

OpenStack Community Activity Report
January-March, 2015
Report sponsored by the OpenStack Foundation



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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 developers

The community of developers is the highest of the whole history. This has reached a mean of 556 developers per month during the last quarter. This increase also affects the number of core and regular developers, having an increase of more than a 10% in the first case and more than a 20% of increase in the second case. Both cases are compared to the last quarter of 2014.

Development process keeps improving

Focusing on the integrated projects, the community seems to keep stable, with similar numbers to previous release timeframe (2014-q3). Although the time to merge has increased in mean, the median seems to be stable and in any case smaller than the time to merge of the previous release timeframe. Indeed it is clear the effort undertaken by the core reviewers given that the time to attend patchsets keeps decreasing in mean and median. While one year ago, it took around 7.3 days to attend changes by the submitters, nowadays this time takes 5.1 days in mean. This is half of the time if we focus on the median, going down from 1 day to 0.52 days.

Submitters time to respond starts to decrease

This is indeed the first quarter where the time waiting for the submitter has decreased if compared to the previous quarter and this takes place in the integrated and incubated projects. These values may be the result of the OpenStack Foundation training policies regarding to newcomers.

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 ecosystem.

¹The analyzed data sources are available in appendixB

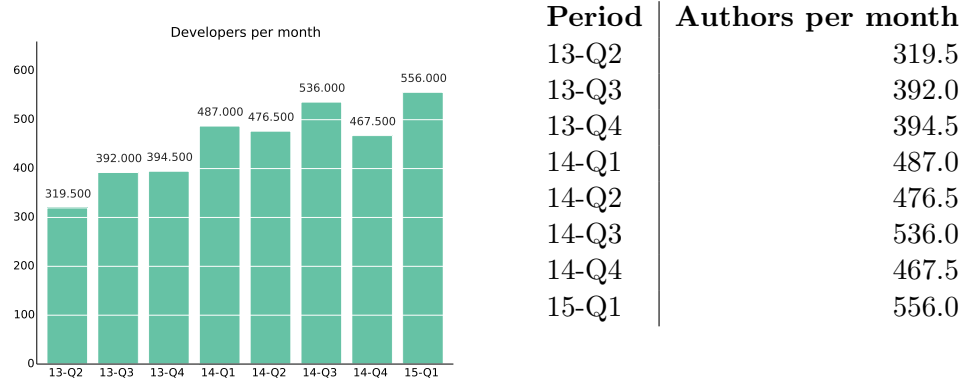
²Each of the projects mentioned are following the analysis of the Programs specified at <http://git.openstack.org/cgit/openstack/governance/tree/reference/programs.yaml>. In addition, the hierarchy of projects and their repositories can be found at the correspondent appendixB

Data source	Activity 365 days	Change (wrt to prev. 365 days)
Gits	53930 commits	9%
Tickets	12290 closed tickets	33%
Mailing Lists	41410 sent emails	4%
Gerrit	55329 submitted reviews	10%
Askbot	6311 posted questions	46%
IRC	1656479 messages	33%

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 increased till 556, the highest in the studied history so far.



In addition in order to characterize developers, those are divided into three main sets: core, regular and casual³. The three levels of characterization have reached the highest number of authors. While the casual developers seem to remain stable, core and regular ones show an increase of more than a 10%.

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.

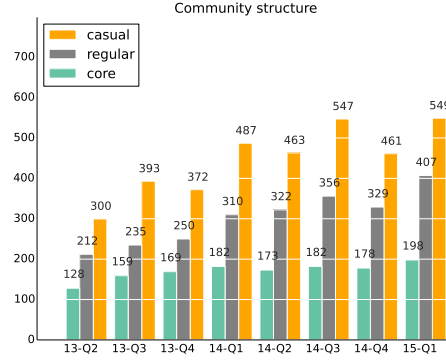


Figure 1.1: Evolution of the last 8 quarters of the core, regular and casual developers (Git activity)

Period	Core	Regular	Occasional
13-Q2	128	212	300
13-Q3	159	235	393
13-Q4	169	250	372
14-Q1	182	310	487
14-Q2	173	322	463
14-Q3	182	356	547
14-Q4	178	329	461
15-Q1	198	407	549

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.

