

Standard Grimoire Report
OPNFV Project
2017-Q4



March 23, 2018

This report would not exist without the effort of the people involved in the development of the Grimoire toolset.

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Executive Summary

This report provides a quantitative analysis of the current and past situation of the OPNFV project. All the data presented in it is based on information retrieved from the software development repositories of the project. The analysis includes a summary of the general situation of the project, and specific analysis of some of its development processes (issue tracking, code review) and communication channels (mailing lists, IRC, AskBot). For comparison with the past, most of the data is shown on a quarterly basis.

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Chapter 1

Project overview

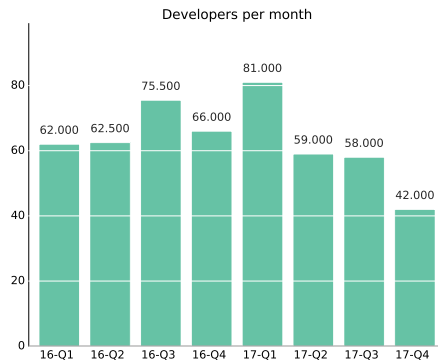
The report looks at activities across the OPNFV community during the fourth quarter of 2017, comparing it to previous quarters.¹.

Data source	Activity 90 days	Change (wrt to prev. 90 days)
Gits	3984 commits	-33%
Tickets	485 closed tickets	-38%
Mailing Lists	1073 sent emails	-13%
Gerrit	2222 submitted reviews	-17%
Askbot	5 posted questions	-62%
IRC	34078 messages	-35%

Table 1.1: Activity during the last 90 days and its evolution

The overall development activity has decreased following the pattern of quarters with release activity. Git and Gerrit activity has decreased between 17% and 33%. Ticketing activity shows a decrease of 38% when closing tickets. Mailing list activity has decreased 13% as well an inline with other communication channels such as IRC with an decrease of 35%. Askbot shows 62% of activity decrease when posting questions.

¹The analyzed data sources are available in appendixB



Period	Authors per month
16-Q1	62.0
16-Q2	62.5
16-Q3	75.5
16-Q4	66.0
17-Q1	81.0
17-Q2	59.0
17-Q3	58.0
17-Q4	42.0

In this quarter of 2017 the mean number of developers active per month has reached a total of 42. It is a decrease when compared to the previous quarter, and a valley of activity for the last 8 quarters.

The total number of contributors divided into three sets (core, regular and casual²) follow a similar pattern.

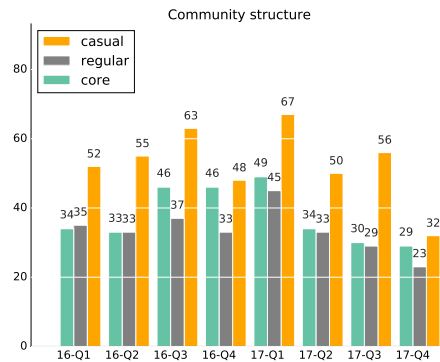


Figure 1.1: Evolution during the last quarters of core, regular and casual developers (based on git activity)

²Contributing developers are characterized as core, regular and casual depending on their activity in the git repositories. The classification is built by sorting contributors by their total number of commits; we sum the total commits per each individual contributors: the individuals whose commits sum up to 80% of the total number of commits in the quarter are the core contributors in that quarter. The regular contributors are those whose commits sum up to 95% of the total. The others are the casual contributors.

Period	Core	Regular	Occasional
16-Q1	34	35	52
16-Q2	33	33	55
16-Q3	46	37	63
16-Q4	46	33	48
17-Q1	49	45	67
17-Q2	34	33	50
17-Q3	30	29	56
17-Q4	29	23	32

Table 1.2: Characterization of developers by their total contribution to the project

This report aims to provide some insight into the software development process of the OPNFV community measuring efficiency and process of the community based on three metrics: the Review Efficiency Index (REI), the Time to Merge (TTM), and the Backlog Management Index (BMI). REI is measured as the number of closed (merged or abandoned) changesets out of the submitted changesets in a given period. TTM is measured as the time since a review is submitted until this is closed. The BMI is measured as the number of closed tickets out of open tickets in a given period.

