

Standard Grimoire Report
OPNFV Project
2017-Q3



December 27, 2017

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

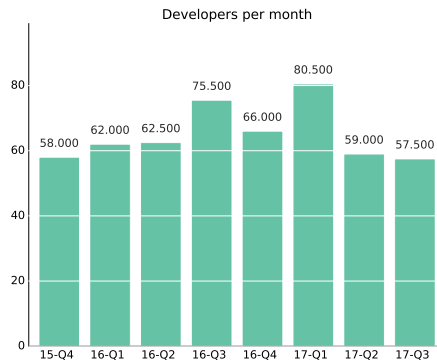
The report looks at activities across the OPNFV community during the first quarter of 2017, comparing it to previous quarters.¹.

Data source	Activity 90 days	Change (wrt to prev. 90 days)
Gits	5957 commits	80%
Tickets	769 closed tickets	1%
Mailing Lists	1709 sent emails	124%
Gerrit	3087 submitted reviews	80%
Askbot	12 posted questions	140%
IRC	52638 messages	29%

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

The overall development activity has increased following the pattern of quarters with release activity. Git and Gerrit activity has increased 80%. Ticketing activity shows a small increase of 1% when closing tickets. Mailing list activity has increased 124% as well as inline with other communication channels such as IRC with an increase of 29%. Askbot shows 140% of activity increase.

¹The analyzed data sources are available in appendixB



Period	Authors per month
15-Q4	58.0
16-Q1	62.0
16-Q2	62.5
16-Q3	75.5
16-Q4	66.0
17-Q1	80.5
17-Q2	59.0
17-Q3	57.5

In this quarter of 2017 the mean number of developers active per month has reached a total of 57. It is a decrease when compared to the previous quarter, and close to the fourth quarter of 2015.

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

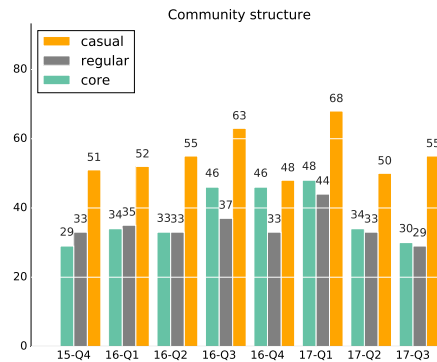


Figure 1.1: Evolution during the last quarters of core, regular and casual developers (based on git activity)

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
15-Q4	29	33	51
16-Q1	34	35	52
16-Q2	33	33	55
16-Q3	46	37	63
16-Q4	46	33	48
17-Q1	48	44	68
17-Q2	34	33	50
17-Q3	30	29	55

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	0.87	0.78 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)

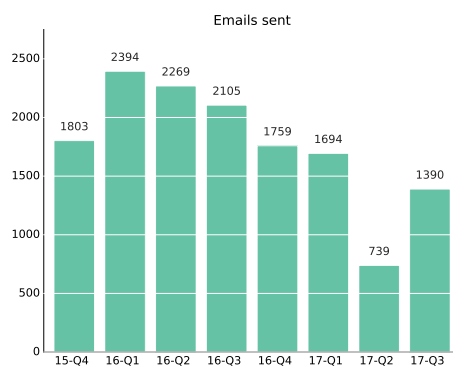
Chapter 2

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.

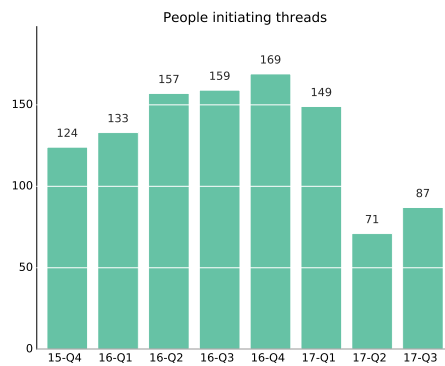


Period	Emails
15-Q4	1803
16-Q1	2394
16-Q2	2269
16-Q3	2105
16-Q4	1759
17-Q1	1694
17-Q2	739
17-Q3	1390

