

OpenStack Community Activity Report
April-June, 2015
Report sponsored by the OpenStack Foundation



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AUTHOR Daniel Izquierdo Cortázar
Chief Data Officer
dizquierdo@bitergia.com

AUTHOR Stefano Maffulli
OpenStack Developer Advocate
stefano@openstack.org

This report would not exist without the effort of the people involved in the development of the OpenStack Activity Board, Grimoire toolset and the feedback of the people in the development mailing list of the OpenStack Foundation.

Executive Summary

The January-March 2015 summary of OpenStack Community Activity Report¹ starts to show the maturity reached by the project, with most metrics remaining stable compared to previous quarters. However the project keeps growing as observed with a minimum increase of activity of a 4% if compared to the previous year.

Key findings:

New peak of code contributors

With 556 active contributors per month, this quarter has the highest in the history of OpenStack. Compared to previous quarter, core and regular contributors have also increased over 10% the former and 20% the latter.

Development process keeps improving

The time to merge patches for integrated projects shows similar numbers to previous quarter, with the median time reducing. There seem to be a very positive inversion of trend for time to attend pending patchsets: while one year ago the mean time for a reviewer to give a comment to a patchset was over seven days, in this quarter the mean time is just five days. The median time is also down from one full day to half day. Nova and Glance have very high time to merge, requiring deeper investigation to identify the root cause.

Submitters time to respond starts to decrease

For the first time, contributors submitting changesets seem to be reacting faster to comments from reviewers and submit new patches more rapidly. These values may be the result of the increased efforts by the OpenStack Foundation targeting newcomers.

Conversations are happening in many new places

Many discussions have moved to Ask OpenStack and, for development and governance issues, moved to gerrit and the traffic on mailing list has stalled as a side effect.

¹This report is produced quarterly to give Community Managers and OpenStack Foundation's management better insights on development activities and online conversations. The quantitative and qualitative assessment start from tracking actions across all OpenStack git repositories, gerrit code reviews, bug trackers as well as IRC channels, mailing lists and questions/answers.

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Chapter 1

Overview of the Project

The OpenStack Community Activity Report is produced quarterly to give Community Managers and OpenStack Foundation's management better insights on development activities and online conversations. The quantitative and qualitative assessment start from tracking actions across all OpenStack git repositories, gerrit code reviews, bug trackers as well as IRC channels, mailing lists and questions/answers site Ask OpenStack.

The report looks at activities across the OpenStack community during the first quarter of 2015, comparing it to previous eight quarters.¹

The analysis aims at providing a detailed view of how the OpenStack project is evolving with special focus on each of the OpenStack programs². OpenStack Integrated Releases are delivered at the beginning of the second and fourth quarters of each year and cycles of development activity are visible in the report: the first and third quarters of the year are periods of higher activity while during the second and fourth ones show other recognizable patterns of activity in the OpenStack community.

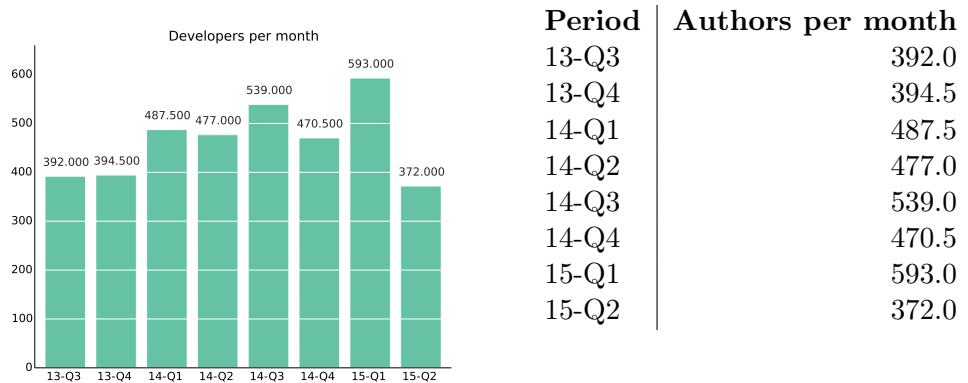
¹The analyzed data sources are available in appendixB

²Each of the projects mentioned are following the analysis of the Programs specified at <http://git.openstack.org/cgit/openstack/governance/tree/reference/programs.yaml>. In addition, the hierarchy of projects and their repositories can be found at the correspondent appendixB

Data source	Activity 365 days	Change (wrt to prev. 365 days)
Gits	50866 commits	5%
Tickets	13042 closed tickets	20%
Mailing Lists	38305 sent emails	13%
Gerrit	48712 submitted reviews	6%
Askbot	5826 posted questions	334%
IRC	1472009 messages	11%

Table 1.1: Activity during the last 365 days and its evolution

The activity around code, from merged commits to code reviews seems to be stable, while bug fixes and conversations on IRC and Ask OpenStack keep increasing, compared to previous year.



In this first quarter of 2015 the mean number of developers active per month has reached a total of 556, the highest number observed so far.

The total number of contributors divided into three sets (core, regular and casual³) also has reached its highest observed numbers. While the casual developers seem to grow more slowly, core and regular ones have increased more than 10% since past quarter.

³Contributing 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.

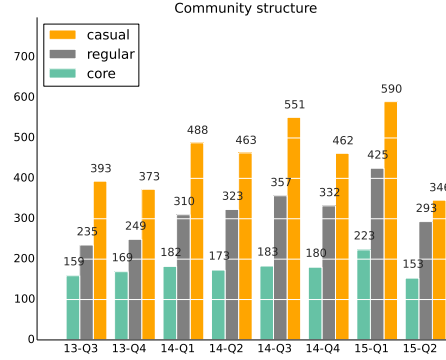


Figure 1.1: Evolution of the last 8 quarters of the core, regular and casual developers (Git activity)

Period	Core	Regular	Occasional
13-Q3	159	235	393
13-Q4	169	249	373
14-Q1	182	310	488
14-Q2	173	323	463
14-Q3	183	357	551
14-Q4	180	332	462
15-Q1	223	425	590
15-Q2	153	293	346

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

This report aims to provide some insights about the software development process of the OpenStack 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.

The median Time To Merge for Nova and Glance is a lot higher then in other project but the root cause of this is not clearly identifiable.

Integrated project	REI	BMI	TTM
neutron	0.74	0.71	4.78 days
sahara	0.8	0.71	4.51 days
ceilometer	0.77	0.67	3.17 days
horizon	0.7	0.68	3.05 days
heat	0.81	0.74	2.46 days
nova	0.54	0.48	11.0 days
trove	0.8	0.64	3.6 days
swift	0.7	0.68	4.51 days
glance	0.57	0.48	6.93 days
cinder	0.68	0.79	5.67 days
keystone	0.7	0.72	8.09 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

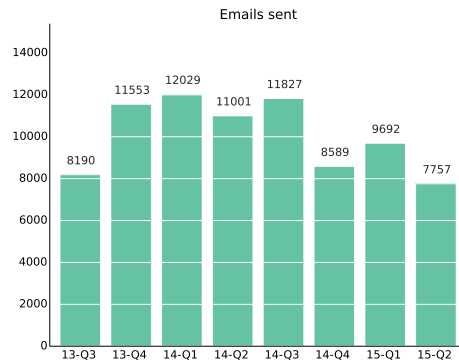
Communication and Support-Related Activities

The OpenStack community uses several channels for communication and support-related activities. Mailing lists were initially the key place for communications, although part of the activity is moving to the questions and answers tool in the Ask OpenStack site.

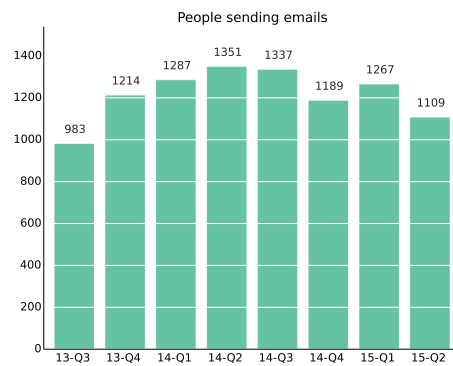
2.1 Mailing Lists

The following charts show activity in terms of emails sent, people sending emails and people initiating threads per quarter. In addition, two tables are presented with the hot topics in the several analyzed mailing lists. First table shows hot topics ordered by number of total posts in such thread, while the second table shows hot topics ordered by the total number of different participants in the discussions. The two tables are based on the last quarter period of activity.