REI	BMI	TTM
0.92	0	0.45 days

Table 1.3: Closed changesets out of opened changesets (REI), closed ticket out of opened tickets (BMI) and median time to merge in Gerrit (TTM)

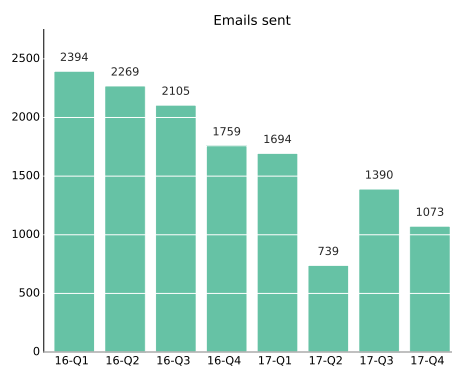
Chapter 2

Communication and support-related activities

Analysis of the communication channels used for communication and support-related activities.

2.1 Mailing Lists

The following charts show activity in terms of emails sent, people sending emails and people initiating threads per quarter. In addition, a table is presented with the hot topics in the several analyzed mailing lists. This shows hot topics ordered by number of total posts in such thread.

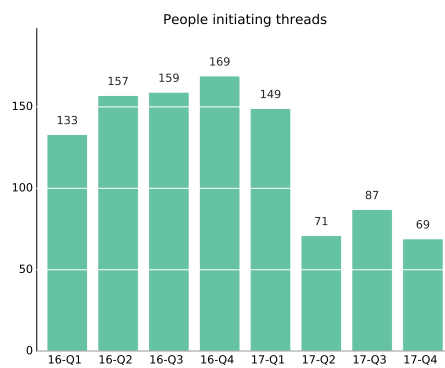


Period	Emails
16-Q1	2394
16-Q2	2269
16-Q3	2105
16-Q4	1759
17-Q1	1694
17-Q2	739
17-Q3	1390
17-Q4	1076

2.1. MAILING LISTS



Period	People
16-Q1	229
16-Q2	267
16-Q3	251
16-Q4	252
17-Q1	210
17-Q2	111
17-Q3	125
17-Q4	112



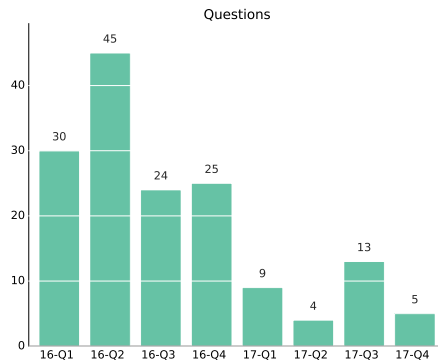
Period	People
16-Q1	133
16-Q2	157
16-Q3	159
16-Q4	169
17-Q1	149
17-Q2	71
17-Q3	87
17-Q4	70

Initial Author and Date	Subject	Number Messages
David McBride 2017-10-20	[opnfv-project-leads] [release][euphrates] MS11 - tag repos	24
Morgan Ri-chomme 2017-10-06	[test-wg] [OPNFV] Bitergia dashboards / Euphrates	24
2018-03-02		19
2018-03-02		19
Georg Kunz 2017-10-11	[opnfv-tech-discuss] [functest] [sdnvpn] Proposal for removing installer dependent information in the test tools	18
Fatih Degirmenci 2017-12-08	[opnfv-tech-discuss] [relog] Committer list per Releng repository	13
liang gao 2017-10-27	[opnfv-tech-discuss] [availability]High Availability Project meeting on Oct. 18	12
David McBride 2017-12-12	[opnfv-tsc] [release][euphrates] Vote to approve release of Euphrates 5.1	12
Georg Kunz 2017-11-16	[opnfv-tech-discuss] [availability] High Availability test cases for Fraser	12
Jack Morgan 2017-10-09	[opnfv-tech-discuss] [Infra] Infra WG Weekly Meeting Minutes - Oct. 9th	11