2.1. MAILING LISTS



Period	People
15-Q4	204
16-Q1	229
16-Q2	267
16-Q3	251
16-Q4	252
17-Q1	210
17-Q2	111
17-Q3	125

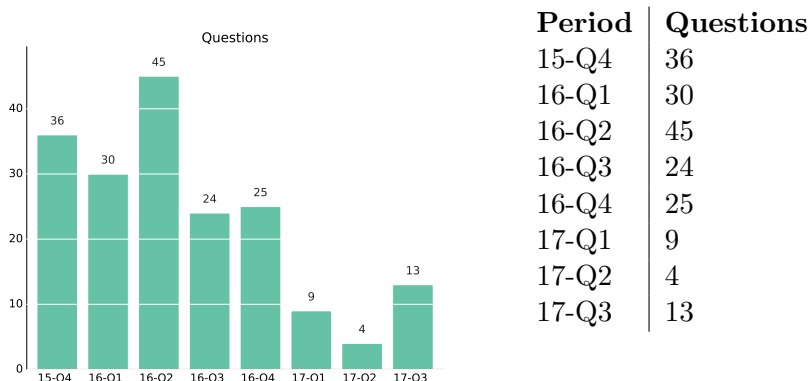


Period	People
15-Q4	124
16-Q1	133
16-Q2	157
16-Q3	159
16-Q4	169
17-Q1	149
17-Q2	71
17-Q3	87

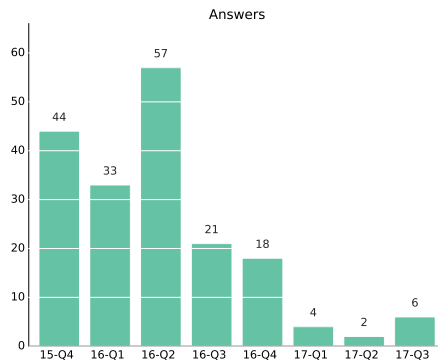
Initial Author and Date	Subject	Number Messages
Raymond Paik 2017-09-03	[opnfv-tech-discuss] [announce] Opening nominations for Committers-at-Large TSC Committer Board elections	47
David McBride 2017-08-29	[opnfv-project-leads] [release][euphrates] stable branch window	26
Mark.Beierl 2017-08-15	[opnfv-tech-discuss] Topics for Weekly Technical Discussion	20
Mark.Beierl 2017-07-26	[opnfv-tech-discuss] [armband] Resource for development or testing	15
Wenjing.Chu 2017-08-10	[opnfv-tech-discuss] [dovetail] weekly call agenda 8 11	14
Morgan Ri-chomme 2017-08-22	[test-wg] [OPNFV] [OpenStack] resiliency stress long duration robustness testing synchro	12
Koren Lev korlev 2017-07-27	[opnfv-project-leads] uploading UI code to OPNFV	11

2.2 Questions and Answers

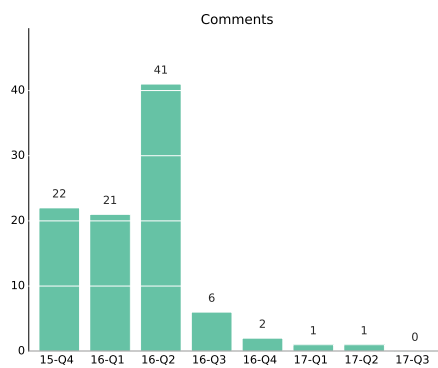
The following charts show activity in the Ask site. Total number of questions, number of answers, number of comments and people sending questions are depicted. In addition two tables represent the hot topics activity in the Ask OPNFV site. These show information about the top visited questions and questions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



