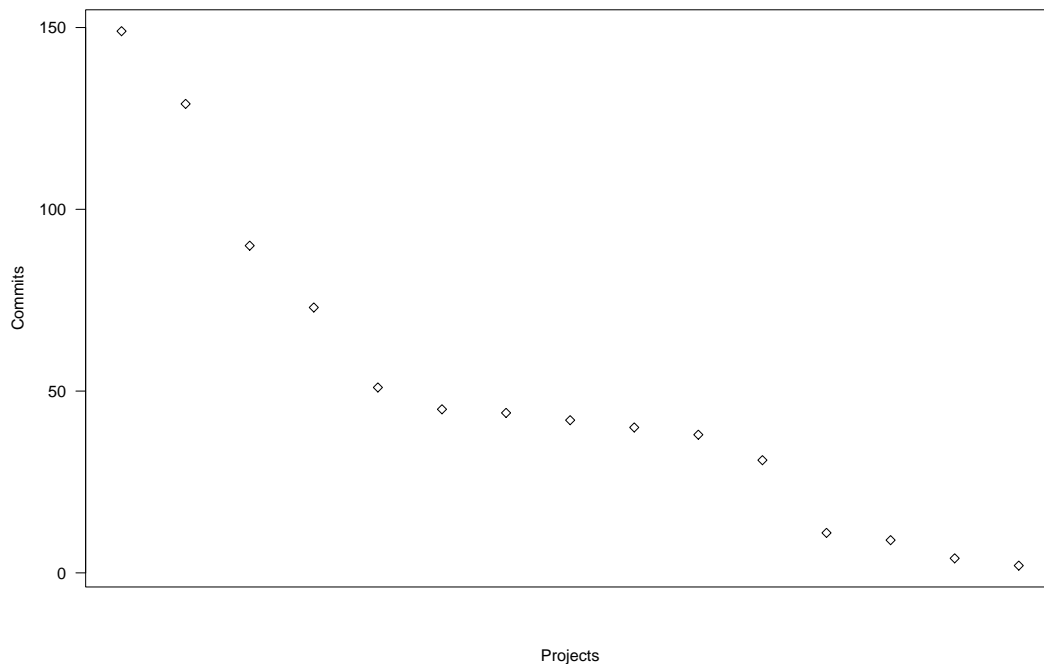


Figure 3.1: Distribution of commits per project in *Linux.hr*

### 3.3 Mailing list information

Although *Linux.hr* is a small forge, it has fourteen mailing lists which have been analysed with MailingListStats<sup>4</sup>. Not all the mailing lists found are project development lists<sup>5</sup>. This is easy to tell because there are 14 lists and only 11 projects in the forge. Some of these lists are related to news about the projects, the forge itself, project announcements. *Linux.hr* is not only a forge and basically most of the mailing lists relate to the activities of HULK (national LUG) and its local groups in places like Karlovac, Nasice, Varazdin, Osijek or Zagreb. The following table shows the number of posters for each mailing list:

<sup>4</sup>Methodology Report - Chapter Tools - Section Mailing List Stats

<sup>5</sup>This study includes mailing lists from forges, communities or LUGs in Croatia. Since *Linux.hr* is both a forge and a LUG, there is no distinction among its mailing lists. We included them all. However, it is worth mentioning that there is only one actual development mailing list: <http://lists.linux.hr/pipermail/fakebo/> and there is another one for I11n: <http://lists.linux.hr/pipermail/lokalizacija>.

Mailing list	Number of posters
<a href="http://lists.linux.hr/pipermail/lokalizacija/">http://lists.linux.hr/pipermail/lokalizacija/</a>	242
<a href="http://lists.linux.hr/pipermail/linux/">http://lists.linux.hr/pipermail/linux/</a>	188
<a href="http://lists.linux.hr/pipermail/hulk-na/">http://lists.linux.hr/pipermail/hulk-na/</a>	180
<a href="http://lists.linux.hr/pipermail/fakebo/">http://lists.linux.hr/pipermail/fakebo/</a>	163
<a href="http://lists.linux.hr/pipermail/hulk-ka/">http://lists.linux.hr/pipermail/hulk-ka/</a>	160
<a href="http://lists.linux.hr/pipermail/hulk-ri/">http://lists.linux.hr/pipermail/hulk-ri/</a>	141
<a href="http://lists.linux.hr/pipermail/lug/">http://lists.linux.hr/pipermail/lug/</a>	134
<a href="http://lists.linux.hr/pipermail/work/">http://lists.linux.hr/pipermail/work/</a>	46
<a href="http://lists.linux.hr/pipermail/hulk-zg/">http://lists.linux.hr/pipermail/hulk-zg/</a>	33
<a href="http://lists.linux.hr/pipermail/faq-workers/">http://lists.linux.hr/pipermail/faq-workers/</a>	20
<a href="http://lists.linux.hr/pipermail/firewall/">http://lists.linux.hr/pipermail/firewall/</a>	18
<a href="http://lists.linux.hr/pipermail/hulk-os/">http://lists.linux.hr/pipermail/hulk-os/</a>	9
<a href="http://lists.linux.hr/pipermail/press/">http://lists.linux.hr/pipermail/press/</a>	6
<a href="http://lists.linux.hr/pipermail/hulk-vz/">http://lists.linux.hr/pipermail/hulk-vz/</a>	2