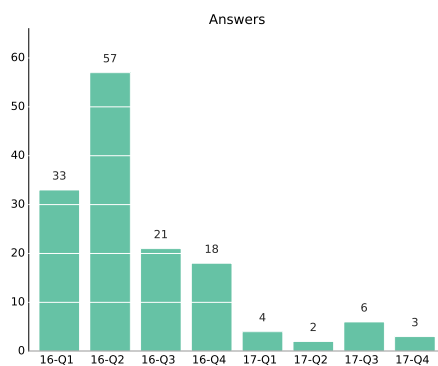
2.2 Questions and Answers

The following charts show activity in the Ask site. Total number of questions, number of answers, number of comments and people sending questions are depicted. In addition two tables represent the hot topics activity in the Ask OPNFV site. These show information about the top visited questions and questions with the highest number of people participating.

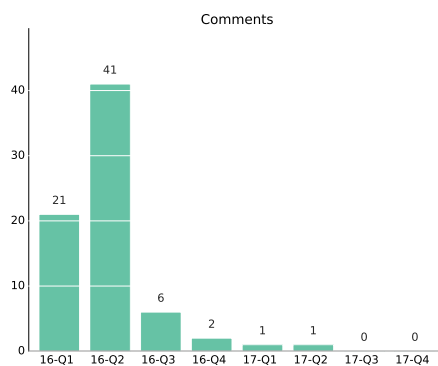
2.2. QUESTIONS AND ANSWERS



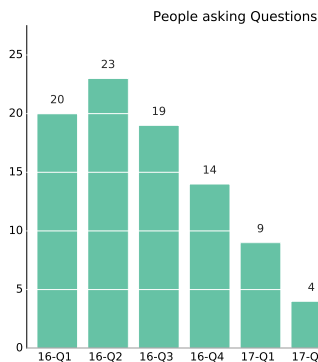
Period	Questions
16-Q1	30
16-Q2	45
16-Q3	24
16-Q4	25
17-Q1	9
17-Q2	4
17-Q3	13
17-Q4	5



Period	Answers
16-Q1	33
16-Q2	57
16-Q3	21
16-Q4	18
17-Q1	4
17-Q2	2
17-Q3	6
17-Q4	3



Period	Comments
16-Q1	21
16-Q2	41
16-Q3	6
16-Q4	2
17-Q1	1
17-Q2	1
17-Q3	0
17-Q4	0



Period	People asking
16-Q1	20
16-Q2	23
16-Q3	19
16-Q4	14
17-Q1	9
17-Q2	4
17-Q3	9
17-Q4	4

- Top visited questions.

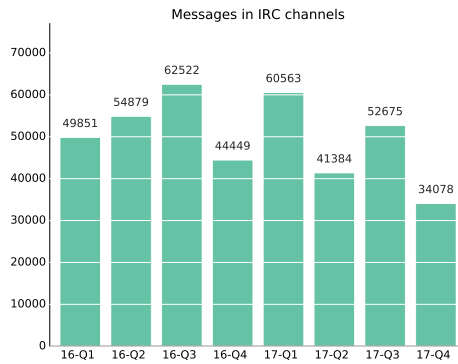
Question subject	Visits
danube giving a new node an+	10
connectivity_test failed for slave node mid+	0
unable to see the console in+	0
apex virtual deployment failed to configure+	0
vm instance launch issue neutron with+	0

- Top questions with the highest number of people participating.