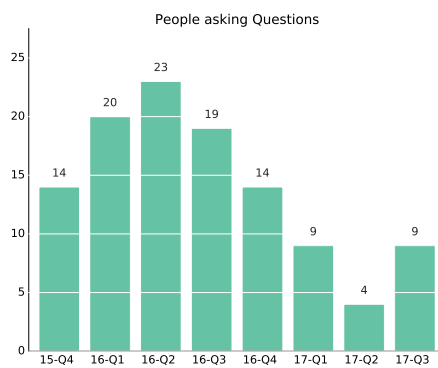
2.2. QUESTIONS AND ANSWERS



Period	Answers
15-Q4	44
16-Q1	33
16-Q2	57
16-Q3	21
16-Q4	18
17-Q1	4
17-Q2	2
17-Q3	6



Period	Comments
15-Q4	22
16-Q1	21
16-Q2	41
16-Q3	6
16-Q4	2
17-Q1	1
17-Q2	1
17-Q3	0



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

- Top visited questions.

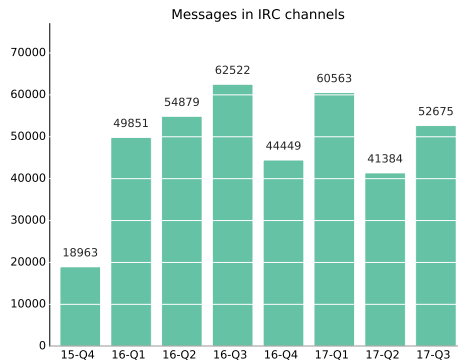
Question subject	Visits
opnfv danube 20 fuel deployment failed+	793
sfc functest is not working+	109
openstack novnc console is not working+	43
fuel no option to install ceilometer+	18
opnfv danube+	18
problem with dhcp server during opnfv+	1
git review is not working+	0
image upload failed+	0
opnfv release in production+	0
cluster loop detected+	0

- Top questions with the highest number of people participating.

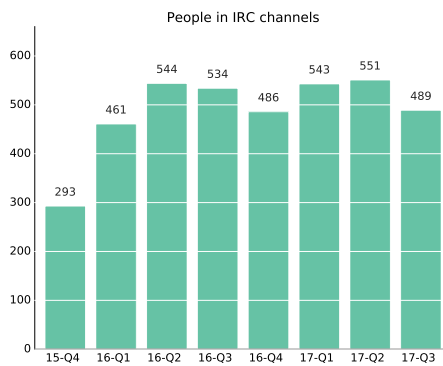
Question subject	People participating
openstack novnc console is not working+	3
sfc functest is not working+	3
opnfv danube 20 fuel deployment failed+	2
git review is not working+	1
image upload failed+	1
opnfv release in production+	1
opnfv danube+	1
openstack provider network configuration in opnfv+	1
fuel no option to install ceilometer+	1
problem with dhcp server during opnfv+	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
15-Q4	18963
16-Q1	49851
16-Q2	54879
16-Q3	62522
16-Q4	44449
17-Q1	60563
17-Q2	41384
17-Q3	52675



Period	People
15-Q4	293
16-Q1	461
16-Q2	544
16-Q3	534
16-Q4	486
17-Q1	543
17-Q2	551
17-Q3	489

Chapter 3

Details on OPNFV development community

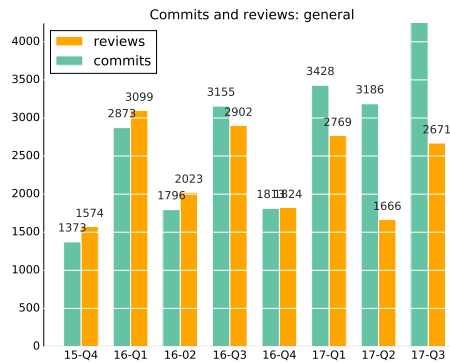
Each breakdown is divided into three sections with information from the last 6 quarters:

- 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.