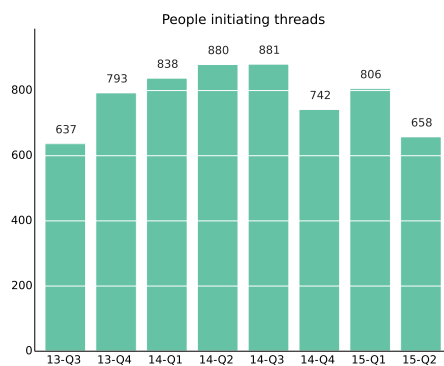
2.1. MAILING LISTS



Period	Emails
13-Q3	8190
13-Q4	11553
14-Q1	12029
14-Q2	11001
14-Q3	11827
14-Q4	8589
15-Q1	9692
15-Q2	7757



Period	People
13-Q3	983
13-Q4	1214
14-Q1	1287
14-Q2	1351
14-Q3	1337
14-Q4	1189
15-Q1	1267
15-Q2	1109



Period	People
13-Q3	637
13-Q4	793
14-Q1	838
14-Q2	880
14-Q3	881
14-Q4	742
15-Q1	806
15-Q2	658

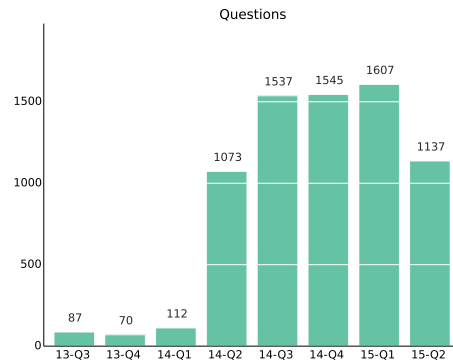
Initial Author and Date	Subject	Number Messages
Angus Salkeld 2015-04-07	[openstack-dev] [all] how to send messages (and events) to our users	51
filip-blaha 2015-05-06	[openstack-dev] [Murano] [Mistral] SSH workflow action	50
Neil.Jerram@metaswitch.com 2015-04-08	[openstack-dev] [neutron] Neutron scaling datapoints?	48
Russell Bryant 2015-04-22	[openstack-dev] [Neutron] A big tent home for Neutron backend code	47
Chris Dent 2015-04-23	[openstack-dev] [all] Question for the TC candidates	43
Joe Gordon 2015-05-11	[openstack-dev] [nova][all] Ar- chitecture Diagrams in ascii art?	42
Julien Danjou 2015-04-24	[openstack-dev] Please stop reviewing code while asking questions	38
jazeltq 2015-05-08	[openstack-dev] [all] who is the ptl of trove?	35
Boris Pavlovic 2015-06-03	[openstack-dev] [all][infra][tc][ptl] Scaling up code review process (subdir cores)	35
SpamapS 2015-04-14	[openstack-dev] [all] QPID in- compatible with python 3 and untested in gate – what to do?	34

Initial Author and Date	Subject	Diff. People
jaypipes 2015-04-24	[openstack-dev] Please stop review- ing code while asking questions	25
Marco.Fargetta@ct.infn.it 2015-05-12	[openstack-dev] [nova][all] Architec- ture Diagrams in ascii art?	24
Dean Troyer 2015-04-24	[openstack-dev] [all] Question for the TC candidates	23
Salvatore Orlando 2015-06-03	[openstack-dev] [all][infra][tc][ptl] Scaling up code review process (subdir cores)	19
ArkadyKanevsky 2015-05-26	[openstack-dev] [cinder] Some Changes to Cinder Core	17
Kyle Mestery 2015-04-23	[openstack-dev] [Neutron] A big tent home for Neutron backend code	16
Gordon Chung 2015-04-07	[openstack-dev] [all] how to send messages (and events) to our users	16
Chris Jones 2015-05-08	[openstack-dev] [TripleO] Core re- viewer update proposal	15
SpamapS 2015-04-27	[openstack-dev] [Zaqar] Call for adoption (or exclusion?)	15
James Polley 2015-05-08	[openstack-dev] [all] who is the ptl of trove?	14

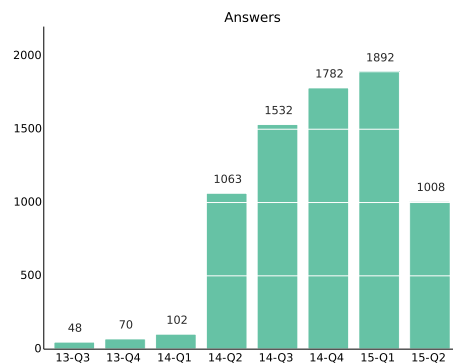
2.2 Questions and Answers

The following charts show activity in the Ask OpenStack site. Total number of questions, number of answers, number of comments and people sending questions are depicted. In addition four tables represent the hot topics

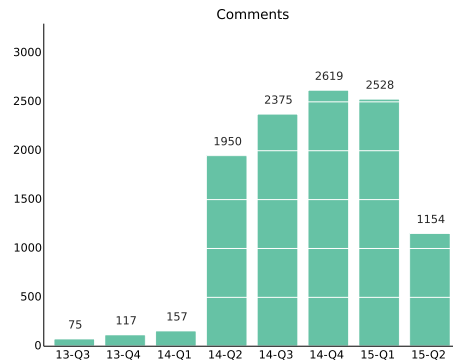
activity in the Ask OpenStack site. Those show information about the top visited questions, questions with the highest number of comments, questions with the highest number of different people participating and the tags with the highest number of references.



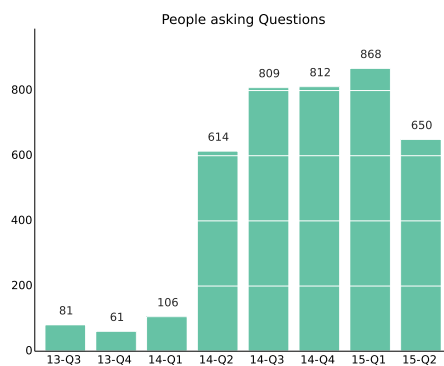
Period	Questions
13-Q3	87
13-Q4	70
14-Q1	112
14-Q2	1073
14-Q3	1537
14-Q4	1545
15-Q1	1607
15-Q2	1137



Period	Answers
13-Q3	48
13-Q4	70
14-Q1	102
14-Q2	1063
14-Q3	1532
14-Q4	1782
15-Q1	1892
15-Q2	1008



Period	Comments
13-Q3	75
13-Q4	117
14-Q1	157
14-Q2	1950
14-Q3	2375
14-Q4	2619
15-Q1	2528
15-Q2	1154



Period	People asking
13-Q3	81
13-Q4	61
14-Q1	106
14-Q2	614
14-Q3	809
14-Q4	812
15-Q1	868
15-Q2	650

- Top visited questions.

Question subject

no log or console for instance+
kilo on centos7 keystone throws http+
how many mutiple nics can be+
is there any mechanism to provide+
how can i deploy multi node+
error unable to connect to neutron+
unable to ping vm from an+
switching from vnc to spice console+
dvr no need for snat so+
can openstack junos installed using 2+

Visits

57728
521
353
329
323
318
308
282
280
272

- Top questions with more comments.

Question subject	Comments
instance cannot connect to external network+	5
strange self healing icehouse neutronovs	5
performance+	
cant access dashboard on vm installation+	5
openstack allinone deployment using vlan	5
instead+	
neutron network node dhcp requests hit+	5
how does compute node get ip+	5
connection to neutron failed maximum	5
attempts+	
cirros instance cannot get ip address+	5
rdo kilo novalidhost no valid host+	5
add another compute host to juno+	5

- Top questions with the highest number of different people participating.

Question subject	People participating
error unable to connect to neutron+	7
cant create or delete instances+	7
kilo on centos7 keystone throws http+	7
unable ping google from instance+	6
maximum amount of instances deployed at+	6
migration from older releases to kilo+	5
floating ip does not work+	5
accessing the vm from internet+	5
instance cannot connect to external network+	5
keystone socket error errno 98 address+	5

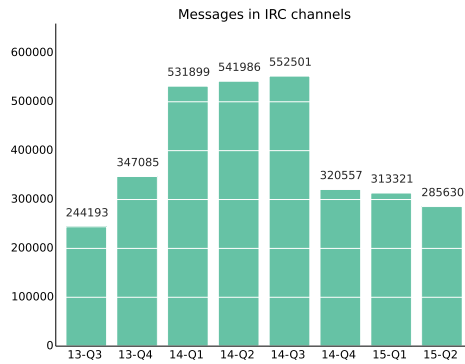
- Top tags

Tag name	Ocurrences
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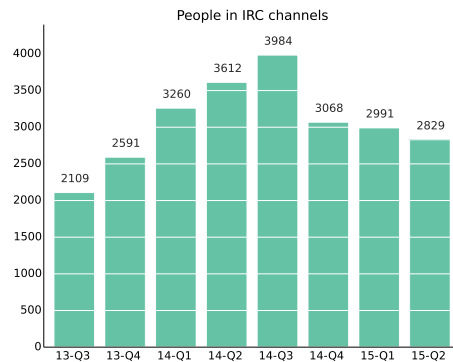
2.3 IRC

Finally, the community of OpenStack uses several IRC channels for asynchronous communication. This section shows information about the total

number of messages sent in the community during the last 8 quarters together with the number of the several people participating in such discussions. In addition, a list with the top participants in the IRC channels is provided.