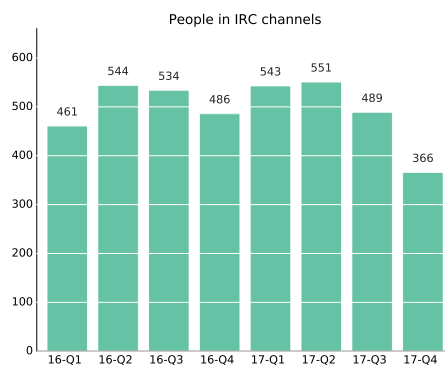
Question subject	People participating
danube giving a new node an+	1
apex virtual deployment failed to configure+	1
vm instance launch issue neutron with+	1
connectivity_test failed for slave node mid+	1
unable to see the console in+	1

2.3 IRC

The community uses several IRC channels for asynchronous communication. This section shows information about the total number of messages sent in the community during the last 7 quarters together with the number of people participating in such discussions.



Period	Messages
16-Q1	49851
16-Q2	54879
16-Q3	62522
16-Q4	44449
17-Q1	60563
17-Q2	41384
17-Q3	52675
17-Q4	34334



Period	People
16-Q1	461
16-Q2	544
16-Q3	534
16-Q4	486
17-Q1	543
17-Q2	551
17-Q3	489
17-Q4	366

Chapter 3

Details on OPNFV development community

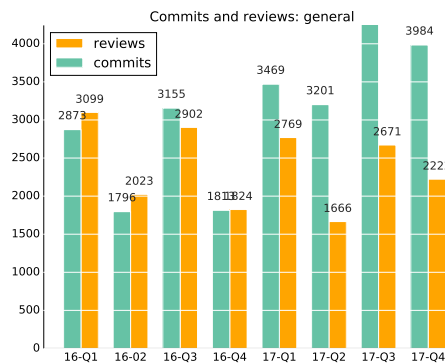
Each breakdown is divided into three sections with information from the last 6 quarters:

- activity: centered on the following metrics: commits from git activity, submitted, merge and abandoned reviews from the review system and opened and closed tickets from the issue tracking system.
- community: active core reviewers in gerrit, active authors in git and top ten developers and top ten organizations contributing to the development in the last quarter.
- process: efficiency closing tickets, efficiency closing changesets, Time to Merge (mean and median), number of patchsets (iterations) per changeset and a study on the time waiting for a reviewer or submitter action in the patchset review process.

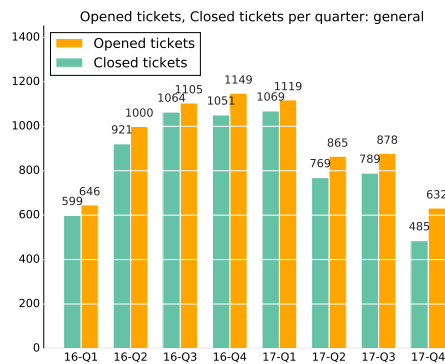
3.1 Details of the project

3.2 Activity

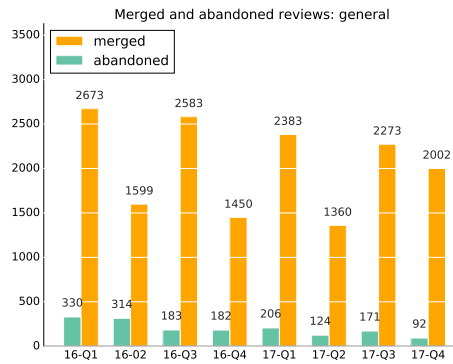
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Jira.



Period	Commits	Reviews
16-Q1	2873	3099
16-Q2	1796	2023
16-Q3	3155	2902
16-Q4	1813	1824
17-Q1	3469	2769
17-Q2	3201	1666
17-Q3	5170	2671
17-Q4	4133	2258



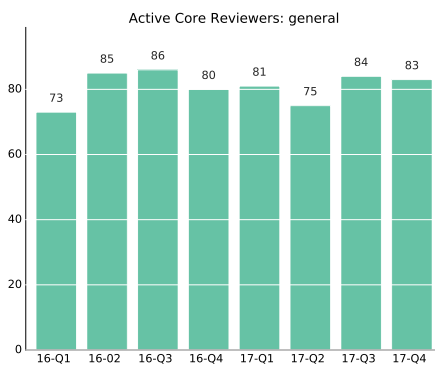
Period	Closed	Opened
16-Q1	599	646
16-Q2	921	1000
16-Q3	1064	1105
16-Q4	1051	1149
17-Q1	1069	1119
17-Q2	769	865
17-Q3	789	878
17-Q4	485	632