Table 3.6: Mailing list and number of posters

We have found around 1225 distinct email address which have ever sent any email to any mailing list. We can even say that there are around 1100 different users who use these mailing lists to communicate. There is however, a big contrast in the number of emails sent per person, since most of them were sent by only 24 people. The rest of posters have less than 10 emails sent to any mailing list, and the majority of them just sent one email once. The next table shows the top 5 of people who have sent more emails in the *linux.hr* mailing list. Notice that *translation@IRO.UMontreal.CA* is not a person, but an automated Translation Project Robot. Also *work@linux.hr* is not a person either, but a mailing list address.

Email	Number of posts
<a href="mailto:translation@IRO.UMontreal.CA">translation@IRO.UMontreal.CA</a>	666
<a href="mailto:work@linux.hr">work@linux.hr</a>	197
<a href="mailto:slobodan.milnovic@vt.htnet.hr">slobodan.milnovic@vt.htnet.hr</a>	49
<a href="mailto:kost@linux.hr">kost@linux.hr</a>	49
<a href="mailto:mario.danic@gmail.com">mario.danic@gmail.com</a>	26

Table 3.7: Top 5 Email and Posts

So if we compare the use of mailing lists in this forge against others which are bigger than this (like the *Ossc* forge from Malaysia) we can see that proportionally, mailing lists are way more popular in *Linux.hr*. There are just three mailing list in *Ossc* and they are not dedicated to specific projects. On the other hand, there are some global lists in *Linux.hr* which are not related to specific projects. Additionally, *Linux.hr* also has forums<sup>6</sup>. No forum is exclusively development dedicated, but there is one dedicated to programming under Linux<sup>7</sup>.

It is also notorious that there is not much difference between traffic in global mailing lists and project lists. Only *lokalizacija* has significantly more traffic than the others. There are also seven mailing lists with less than 50 emails on their archive.

<sup>6</sup><http://www.linux.hr/modules/newbb/index.php>

<sup>7</sup><http://www.linux.hr/modules/newbb/viewforum.php?forum=8>

### 3.4 Source code information

The data for the analysis of the source code was obtained by downloading releases of software and then running SLOCCCount<sup>8</sup> on them. Analysing the effort estimations calculated with the COCOMO Model on the SLOCCCount data, we can see that the project with the most lines is the project with the highest developer/year effort. But this is not always the case. The project *Fakebo* has 4170 code lines and three developers were working on it for one year. But this is misleading data now, since this code has remained unchanged for seven years now. The following table includes these numbers:

Project	Num Lines	Dev/year (Dev/month)	Schedule	Avg developers	Cost to develop
fakebo	4,170	0.90 (10.75)	0.51 (6.16)	1.74	\$ 121,000
si3d	3,690	0.79 (9.45)	0.49 (5.87)	1.61	\$ 106,419
droper	1,404	0.29 (3.43)	0.33 (3.99)	0.86	\$ 38,581
xplsisnjasp	1,071	0.21 (2.58)	0.30 (3.58)	0.72	\$ 29,035
multiseti	972	0.19 (2.33)	0.29 (3.45)	0.68	\$ 26,224
scom	827	0.16 (1.97)	0.27 (3.23)	0.61	\$ 22,132
bag	312	0.06 (0.71)	0.18 (2.19)	0.32	\$ 7,953

Table 3.8: Sloccount data for linux forge in croatia

There is not much difference between the average of developers in the two first projects of the ranking. But notice the considerable gap before the third one.

The programming languages used to develop in the *Linux.hr* forge are *C*, *Perl* and *sh* (the shell scripting language) being *C* way much popular than the others. Table 3.9 and figure 3.2 show this relation.

Programming language	N. of detected lines	Percentage
C	10,980	88.2282
Perl	972	7.8103
SH	493	3.9614

Table 3.9: General Language results

---

<sup>8</sup>Methodology Report - Chapter Tools - Section SLOCCCount

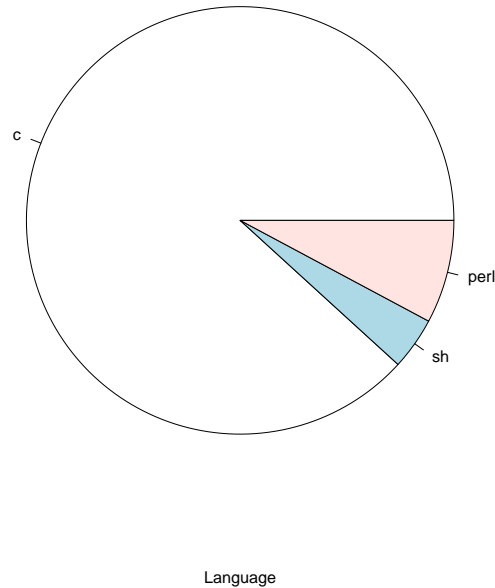


Figure 3.2: Programming languages in *Linux.hr*

### 3.5 Authorship information

Due to *Linux.hr* being such a small forge, there is not much information to analyse regarding authorship. All of the projects are being developed by just one individual on average. There are just 6 developers and each of these 6 developer works in one or more of these projects.