Period	Messages
13-Q3	244193
13-Q4	347085
14-Q1	531899
14-Q2	541986
14-Q3	552501
14-Q4	320557
15-Q1	313321
15-Q2	285630



Period	People
13-Q3	2109
13-Q4	2591
14-Q1	3260
14-Q2	3612
14-Q3	3984
14-Q4	3068
15-Q1	2991
15-Q2	2829

IRC id	Messages sent
morganfainberg	4743
clarkb	4317
openstack	3976
Monty Taylor	3939
Thierry Carrez	3376
Jeremy Stanley	3344
ayoung	2960
Lucas Alvares Gomes	2809
Sean Dague	2779
jgriffith	2682
sdake	2565
Matt Riedemann	2437
Anita Kuno	2285
Devananda	2231
rbtcollins	2228

Chapter 3

Details on OpenStack Integrated and Incubated projects

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

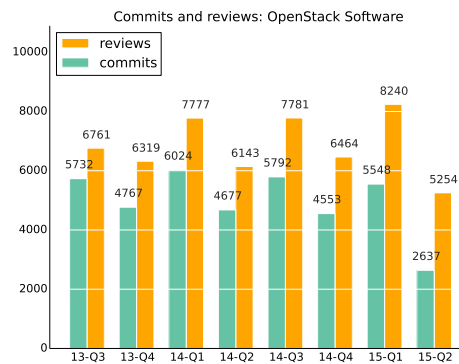
- activity: centered in the following metrics: commits from git activity, submitted, merge and abandoned reviews from the review system and opened and closed tickets from the issue tracking system.
- community: active core reviewers in gerrit, active authors in git and top ten developers and top ten organizations contributing to the development in the last quarter. of each project.
- process: efficiency closing tickets, efficiency closing changesets, Time to Merge (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.

Details on individual OpenStack programs are provided in separate documents on git.openstack.org/cgit/openstack-infra/activity-board/tree/reports/2015-q1.

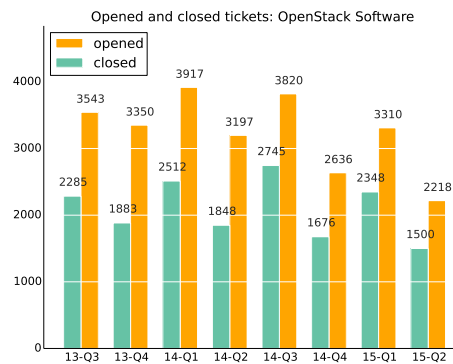
3.1 Overview of OpenStack Programs

3.2 Activity

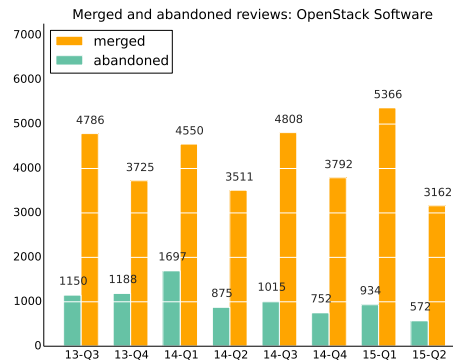
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



Period	Commits	Reviews
13-Q3	5732	6761
13-Q4	4767	6319
14-Q1	6024	7777
14-Q2	4677	6143
14-Q3	5792	7781
14-Q4	4553	6464
15-Q1	5548	8240
15-Q2	2637	5254



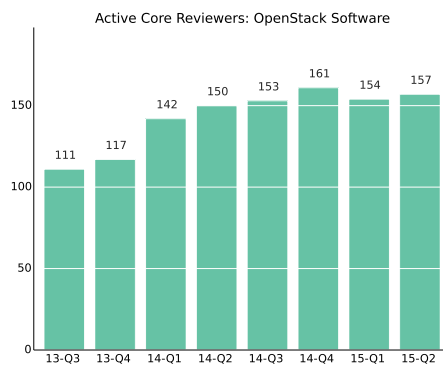
Period	Closed	Opened
13-Q3	2285	3543
13-Q4	1883	3350
14-Q1	2512	3917
14-Q2	1848	3197
14-Q3	2745	3820
14-Q4	1676	2636
15-Q1	2348	3310
15-Q2	1500	2218



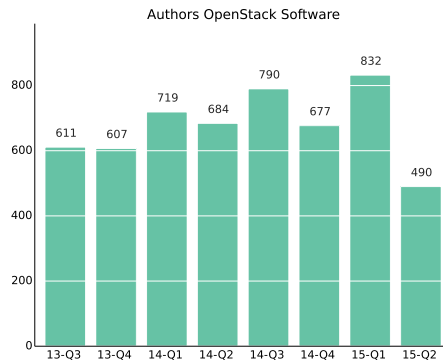
Period	Merged	Abandoned
13-Q3	4786	1150
13-Q4	3725	1188
14-Q1	4550	1697
14-Q2	3511	875
14-Q3	4808	1015
14-Q4	3792	752
15-Q1	5366	934
15-Q2	3162	572

3.3 Community

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



Period	Active Core
13-Q3	111
13-Q4	117
14-Q1	142
14-Q2	150
14-Q3	153
14-Q4	161
15-Q1	154
15-Q2	157



Period	Authors
13-Q3	611
13-Q4	607
14-Q1	719
14-Q2	684
14-Q3	790
14-Q4	677
15-Q1	832
15-Q2	490

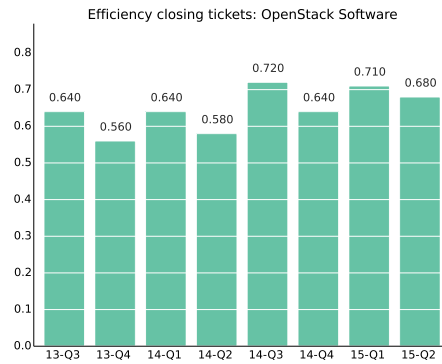
Commit (s)	Author
82	Doug Hellmann
51	Thierry Carrez
47	Kevin Benton
43	Brant Knudson
39	Kiall Mac Innes
38	Victor Stinner
36	Matt Riedemann
34	cedric.brandily
31	Dan Smith
31	Tianhua Huang

Commit (s)	Organizations
408	Red Hat
360	HP
310	IBM
281	Mirantis
165	Rackspace
84	Intel
79	Huawei
67	Cisco Systems
57	OpenStack Foundation
47	Bit Switch Networks

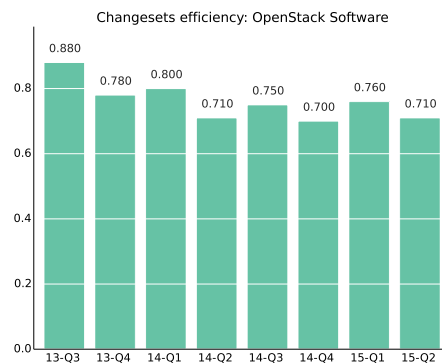
3.4 Process

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.

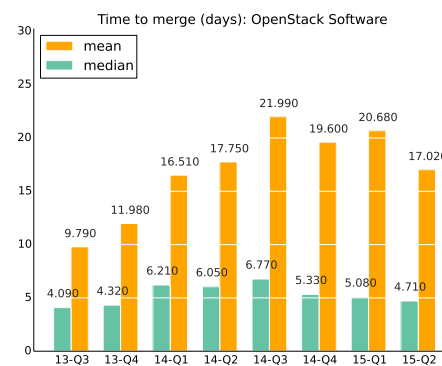
3.4. PROCESS



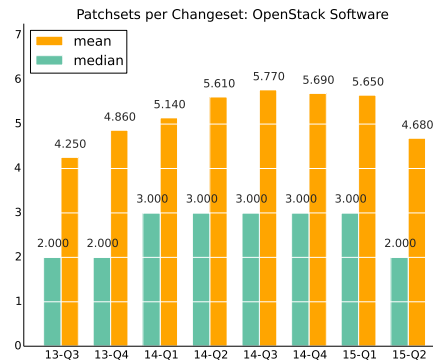
Period	Closed/Opened
13-Q3	0.64
13-Q4	0.56
14-Q1	0.64
14-Q2	0.58
14-Q3	0.72
14-Q4	0.64
15-Q1	0.71
15-Q2	0.68



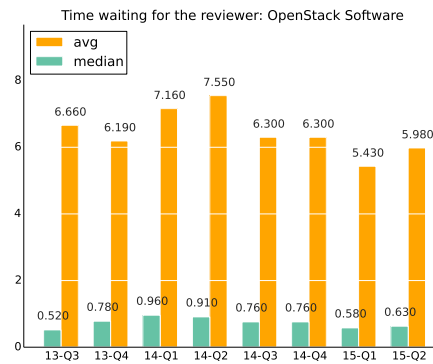
Period	(Aband. and Merg.)/Subm.
13-Q3	0.88
13-Q4	0.78
14-Q1	0.8
14-Q2	0.71
14-Q3	0.75
14-Q4	0.7
15-Q1	0.76
15-Q2	0.71



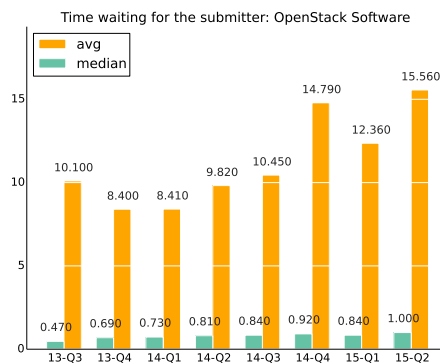
Period	Median	Mean
13-Q3	4.09	9.79
13-Q4	4.32	11.98
14-Q1	6.21	16.51
14-Q2	6.05	17.75
14-Q3	6.77	21.99
14-Q4	5.33	19.6
15-Q1	5.08	20.68
15-Q2	4.71	17.02