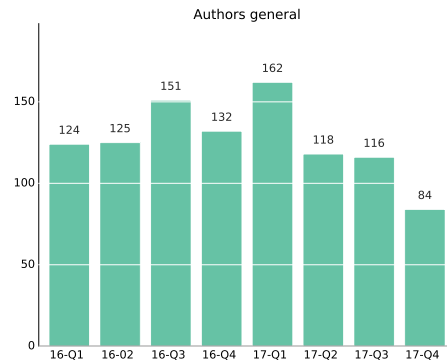
Period	Merged	Abandoned
16-Q1	2673	330
16-Q2	1599	314
16-Q3	2583	182
16-Q4	1450	182
17-Q1	2383	206
17-Q2	1360	124
17-Q3	2273	171
17-Q4	1987	92

3.3 Community

Active core reviewers in Gerrit, active authors in Git, top authors and organizations in the last quarter



Period	Active Core
16-Q1	73
16-Q2	85
16-Q3	86
16-Q4	80
17-Q1	81
17-Q2	75
17-Q3	84
17-Q4	83



Period	Authors
16-Q1	124
16-Q2	125
16-Q3	151
16-Q4	132
17-Q1	162
17-Q2	118
17-Q3	116
17-Q4	84

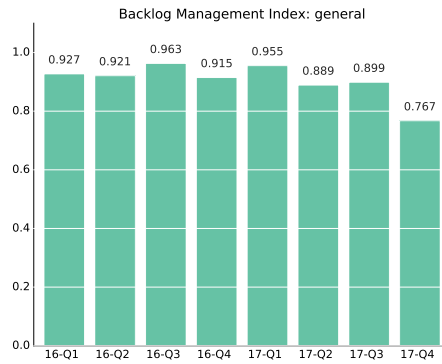
Commit (s)	Author
701	Alexandru Avadanii
341	cedric.ollivier
330	Ross Brattain
235	Markos Chandras
198	Michael Polenchuk
167	Aric Gardner
136	Trevor Bramwell
135	wulin wang
131	Tim Rozet
130	Deepak S

Commit (s)	Organizations
748	ENEA AB
705	Huawei
699	Intel
618	Orange
316	SUSE
303	Linux Foundation
287	ZTE Corporation
271	Ericsson
210	Red Hat
198	Mirantis
104	ATT
40	Dell
38	EMC
30	Nokia
26	Cisco
26	Tata Consultancy
19	NEC
18	Juniper
4	Fraunhofer FOKUS
2	VMWare

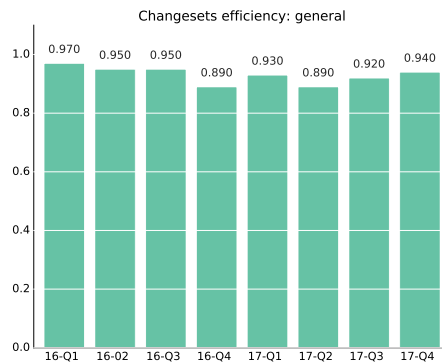
3.4 Process

Efficiency closing changesets and tickets, time to review (mean and median), number of patchsets (iterations) per changeset and study on the time waiting

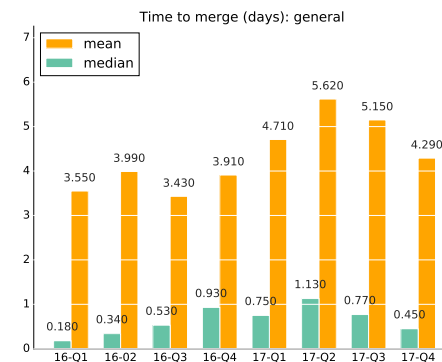
for a reviewer or submitter action in the patchset review process.