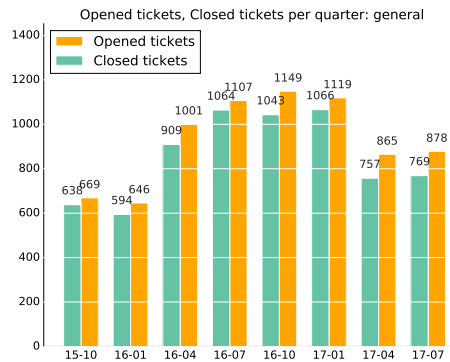
3.1 Details of the project

3.2 Activity

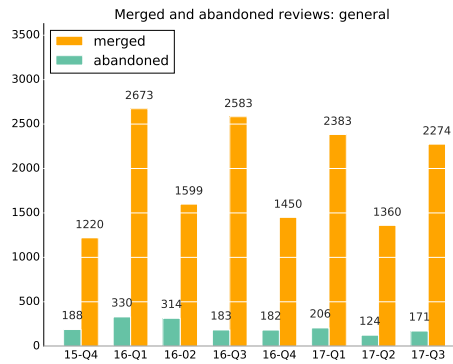
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Jira.



Period	Commits	Reviews
15-Q4	1373	1574
16-Q1	2873	3099
16-Q2	1796	2023
16-Q3	3155	2902
16-Q4	1813	1824
17-Q1	3428	2769
17-Q2	3186	1666
17-Q3	5130	2671



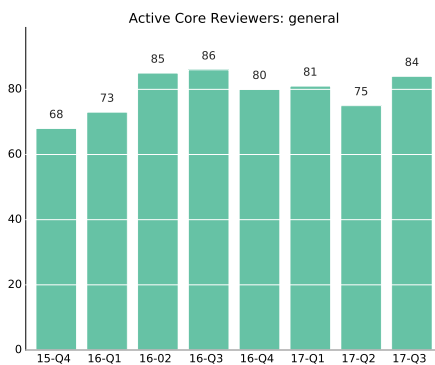
Period	Closed	Opened
15-10	638	669
16-01	594	646
16-04	909	1001
16-07	1064	1107
16-10	1043	1149
17-01	1066	1119
17-04	757	865
17-07	769	878



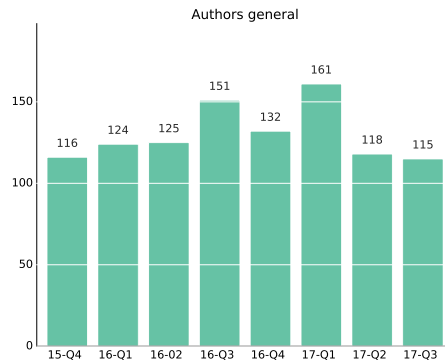
Period	Merged	Abandoned
15-Q4	1220	188
16-Q1	2673	330
16-02	1599	314
16-Q3	2583	183
16-Q4	1450	182
17-Q1	2383	206
17-Q2	1360	124
17-Q3	2274	171

3.3 Community

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



Period	Active Core
15-Q4	68
16-Q1	73
16-02	85
16-Q3	86
16-Q4	80
17-Q1	81
17-Q2	75
17-Q3	84



Period	Authors
15-Q4	116
16-Q1	124
16-Q2	125
16-Q3	151
16-Q4	132
17-Q1	161
17-Q2	118
17-Q3	115

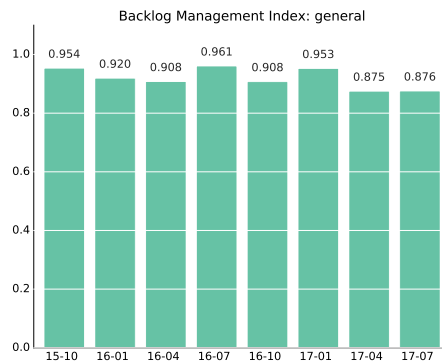
Commit (s)	Author
488	Alexandru Avadanii
470	Ross Brattain
370	cedric.ollivier
320	Tim Rozet
250	Morgan Richomme
209	Steven Pisarski
193	Serena Feng
181	Narinder Gupta
174	Aric Gardner
162	Trevor Bramwell