Period	Median	Mean
13-Q3	2.0	4.25
13-Q4	2.0	4.86
14-Q1	3.0	5.14
14-Q2	3.0	5.61
14-Q3	3.0	5.77
14-Q4	3.0	5.69
15-Q1	3.0	5.65
15-Q2	2.0	4.68



Period	Median	Mean
13-Q3	0.52	6.66
13-Q4	0.78	6.19
14-Q1	0.96	7.16
14-Q2	0.91	7.55
14-Q3	0.76	6.3
14-Q4	0.76	6.3
15-Q1	0.58	5.43
15-Q2	0.63	5.98

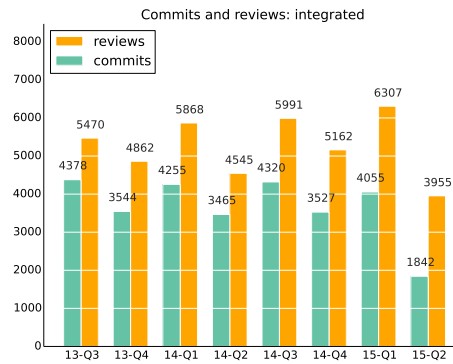


Period	Median	Mean
13-Q3	0.47	10.1
13-Q4	0.69	8.4
14-Q1	0.73	8.41
14-Q2	0.81	9.82
14-Q3	0.84	10.45
14-Q4	0.92	14.79
15-Q1	0.84	12.36
15-Q2	1.0	15.56

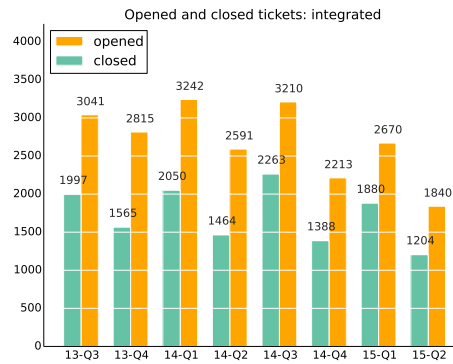
3.4.1 OpenStack Integrated Programs

3.5 Activity

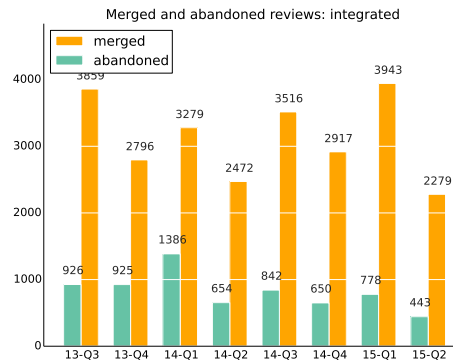
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



Period	Commits	Reviews
13-Q3	4378	5470
13-Q4	3544	4862
14-Q1	4255	5868
14-Q2	3465	4545
14-Q3	4320	5991
14-Q4	3527	5162
15-Q1	4055	6307
15-Q2	1842	3955



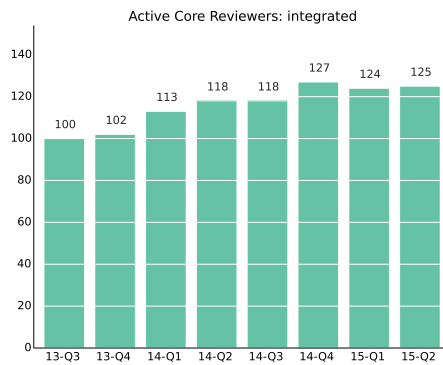
Period	Closed	Opened
13-Q3	1997	3041
13-Q4	1565	2815
14-Q1	2050	3242
14-Q2	1464	2591
14-Q3	2263	3210
14-Q4	1388	2213
15-Q1	1880	2670
15-Q2	1204	1840



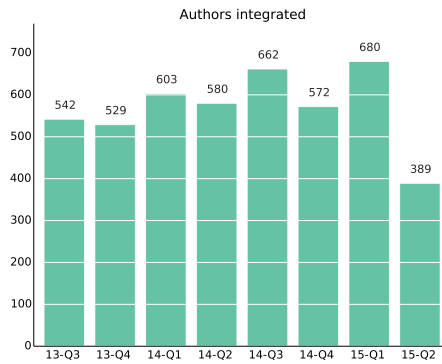
Period	Merged	Abandoned
13-Q3	3859	926
13-Q4	2796	925
14-Q1	3279	1386
14-Q2	2472	654
14-Q3	3516	842
14-Q4	2917	650
15-Q1	3943	778
15-Q2	2279	443

3.6 Community

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



Period	Active Core
13-Q3	100
13-Q4	102
14-Q1	113
14-Q2	118
14-Q3	118
14-Q4	127
15-Q1	124
15-Q2	125



Period	Authors
13-Q3	542
13-Q4	529
14-Q1	603
14-Q2	580
14-Q3	662
14-Q4	572
15-Q1	680
15-Q2	389

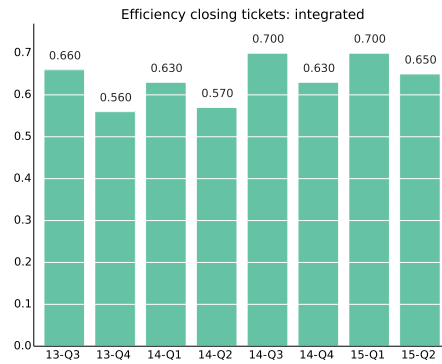
Commit (s)	Author
47	Kevin Benton
37	Thierry Carrez
36	Victor Stinner
33	Matt Riedemann
32	Brant Knudson
31	Dan Smith
30	Tianhua Huang
24	Thai Tran
23	cedric.brandily
23	Vitaly Gridnev

Commit (s)	Organizations
306	Red Hat
282	IBM
190	Mirantis
189	HP
75	Rackspace
66	Huawei
51	Cisco Systems
51	Intel
47	Bit Switch Networks
40	OpenStack Foundation

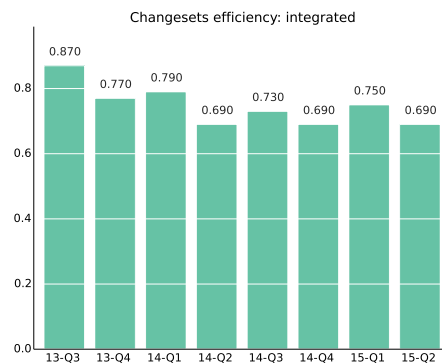
3.7 Process

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.

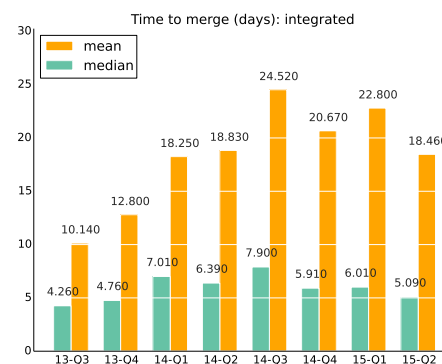
3.7. PROCESS



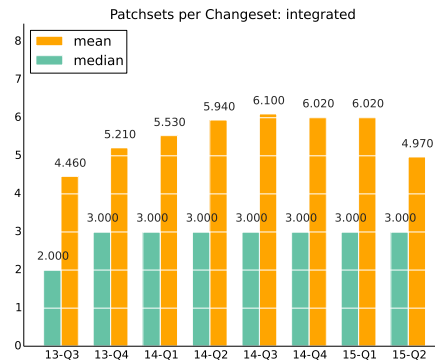
Period	Closed/Opened
13-Q3	0.66
13-Q4	0.56
14-Q1	0.63
14-Q2	0.57
14-Q3	0.7
14-Q4	0.63
15-Q1	0.7
15-Q2	0.65



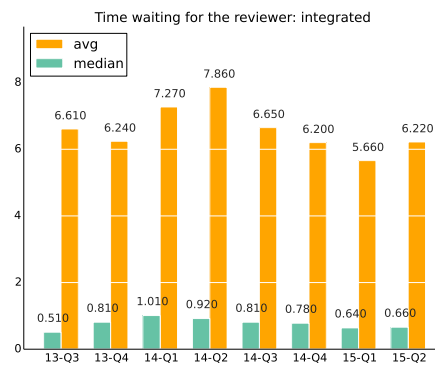
Period	(Aband. and Merg.)/Subm.
13-Q3	0.87
13-Q4	0.77
14-Q1	0.79
14-Q2	0.69
14-Q3	0.73
14-Q4	0.69
15-Q1	0.75
15-Q2	0.69



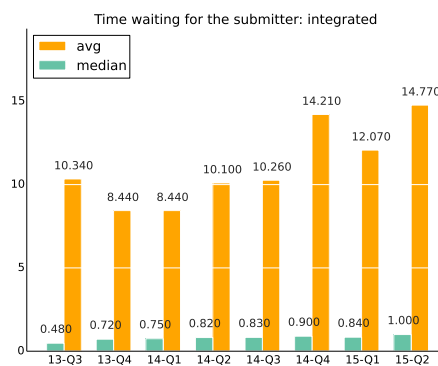
Period	Median	Mean
13-Q3	4.26	10.14
13-Q4	4.76	12.8
14-Q1	7.01	18.25
14-Q2	6.39	18.83
14-Q3	7.9	24.52
14-Q4	5.91	20.67
15-Q1	6.01	22.8
15-Q2	5.09	18.46