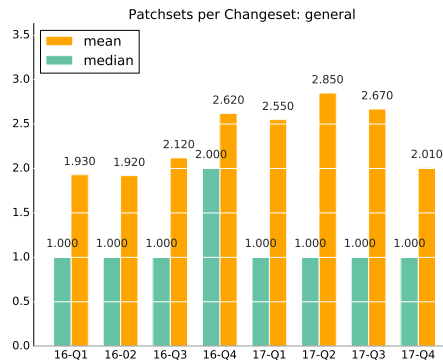
Period	Closed/Opened
16-Q1	0.93
16-Q2	0.92
16-Q3	0.96
16-Q4	0.91
17-Q1	0.96
17-Q2	0.89
17-Q3	0.90
17-Q4	0.77



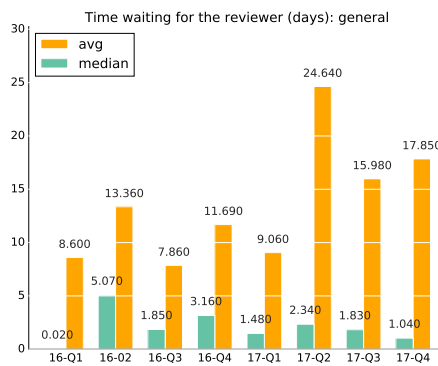
Period	(Aband. and Merg.)/Subm.
16-Q1	0.97
16-Q2	0.95
16-Q3	0.95
16-Q4	0.89
17-Q1	0.93
17-Q2	0.89
17-Q3	0.92
17-Q4	0.92



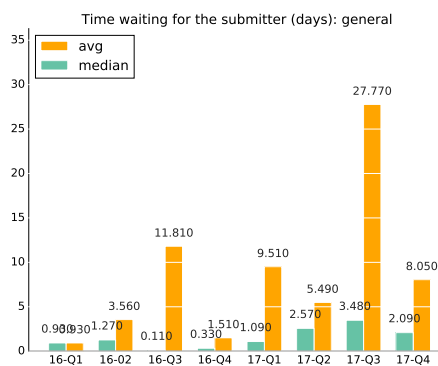
Period	Median	Mean
16-Q1	0.18	3.55
16-Q2	0.34	3.99
16-Q3	0.53	3.43
16-Q4	0.93	3.91
17-Q1	0.75	4.71
17-Q2	1.13	5.62
17-Q3	0.77	5.15
17-Q4	0.45	4.28



Period	Median	Mean
16-Q1	1.0	1.93
16-Q2	1.0	1.92
16-Q3	1.0	2.12
16-Q4	2.0	2.62
17-Q1	1.0	2.55
17-Q2	1.0	2.85
17-Q3	1.0	2.67
17-Q4	1.0	2.09



Period	Median	Mean
16-Q1	0.02	8.6
16-Q2	5.07	13.36
16-Q3	1.85	7.86
16-Q4	3.16	11.69
17-Q1	1.48	9.06
17-Q2	2.34	24.64
17-Q3	1.83	15.98
17-Q4	1.04	18.55



Period	Median	Mean
16-Q1	0.93	0.93
16-Q2	1.27	3.56
16-Q3	0.11	11.81
16-Q4	0.33	1.51
17-Q1	1.09	9.51
17-Q2	2.57	5.49
17-Q3	3.48	27.77
17-Q4	2.09	8.44