Commit (s)	Organizations
1053	Huawei
819	Intel
814	ZTE Corporation
703	Orange
513	Red Hat
503	ENEA AB
388	Ericsson
336	Linux Foundation
242	SUSE
148	Dell
145	EMC
136	Mirantis
42	Nokia
29	NEC
25	ATT
23	Cisco
15	Juniper
11	Fraunhofer FOKUS
5	Tata Consultancy
3	VMWare

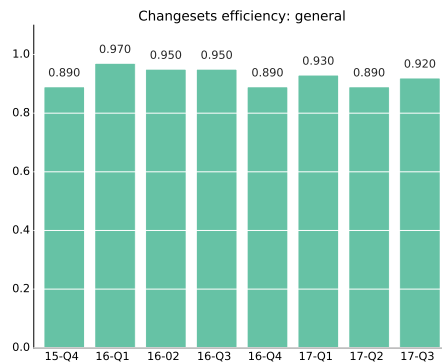
3.4 Process

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

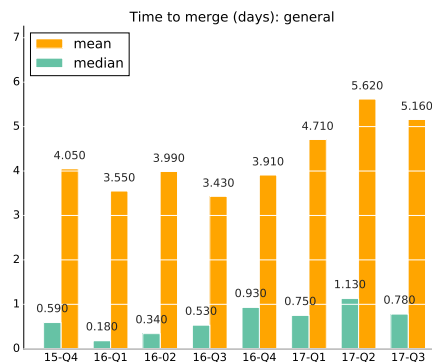
for a reviewer or submitter action in the patchset review process.



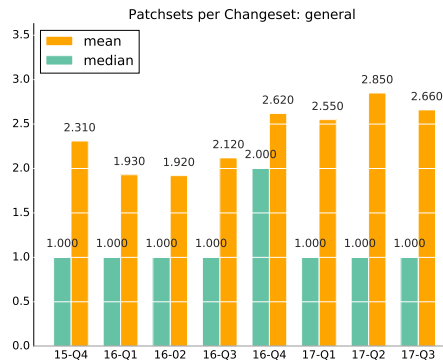
Period	Closed/Opened
15-10	0.95
16-01	0.92
16-04	0.91
16-07	0.96
16-10	0.91
17-01	0.95
17-04	0.88
17-07	0.88



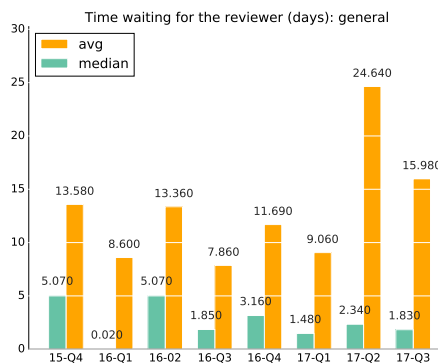
Period	(Aband. and Merg.)/Subm.
15-Q4	0.89
16-Q1	0.97
16-Q2	0.95
16-Q3	0.95
16-Q4	0.89
17-Q1	0.93
17-Q2	0.89
17-Q3	0.92



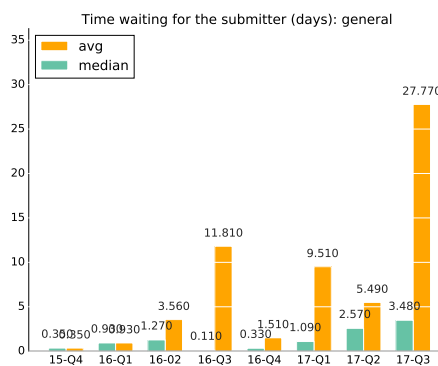
Period	Median	Mean
15-Q4	0.59	4.05
16-Q1	0.18	3.55
16-Q2	0.34	3.99
16-Q3	0.53	3.43
16-Q4	0.93	3.91
17-Q1	0.75	4.71
17-Q2	1.13	5.62
17-Q3	0.78	5.16



Period	Median	Mean
15-Q4	1.0	2.31
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	2.66



Period	Median	Mean
15-Q4	5.07	13.58
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



Period	Median	Mean
15-Q4	0.35	0.35
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

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/>