Period	Median	Mean
13-Q3	2.0	4.46
13-Q4	3.0	5.21
14-Q1	3.0	5.53
14-Q2	3.0	5.94
14-Q3	3.0	6.1
14-Q4	3.0	6.02
15-Q1	3.0	6.02
15-Q2	3.0	4.97



Period	Median	Mean
13-Q3	0.51	6.61
13-Q4	0.81	6.24
14-Q1	1.01	7.27
14-Q2	0.92	7.86
14-Q3	0.81	6.65
14-Q4	0.78	6.2
15-Q1	0.64	5.66
15-Q2	0.66	6.22

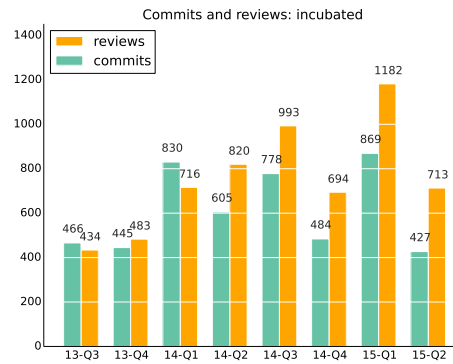


Period	Median	Mean
13-Q3	0.48	10.34
13-Q4	0.72	8.44
14-Q1	0.75	8.44
14-Q2	0.82	10.1
14-Q3	0.83	10.26
14-Q4	0.9	14.21
15-Q1	0.84	12.07
15-Q2	1.0	14.77

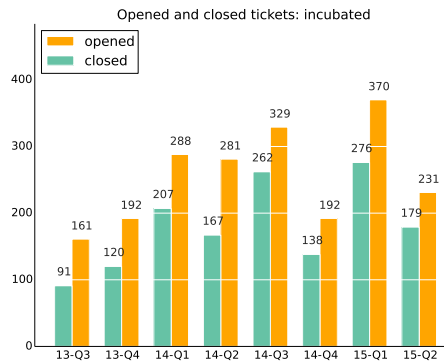
3.7.1 OpenStack Incubated Programs

3.8 Activity

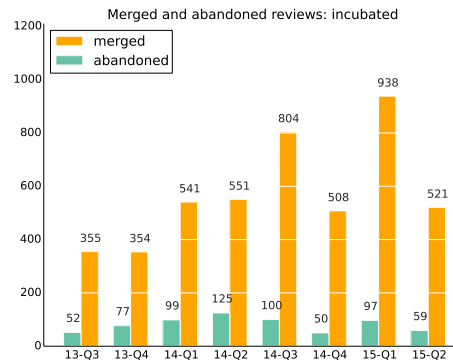
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



Period	Commits	Reviews
13-Q3	466	434
13-Q4	445	483
14-Q1	830	716
14-Q2	605	820
14-Q3	778	993
14-Q4	484	694
15-Q1	869	1182
15-Q2	427	713



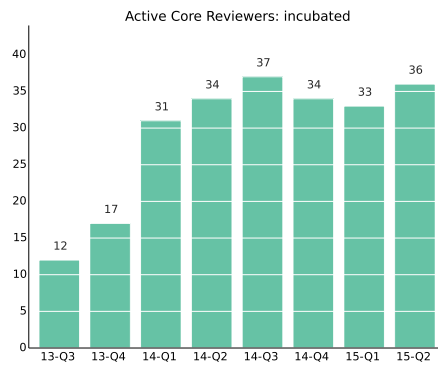
Period	Closed	Opened
13-Q3	91	161
13-Q4	120	192
14-Q1	207	288
14-Q2	167	281
14-Q3	262	329
14-Q4	138	192
15-Q1	276	370
15-Q2	179	231



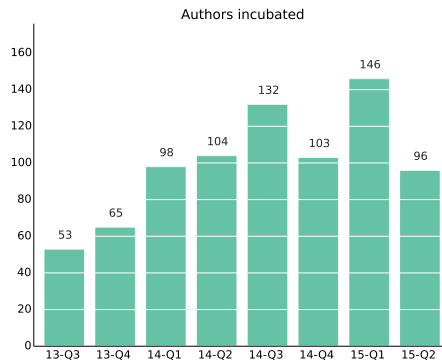
Period	Merged	Abandoned
13-Q3	355	52
13-Q4	354	77
14-Q1	541	99
14-Q2	551	125
14-Q3	804	100
14-Q4	508	50
15-Q1	938	97
15-Q2	521	59

3.9 Community

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



Period	Active Core
13-Q3	12
13-Q4	17
14-Q1	31
14-Q2	34
14-Q3	37
14-Q4	34
15-Q1	33
15-Q2	36



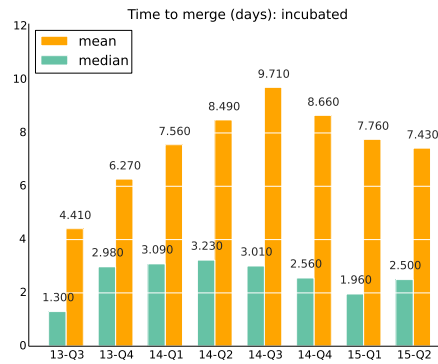
Period	Authors
13-Q3	53
13-Q4	65
14-Q1	98
14-Q2	104
14-Q3	132
14-Q4	103
15-Q1	146
15-Q2	96

Commit (s)	Author
37	Kiall Mac Innes
18	Graham Hayes
17	John L. Villalovos
17	Valeriy Ponomaryov
15	Dave McCowan
15	Igor Malinovskiy
14	Lucas Alvares Gomes
14	Thierry Carrez
12	Ruby Loo
11	Yuriy Zveryanskyy

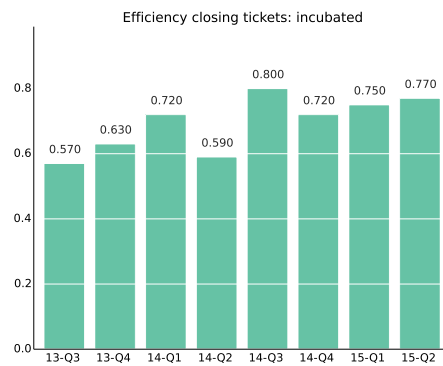
Commit (s)	Organizations
76	HP
56	Mirantis
53	Rackspace
25	Intel
18	Red Hat
17	OpenStack Foundation
15	Cisco Systems
14	Yahoo!
9	Ericsson
8	SUSE

3.10 Process

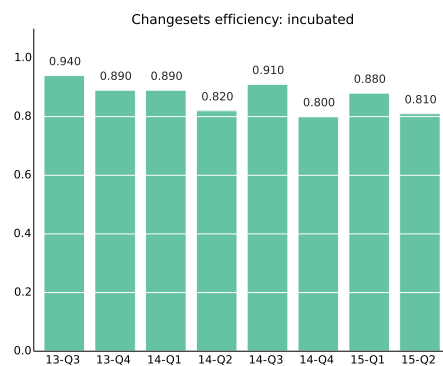
Efficiency closing changesets and tickets, time to review (mean and median), number of patchsets (iterations) per changeset and study on the time waiting for a reviewer or submitter action in the patchset review process.



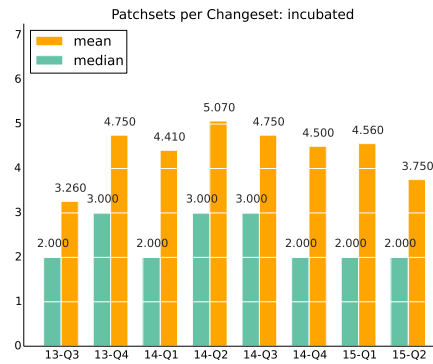
Period	Median	Mean
13-Q3	1.3	4.41
13-Q4	2.98	6.27
14-Q1	3.09	7.56
14-Q2	3.23	8.49
14-Q3	3.01	9.71
14-Q4	2.56	8.66
15-Q1	1.96	7.76
15-Q2	2.5	7.43



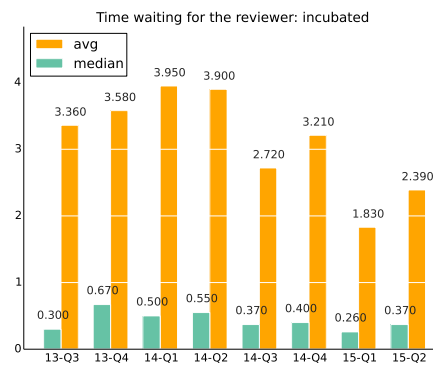
Period	Closed/Opened
13-Q3	0.57
13-Q4	0.63
14-Q1	0.72
14-Q2	0.59
14-Q3	0.8
14-Q4	0.72
15-Q1	0.75
15-Q2	0.77



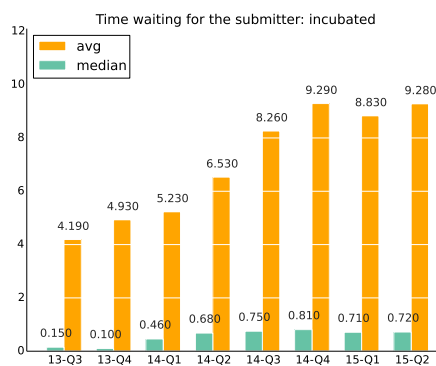
Period	(Aband. and Merg.)/Subm.
13-Q3	0.94
13-Q4	0.89
14-Q1	0.89
14-Q2	0.82
14-Q3	0.91
14-Q4	0.8
15-Q1	0.88
15-Q2	0.81