Appendix A

Metrics Definitions

- Commit: this is defined as the action(s) that performs a change in the source code. Bots, merges and other type of automatic activity is removed from the records. In addition, when aggregating several git repositories, this metric only counts unique revisions (unique hashes found in the git repositories). In addition, all branches are aggregated to the analysis.
- Submitted changeset: a changeset is the process of peer reviewing source code changes. A submitted code is not merged to the master code of a given project till this is approved for at least one core reviewer of such project. A submitted changeset is defined as any changeset submitted to the Gerrit system.
- Merged and abandoned changsets: a merge is defined as the patchset that was finally submitted to the source code. An abandoned changeset is a potential merge that was finally dismissed by developers as being part of the source code. This status is found in the status of the final patchset. However, although a patchset can be merged or abandoned, this action can be reverted. If a patchset presents several of these changes in the same period of time, only one of them is counted (the very last one). On the other hand, if those changes take place in different periods of analysis, both status would be counted.
- Open and closed ticket: a ticket in Jira is counted as closed if the status of such ticket is defined as 'Closed'. The rest of the tickets are counted as opened tickets.
- Active Core Reviewer: a core reviewer has the possibility to use +2 or

-2 actions when reviewing the code. However, if there are developers that for some period do not use those actions, those can not be measured as core reviewer. Thus, this metric provides information about 'active' core reviewers. This can be also defined as those developers that actively have used the +2 or -2 review action. This metric is also filtered by branch of activity, only using 'master'. This helps to detect actual core reviewers in each of the projects.

- Authors: a developer is defined as author if she is the owner of the patchset sent for reviewing and this is merged into the source code. As previously indicated, automatic commits such bot's are removed from this analysis.
- Efficiency closing issues: this metric is a derivation of the Backlog Management Index (BMI) that measures the number of closed tickets out of the opened tickets in a period of time. Values under 1.0 indicates that the number of closing issues is lower than the number of opened issues arriving. On the contrary, higher charts would indicate better maintenance effort by the community.
- Efficiency closing changesets: this metric is a derivation of the Backlog Management Index as it is named as Review efficiency index (REI). As similarly used in the BMI index, this metrics measures the number of closed changesets (merged or abandoned) out of the total number of new changesets.
- Time to Merge: this time consists of the time between the first upload of the first patchset (as defined as a submitted changeset) till the last patchset of the changeset is merged into the code and this is indicated in the comments side of the Gerrit tool. This metric is provided in number of days.
- Patchsets per changeset: this metric calculates the total number of iterations in a changeset till this is abandoned or merged.
- Time waiting for the reviewer or the submitter: a changeset is waiting for a reviewer action if a new patchset upload or a new changset arrives to the system. On the other hand, a submitter action is required when a specific negative verification or reviewing action takes place (Verified -1/-2 or Code-Review -1/-2). In addition, when a Code-Review +2 action takes place, it is assumed that the changset is closing and no

more times are registered either for the reviewer or the submitter. For this analysis, those patchsets flagged as work in progress are ignored.

Metrics measured in the general overview:

- Community structure, core, regular and casual developers: developers are ordered in descendant order by the number of commits authored for a given period. Core developers are defined as the list of developers that reach 80% of the total commits. Regular is the set of developers that are between that 80% and 95% of the commits. Casual developers are found in the rest of the 5%. Bots are ignored in this list of developers.
- Developer per month: average of developers per month ignoring bots.
- Emails sent: number of emails sent by people to the several mailing lists. Bots are not registered.
- People sending emails: number of people sending those emails ignoring bots.
- People initiating threads: a thread is defined as a list of emails that has the same root. There may exist threads of one email.
- Top threads: this list provides the longest threads in terms of number of emails that have a common root email.
- Questions, answers and comments in Askbot.
- People asking questions in Askbot: number of people sending a new question.
- Top visited questions.
- Messages and people in IRC: this analysis ignores as a message those entries in the IRC channels that provide information about people entering or leaving the system.

Appendix B

Source code and data sources

The source code of the scripts and templates used to produce this report are available from the GrimoireReports repository¹.

The databases used for the analysis can be obtained from the “Data sources” panel² of the Grimoire Dashboard for the project³.

¹<https://github.com/VizGrimoire/GrimoireReports>

²http://projects.bitergia.com/opnfv/browser/data_sources.html

³<http://projects.bitergia.com/opnfv/>