### 3.6 SourceForge

We found Croatian presence in SourceForge as well. There are 104 projects in SourceForge that the team resolved to identify as Croatian-driven. However, with very little information and few possibilities for data mining. Only fourteen of these projects have a reference to a CVS or SVN repository which do not have much activity either. This should be an indicator that Croatian-driven projects in SourceForge are really small projects. For example, the *ngode* project is the Croatian-driven project with the most commits but it only has a total of 1452 commits. On the other hand, the *advcw* project has only one commit. There is an average of 196.42 commits per project among Croatian-driven projects hosted in SourceForge.

Project Name	Num of Commits
ngode	1452
gpfelert	237
masn1	236
apvfs	203
ummon	200
oraexp	110
objectiveasp	104
iim4j	104
minshara	83
prospec	17
teka	3
advew	1

Table 3.10: Relation of projects and number of commits in SourceForge

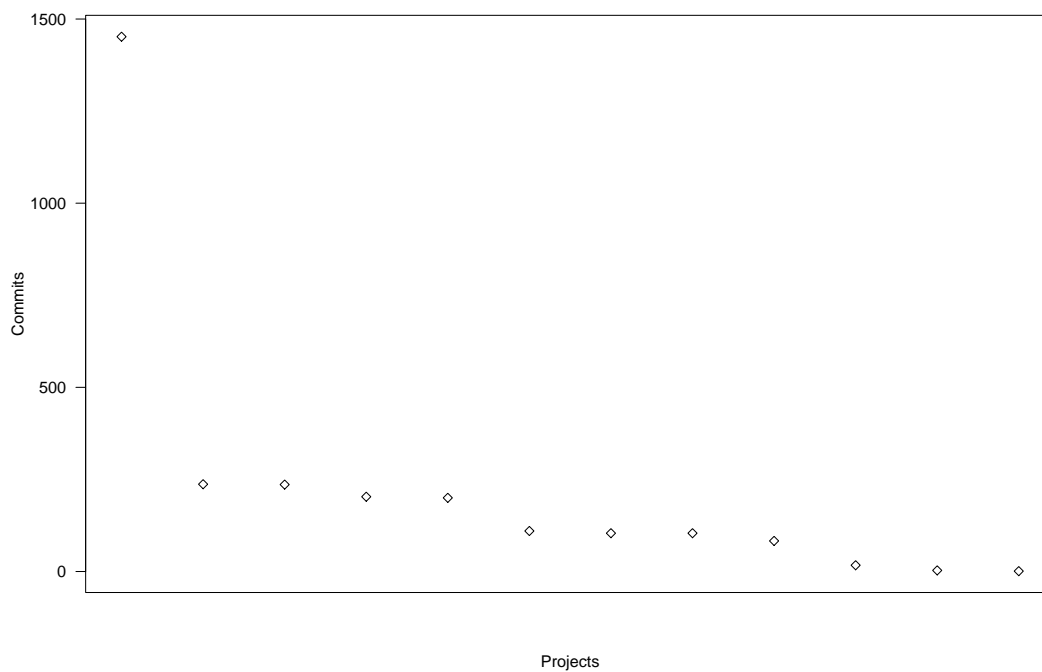


Figure 3.3: Distribution of commits per project in SourceForge forge made by Croatian developers

## Chapter 4

# Appendixes

### 4.1 Mailing lists

Detailed table including posters and number of posts in the mailing lists studied in this report.

Email	Number of posts
translation@IRO.UMontreal.CA	666
work@linux.hr	197
slobodan.milnovic@vt.htnet.hr	49
kost@linux.hr	49
mario.danic@gmail.com	26
ljubo108@vip.hr	26
miroslav.zubic@zesoi.fer.hr	19
vms@bofhlet.net	18
stephen@garageservice.biz	18
stephen@quasarman.biz	18
richard@expomedica.biz	18
robert.sedak@sk.t-com.hr	17
slobodan.milnovic@gmail.com	16
djosip@croadria.com	16
ravilov@linux.hr	14
radoslav.dejanovic@opsus.hr	14
delacko@fly.srk.fer.hr	14
igorm5@vip.hr	13
hulk-na@linux.hr	12
press@linux.hr	11
ivoks@grad.hr	11
joy@gkvk.hr	11
fritzfs@gmail.com	11
gilbert@garageservices.biz	11

Table 4.1: Table of Email and Posts