Period	Median	Mean
13-Q3	2.0	3.26
13-Q4	3.0	4.75
14-Q1	2.0	4.41
14-Q2	3.0	5.07
14-Q3	3.0	4.75
14-Q4	2.0	4.5
15-Q1	2.0	4.56
15-Q2	2.0	3.75



Period	Median	Mean
13-Q3	0.3	3.36
13-Q4	0.67	3.58
14-Q1	0.5	3.95
14-Q2	0.55	3.9
14-Q3	0.37	2.72
14-Q4	0.4	3.21
15-Q1	0.26	1.83
15-Q2	0.37	2.39



Period	Median	Mean
13-Q3	0.15	4.19
13-Q4	0.1	4.93
14-Q1	0.46	5.23
14-Q2	0.68	6.53
14-Q3	0.75	8.26
14-Q4	0.81	9.29
15-Q1	0.71	8.83
15-Q2	0.72	9.28

Appendix A

Metrics Definitions

Metrics measured in each OpenStack program:

- 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). Finally, all branches are aggregated to the analysis.
- Submitted changeset: a changeset is the process of peer reviewing source code changes. A commit 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. However, given the limitations of the current version of the tool, with at least 5,900 changesets detected as having an erroneous creation date, this metric counts the first patchset upload action.
- 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 Launchpad is counted as closed if the status of such ticket is defined as 'Fix Released'. 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.
- Top tags: each of the questions has a list of associated tags. The top tags are those with the highest number of repetitions aggregating all of the 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 data source used to provide the data of this analysis can be found at the GrimoireLib library. Specifically the `openstack_report.py` file¹.

With respect to the list of analyzed repositories per project, the following table lists all of them. There are three data sources: git activity (scm), tickets activity (its) and review activity (scr). This information is based on the information listed in the yaml organizational file² provided by the OpenStack Foundation.

Program	Data source	Repository
barbican	its	https://bugs.launchpad.net/barbican
barbican	scm	git://git.openstack.org/openstack/barbican
barbican	scm	git://git.openstack.org/openstack/castellan
barbican	scm	git://git.openstack.org/openstack/kite
barbican	scr	review.openstack.org_openstack/barbican
barbican	scr	review.openstack.org_openstack/castellan
barbican	scr	review.openstack.org_openstack/kite
ceilometer	its	https://bugs.launchpad.net/ceilometer
ceilometer	scm	https://github.com/openstack/ceilometer.git
ceilometer	scr	review.openstack.org_openstack/ceilometer
cinder	its	https://bugs.launchpad.net/cinder

¹https://github.com/VizGrimoire/GrimoireLib/blob/master/vizGrimoireJS/openstack_report.py. Commit identified with the hash `d33b6f5951662fb5bd895eee89c0b0344b09c956`

²<http://git.openstack.org/cgit/openstack/governance/tree/reference/projects.yaml>

cinder	scm	https://github.com/openstack/cinder.git
cinder	scr	review.openstack.org_openstack/cinder
clients	its	https://bugs.launchpad.net/python-glanceclient
clients	its	https://bugs.launchpad.net/python-novaclient
clients	its	https://bugs.launchpad.net/python-cinderclient
clients	its	https://bugs.launchpad.net/python-zaqarclient
clients	its	https://bugs.launchpad.net/python-heatclient
clients	its	https://bugs.launchpad.net/python-saharacclient
clients	its	https://bugs.launchpad.net/python-designateclient
clients	its	https://bugs.launchpad.net/python-neutronclient
clients	its	https://bugs.launchpad.net/python-ceilometerclient
clients	its	https://bugs.launchpad.net/python-keystoneclient
clients	its	https://bugs.launchpad.net/python-swiftclient
clients	scm	https://github.com/openstack/python-ceilometerclient.git
clients	scm	https://github.com/openstack/python-keystoneclient.git
clients	scm	https://github.com/openstack/python-troveclient.git
clients	scm	git://git.openstack.org/openstack/python-magnumclient
clients	scm	git://git.openstack.org/openstack-dev/heat-cfnclient
clients	scm	https://github.com/openstack/python-heatclient.git
clients	scm	https://github.com/openstack/python-novaclient.git
clients	scm	git://git.openstack.org/openstack/python-designateclient
clients	scm	https://github.com/openstack/python-cinderclient.git
clients	scm	git://git.openstack.org/openstack/python-zaqarclient
clients	scm	git://git.openstack.org/openstack/python-barbicanclient
clients	scm	git://git.openstack.org/openstack/python-saharacclient
clients	scm	https://github.com/openstack/python-ironicclient.git
clients	scm	https://github.com/openstack/python-swiftclient.git
clients	scm	git://git.openstack.org/openstack/python-kiteclient
clients	scm	https://github.com/openstack/python-glanceclient.git
clients	scm	https://github.com/openstack/python-neutronclient.git
clients	scr	review.openstack.org_openstack/python-neutronclient
clients	scr	review.openstack.org_stackforge/python-designateclient
clients	scr	review.openstack.org_openstack/python-barbicanclient
clients	scr	review.openstack.org_openstack/python-ironicclient
clients	scr	review.openstack.org_openstack/python-swiftclient
clients	scr	review.openstack.org_openstack/python-zaqarclient
clients	scr	review.openstack.org_openstack/python-glanceclient
clients	scr	review.openstack.org_openstack/python-novaclient
clients	scr	review.openstack.org_openstack/python-kiteclient
clients	scr	review.openstack.org_openstack/python-ceilometerclient

clients	scr	review.openstack.org_openstack/python-keystoneclient
clients	scr	review.openstack.org_openstack/python-troveclient
clients	scr	review.openstack.org_openstack/python-heatclient
clients	scr	review.openstack.org_openstack/python-saharaclient
clients	scr	review.openstack.org_openstack/python-magnumclient
clients	scr	review.openstack.org_openstack/python-cinderclient
Common Libraries	its	https://bugs.launchpad.net/pbr
Common Libraries	its	https://bugs.launchpad.net/oslo.cache
Common Libraries	its	https://bugs.launchpad.net/oslo.i18n
Common Libraries	its	https://bugs.launchpad.net/oslo.serialization
Common Libraries	its	https://bugs.launchpad.net/oslotest
Common Libraries	its	https://bugs.launchpad.net/hacking
Common Libraries	its	https://bugs.launchpad.net/oslo.context
Common Libraries	its	https://bugs.launchpad.net/oslo.policy
Common Libraries	its	https://bugs.launchpad.net/oslo.wmware
Common Libraries	its	https://bugs.launchpad.net/tooz
Common Libraries	its	https://bugs.launchpad.net/taskflow
Common Libraries	its	https://bugs.launchpad.net/oslo.concurrency
Common Libraries	its	https://bugs.launchpad.net/oslo.log
Common Libraries	its	https://bugs.launchpad.net/oslo.utils
Common Libraries	its	https://bugs.launchpad.net/pylockfile
Common Libraries	its	https://bugs.launchpad.net/oslo.messaging
Common Libraries	its	https://bugs.launchpad.net/oslo.db
Common Libraries	its	https://bugs.launchpad.net/oslo.rootwrap
Common Libraries	its	https://bugs.launchpad.net/oslosphinx
Common Libraries	its	https://bugs.launchpad.net/oslo.config
Common Libraries	its	https://bugs.launchpad.net/oslo.middleware
Common Libraries	its	https://bugs.launchpad.net/oslo.versionedobjects
Common Libraries	its	https://bugs.launchpad.net/stevedore
Common Libraries	scm	git://git.openstack.org/openstack/oslo.utils
Common Libraries	scm	git://git.openstack.org/openstack/oslo.context
Common Libraries	scm	git://git.openstack.org/openstack/oslosphinx
Common Libraries	scm	https://github.com/openstack/oslo.config.git
Common Libraries	scm	git://git.openstack.org/openstack/oslo.cache
Common Libraries	scm	git://git.openstack.org/openstack/oslo.rootwrap
Common Libraries	scm	git://git.openstack.org/openstack/oslo.i18n
Common Libraries	scm	git://git.openstack.org/openstack/oslo.rootwrap
Common Libraries	scm	git://git.openstack.org/openstack/oslotest
Common Libraries	scm	git://git.openstack.org/openstack/taskflow
Common Libraries	scm	git://git.openstack.org/openstack/oslo.middleware

Common Libraries	scm	git://git.openstack.org/openstack/oslo.versionedobjects
Common Libraries	scm	git://git.openstack.org/openstack/oslo.concurrency
Common Libraries	scm	git://git.openstack.org/openstack/pycadf
Common Libraries	scm	https://github.com/openstack/oslo.messaging.git
Common Libraries	scm	git://git.openstack.org/openstack/oslo.config
Common Libraries	scm	git://git.openstack.org/openstack/oslo.serialization
Common Libraries	scm	git://git.openstack.org/openstack/tooz
Common Libraries	scm	git://git.openstack.org/openstack/oslo.vmware
Common Libraries	scm	git://git.openstack.org/openstack/pylockfile
Common Libraries	scm	https://github.com/openstack/oslo-incubator.git
Common Libraries	scm	git://git.openstack.org/openstack/debtcollector
Common Libraries	scm	git://git.openstack.org/openstack/oslo.policy
Common Libraries	scm	git://git.openstack.org/openstack-dev/oslo-cookiecutter
Common Libraries	scm	git://git.openstack.org/openstack/oslo.vmware
Common Libraries	scm	git://git.openstack.org/openstack/stevedore
Common Libraries	scm	https://github.com/openstack/oslo.version.git
Common Libraries	scm	git://git.openstack.org/openstack/oslo.log
Common Libraries	scm	git://git.openstack.org/openstack/oslo.db
Common Libraries	scr	review.openstack.org_openstack/debtcollector
Common Libraries	scr	review.openstack.org_openstack/oslo.policy
Common Libraries	scr	review.openstack.org_openstack/oslo.vmware
Common Libraries	scr	review.openstack.org_openstack/taskflow
Common Libraries	scr	review.openstack.org_openstack/oslo-incubator
Common Libraries	scr	review.openstack.org_openstack/oslo.context
Common Libraries	scr	review.openstack.org_openstack/oslo.messaging
Common Libraries	scr	review.openstack.org_openstack/oslo.utils
Common Libraries	scr	review.openstack.org_openstack/pylockfile
Common Libraries	scr	review.openstack.org_openstack-dev/hacking
Common Libraries	scr	review.openstack.org_openstack/oslo.db
Common Libraries	scr	review.openstack.org_openstack/oslo.cache
Common Libraries	scr	review.openstack.org_openstack/oslo.rootwrap
Common Libraries	scr	review.openstack.org_openstack/oslosphinx
Common Libraries	scr	review.openstack.org_openstack/oslo.config
Common Libraries	scr	review.openstack.org_openstack/oslo.concurrency
Common Libraries	scr	review.openstack.org_openstack/oslo.middleware
Common Libraries	scr	review.openstack.org_openstack/oslo.versionedobjects
Common Libraries	scr	review.openstack.org_openstack/stevedore
Common Libraries	scr	review.openstack.org_openstack-dev/pbr
Common Libraries	scr	review.openstack.org_openstack/oslo.i18n
Common Libraries	scr	review.openstack.org_openstack/tooz

Common Libraries	scr	review.openstack.org_openstack/oslo.log
Common Libraries	scr	review.openstack.org_openstack/oslo.serialization
Common Libraries	scr	review.openstack.org_openstack/oslotest
Deployment	its	https://bugs.launchpad.net/os-cloud-config
Deployment	its	https://bugs.launchpad.net/diskimage-builder
Deployment	its	https://bugs.launchpad.net/os-refresh-config
Deployment	its	https://bugs.launchpad.net/tuskar
Deployment	its	https://bugs.launchpad.net/os-collect-config
Deployment	its	https://bugs.launchpad.net/os-apply-config
Deployment	its	https://bugs.launchpad.net/os-net-config
Deployment	its	https://bugs.launchpad.net/python-tuskarclient
Deployment	scm	https://github.com/openstack/tripleo-incubator.git
Deployment	scm	git://git.openstack.org/openstack/dib-utils
Deployment	scm	git://git.openstack.org/openstack/os-cloud-config
Deployment	scm	https://github.com/openstack/tripleo-heat-templates.git
Deployment	scm	git://git.openstack.org/openstack/python-tuskarclient
Deployment	scm	git://git.openstack.org/openstack/os-net-config
Deployment	scm	git://git.openstack.org/openstack/os-collect-config
Deployment	scm	https://github.com/openstack/tripleo-image-elements.git
Deployment	scm	git://git.openstack.org/openstack/diskimage-builder
Deployment	scm	git://git.openstack.org/openstack/os-apply-config
Deployment	scm	git://git.openstack.org/openstack/tuskar
Deployment	scm	git://git.openstack.org/openstack/tripleo-puppet-elements
Deployment	scm	git://git.openstack.org/openstack/os-refresh-config
Deployment	scr	review.openstack.org_openstack/os-refresh-config
Deployment	scr	review.openstack.org_openstack/tuskar
Deployment	scr	review.openstack.org_openstack/os-cloud-config
Deployment	scr	review.openstack.org_openstack/tripleo-image-elements
Deployment	scr	review.openstack.org_openstack/dib-utils
Deployment	scr	review.openstack.org_openstack/diskimage-builder
Deployment	scr	review.openstack.org_openstack/python-tuskarclient
Deployment	scr	review.openstack.org_openstack/tripleo-puppet-elements
Deployment	scr	review.openstack.org_openstack/os-collect-config
Deployment	scr	review.openstack.org_openstack/tripleo-incubator
Deployment	scr	review.openstack.org_openstack/os-apply-config
Deployment	scr	review.openstack.org_openstack/tripleo-heat-templates
Deployment	scr	review.openstack.org_openstack/os-net-config
designate	its	https://bugs.launchpad.net/designate
designate	scm	git://git.openstack.org/openstack/designate
designate	scr	review.openstack.org_openstack/designate

Documentation	its	https://bugs.launchpad.net/openstack-api-site
Documentation	its	https://bugs.launchpad.net/openstack-manuals
Documentation	scm	https://github.com/openstack/compute-api.git
Documentation	scm	https://github.com/openstack/openstack-manuals.git
Documentation	scm	git://git.openstack.org/openstack/ha-guide
Documentation	scm	git://git.openstack.org/openstack/operations-guide
Documentation	scm	https://github.com/openstack/netconn-api.git
Documentation	scm	git://git.openstack.org/openstack/training-guides
Documentation	scm	git://git.openstack.org/openstack/security-doc
Documentation	scm	https://github.com/openstack/identity-api.git
Documentation	scm	https://github.com/openstack/volume-api.git
Documentation	scm	git://git.openstack.org/openstack/openstack-doc-tools
Documentation	scm	https://github.com/openstack/api-site.git
Documentation	scm	https://github.com/openstack/object-api.git
Documentation	scm	git://git.openstack.org/openstack/openstackdocstheme
Documentation	scm	https://github.com/openstack/image-api.git
Documentation	scr	review.openstack.org_openstack/security-doc
Documentation	scr	review.openstack.org_openstack/image-api
Documentation	scr	review.openstack.org_openstack/volume-api
Documentation	scr	review.openstack.org_openstack/compute-api
Documentation	scr	review.openstack.org_openstack/openstack-manuals
Documentation	scr	review.openstack.org_openstack/openstackdocstheme
Documentation	scr	review.openstack.org_openstack/netconn-api
Documentation	scr	review.openstack.org_openstack/identity-api
Documentation	scr	review.openstack.org_openstack/operations-guide
Documentation	scr	review.openstack.org_openstack/ha-guide
Documentation	scr	review.openstack.org_openstack/api-site
Documentation	scr	review.openstack.org_openstack/object-api
Documentation	scr	review.openstack.org_openstack/training-guides
Documentation	scr	review.openstack.org_openstack/openstack-doc-tools
glance	its	https://bugs.launchpad.net/glance
glance	scm	git://git.openstack.org/openstack/glance_store
glance	scm	https://github.com/openstack/glance.git
glance	scr	review.openstack.org_openstack/glance_store
glance	scr	review.openstack.org_openstack/glance
heat	its	https://bugs.launchpad.net/heat
heat	scm	https://github.com/openstack/heat.git
heat	scm	git://git.openstack.org/openstack/heat-translator
heat	scr	review.openstack.org_openstack/heat-translator
heat	scr	review.openstack.org_openstack/heat

horizon	its	https://bugs.launchpad.net/horizon
horizon	scm	https://github.com/openstack/horizon.git
horizon	scr	review.openstack.org_openstack/horizon
Infrastructure	its	https://bugs.launchpad.net/openstack-ci
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-logstash
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-storyboard
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-nodepool
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-apparmor
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-unattended-upgrades
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-pip
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-bup
Infrastructure	scm	git://git.openstack.org/openstack-infra/zuul-packaging
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-yum
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-releasestatus
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-elasticsearch
Infrastructure	scm	https://github.com/openstack-infra/gearman-plugin.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-github
Infrastructure	scm	https://github.com/openstack-infra/jenkins-job-builder.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/groups
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-jeepyb
Infrastructure	scm	https://github.com/openstack-infra/zmq-event-publisher.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/storyboard-webclient
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-ssl_cert_check
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-log_processor
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-meetbot
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-accessbot
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-tmpreaper
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-openstackid
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-bandersnatch
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-vcsrepo
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-puppet

Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-drupal
Infrastructure	scm	https://github.com/openstack-infra/devstack-gate.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-gerrit
Infrastructure	scm	https://github.com/openstack-infra/git-review.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/activity-board
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-httpd
Infrastructure	scm	https://github.com/openstack-infra/reviewday.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/os-loganalyze
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-snmpd
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-kibana
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-mailman
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-subunit2sql
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-openafs
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-askbot
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-unbound
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-planet
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-cgit
Infrastructure	scm	https://github.com/openstack-infra/askbot-theme.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-zanata
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-etherpad_lite
Infrastructure	scm	https://github.com/openstack-infra/gerritbot.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-graphite
Infrastructure	scm	https://github.com/openstack-infra/nose-html-output.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/nodepool
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-reviewday
Infrastructure	scm	git://git.openstack.org/openstack-infra/subunit2sql
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-jenkins
Infrastructure	scm	https://github.com/openstack-infra/zuul.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-logrotate
Infrastructure	scm	git://git.openstack.org/openstack-infra/tripleo-ci
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-statusbot
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-mysql_backup
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-ansible
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-ulimit
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-packagekit
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-bugdaystats
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-vinz

Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-redis
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-elastic_recheck
Infrastructure	scm	https://github.com/openstack-infra/gear.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-gerritbot
Infrastructure	scm	https://github.com/openstack-infra/jeepyb.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/elastic-recheck
Infrastructure	scm	git://git.openstack.org/openstack-infra/project-config
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-iptables
Infrastructure	scm	https://github.com/openstack-infra/statusbot.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/storyboard
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-ssh
Infrastructure	scm	git://git.openstack.org/openstack-infra/irc-meetings
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-lodgeit
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-mediawiki
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-sudoers
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-openstackci
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-asterisk
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-user
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-project_config
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-dashboard
Infrastructure	scm	https://github.com/openstack-infra/config.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-exim
Infrastructure	scm	https://github.com/openstack-infra/gerritlib.git
Infrastructure	scm	git://git.openstack.org/openstack-dev/openstack-nose
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-haveged
Infrastructure	scm	https://github.com/openstack-infra/releasestatus.git
Infrastructure	scm	git://git.openstack.org/openstack-infra/odsreg
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-simpleproxy
Infrastructure	scm	git://git.openstack.org/openstack-infra/puppet-kerberos
Infrastructure	scm	https://github.com/openstack/openstack-planet.git
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Infrastructure	scr	review.openstack.org_openstack-infra/git-review
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Infrastructure	scr	review.openstack.org_openstack-infra/meetbot
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-nodepool
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-dashboard
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-pip
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-jeepyb
Infrastructure	scr	review.openstack.org_openstack-infra/statusbot
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-releasestatus
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-ssl_cert_check
Infrastructure	scr	review.openstack.org_openstack-infra/project-config
Infrastructure	scr	review.openstack.org_openstack-infra/config
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-unbound
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-accessbot
Infrastructure	scr	review.openstack.org_openstack-infra/gerritbot
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-log_processor
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-gerrit
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-openstackid
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-httpd
Infrastructure	scr	review.openstack.org_openstack-infra/releasestatus
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-ulimit
Infrastructure	scr	review.openstack.org_openstack-infra/irc-meetings
Infrastructure	scr	review.openstack.org_openstack-dev/openstack-nose
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-subunit2sql
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-askbot
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-cgit
Infrastructure	scr	review.openstack.org_openstack-infra/gitdm
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-mailman
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Infrastructure	scr	review.openstack.org_openstack-infra/nose-html-output
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-openafs

Infrastructure	scr	review.openstack.org_openstack-infra/puppet-graphite
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-vcsrepo
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-planet
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-jenkins
Infrastructure	scr	review.openstack.org_openstack-infra/zmq-event-publisher
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-reviewday
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-statusbot
Infrastructure	scr	review.openstack.org_openstack-infra/devstack-gate
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Infrastructure	scr	review.openstack.org_openstack-infra/gerritlib
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-bugdaystats
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-elastic_recheck
Infrastructure	scr	review.openstack.org_openstack-infra/lodgeit
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-mysql_backup
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-gerritbot
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-redis
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-ssh
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-unattended_upgrades
Infrastructure	scr	review.openstack.org_openstack-infra/askbot-theme
Infrastructure	scr	review.openstack.org_openstack-infra/gerrit
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-zanata
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-asterisk
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Infrastructure	scr	review.openstack.org_openstack-infra/odsreg
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-openstackci
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-haveged
Infrastructure	scr	review.openstack.org_openstack-infra/pypi-mirror

Infrastructure	scr	review.openstack.org_openstack-infra/puppet-project_config
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-kerberos
Infrastructure	scr	review.openstack.org_openstack-infra/zuul
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-simpleproxy
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-tmpreaper
Infrastructure	scr	review.openstack.org_openstack-infra/subunit2sql
ironic	its	https://bugs.launchpad.net/ironic
ironic	scm	git://git.openstack.org/openstack/ironic-python-agent
ironic	scm	https://github.com/openstack/ironic.git
ironic	scr	review.openstack.org_openstack/ironic-python-agent
ironic	scr	review.openstack.org_openstack/ironic
keystone	its	https://bugs.launchpad.net/keystone
keystone	scm	git://git.openstack.org/openstack/keystonemiddleware
keystone	scm	git://git.openstack.org/openstack/python-keystoneclient-federation
keystone	scm	https://github.com/openstack/keystone.git
keystone	scm	git://git.openstack.org/openstack/keystonemiddleware
keystone	scm	git://git.openstack.org/openstack/python-keystoneclient-kerberos
keystone	scr	review.openstack.org_openstack/python-keystoneclient-kerberos
keystone	scr	review.openstack.org_openstack/python-keystoneclient-federation
keystone	scr	review.openstack.org_openstack/keystonemiddleware
keystone	scr	review.openstack.org_openstack/keystone
magnum	its	https://bugs.launchpad.net/magnum
magnum	scm	git://git.openstack.org/openstack/magnum
magnum	scr	review.openstack.org_openstack/magnum
manila	its	https://bugs.launchpad.net/manila
manila	scm	git://git.openstack.org/openstack/manila
manila	scr	review.openstack.org_openstack/manila
neutron	its	https://bugs.launchpad.net/neutron
neutron	scm	git://git.openstack.org/openstack/neutron-lbaas
neutron	scm	git://git.openstack.org/openstack/neutron-vpnaas
neutron	scm	git://git.openstack.org/openstack/neutron-fwaas
neutron	scm	https://github.com/openstack/neutron.git
neutron	scr	review.openstack.org_openstack/neutron
neutron	scr	review.openstack.org_openstack/neutron-lbaas
neutron	scr	review.openstack.org_openstack/neutron-vpnaas

neutron	scr	review.openstack.org_openstack/neutron-fwaas
nova	its	https://bugs.launchpad.net/nova
nova	scm	https://github.com/openstack/nova.git
nova	scr	review.openstack.org_openstack/nova
OpenStackClient	scm	git://git.openstack.org/openstack/cliff
OpenStackClient	scr	review.openstack.org_openstack/cliff
others	its	https://bugs.launchpad.net/heat-cfntools
others	its	https://bugs.launchpad.net/tuskar-ui
others	its	https://bugs.launchpad.net/heat-templates
others	its	https://bugs.launchpad.net/django-openstack-auth
others	its	https://bugs.launchpad.net/swift-bench
others	scm	git://git.openstack.org/openstack/heat-cfntools
others	scm	git://git.openstack.org/openstack/trove-integration
others	scm	git://git.openstack.org/openstack/sahara-image-elements
others	scm	git://git.openstack.org/openstack/sahara-dashboard
others	scm	git://git.openstack.org/openstack/tuskar-ui
others	scm	git://git.openstack.org/openstack/django-openstack-auth
others	scm	git://git.openstack.org/openstack/swift-bench
others	scm	git://git.openstack.org/openstack/sahara-extra
others	scr	review.openstack.org_openstack/trove-integration
others	scr	review.openstack.org_openstack/sahara-extra
others	scr	review.openstack.org_openstack/heat-templates
others	scr	review.openstack.org_openstack/sahara-image-elements
others	scr	review.openstack.org_openstack/sahara-dashboard
others	scr	review.openstack.org_openstack/heat-cfntools
Quality Assurance	its	https://bugs.launchpad.net/tempest
Quality Assurance	its	https://bugs.launchpad.net/devstack
Quality Assurance	scm	git://git.openstack.org/openstack/tempest-lib
Quality Assurance	scm	git://git.openstack.org/openstack-dev/grenade
Quality Assurance	scm	git://git.openstack.org/openstack-dev/devstack
Quality Assurance	scm	https://github.com/openstack/tempest.git
Quality Assurance	scr	review.openstack.org_openstack-dev/grenade
Quality Assurance	scr	review.openstack.org_openstack/tempest
Quality Assurance	scr	review.openstack.org_openstack/tempest-lib
Quality Assurance	scr	review.openstack.org_openstack-dev/devstack
Release cycle management	scm	git://git.openstack.org/openstack/requirements
Release cycle management	scm	git://git.openstack.org/openstack-infra/release-tools

Release cycle management	scr	review.openstack.org_openstack/requirements
sahara	its	https://bugs.launchpad.net/sahara
sahara	scm	git://git.openstack.org/openstack/sahara
sahara	scr	review.openstack.org_openstack/sahara
swift	its	https://bugs.launchpad.net/swift
swift	scm	https://github.com/openstack/swift.git
swift	scr	review.openstack.org_openstack/swift
trove	its	https://bugs.launchpad.net/trove
trove	scm	https://github.com/openstack/trove.git
trove	scr	review.openstack.org_openstack/trove
zaqar	its	https://bugs.launchpad.net/zaqar
zaqar	scm	git://git.openstack.org/openstack/zaqar
zaqar	scr	review.openstack.org_openstack/zaqar