Integrated project	REI	BMI	TTM
neutron	0.78	0.71	5.1 days
sahara	0.86	0.82	4.85 days
ceilometer	0.85	0.67	3.88 days
horizon	0.73	0.64	3.2 days
heat	0.84	0.83	4.07 days
nova	0.68	0.64	13.17 days
trove	0.79	0.75	7.08 days
swift	0.76	0.34	2.23 days
glance	0.74	0.59	13.22 days
cinder	0.69	0.67	5.32 days
keystone	0.77	0.7	6.06 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

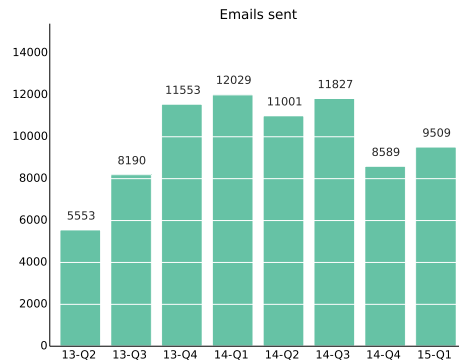
Communication and Support-Related Activities

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.

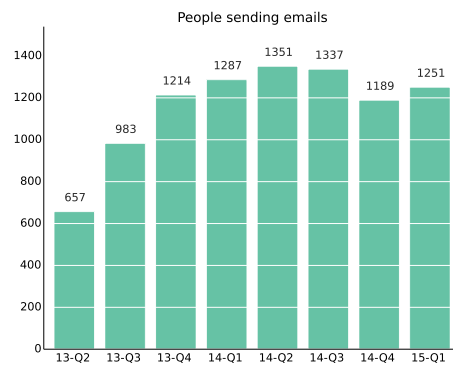
2.1 Mailing Lists

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.

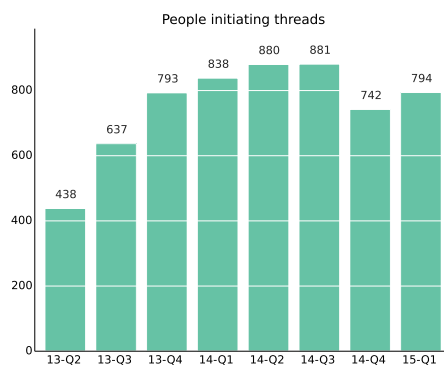
2.1. MAILING LISTS



Period	Emails
13-Q2	5553
13-Q3	8190
13-Q4	11553
14-Q1	12029
14-Q2	11001
14-Q3	11827
14-Q4	8589
15-Q1	9509



Period	People
13-Q2	657
13-Q3	983
13-Q4	1214
14-Q1	1287
14-Q2	1351
14-Q3	1337
14-Q4	1189
15-Q1	1251



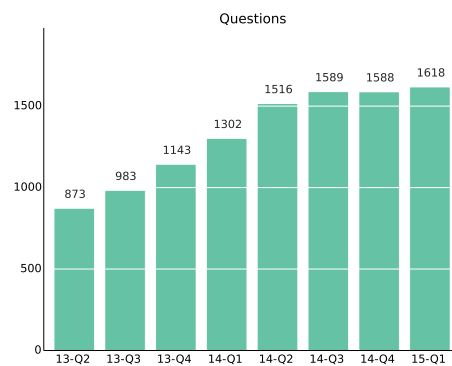
Period	People
13-Q2	438
13-Q3	637
13-Q4	793
14-Q1	838
14-Q2	880
14-Q3	881
14-Q4	742
15-Q1	794

Initial Author and Date	Subject	Number Messages
Flavio Percoco 2015-02-11	[openstack-dev] [all][tc] Lets keep our community open lets fight for it	70
Daniel P. Berrange 2015-02-24	[openstack-dev] [all] Re- evaluating the suitability of the 6 month release cycle	53
Timothy.ClaytonLuce@netapp.com 2015-03-20	[openstack-dev] [cinder] Re- quest exemption for removal of NetApp FC drivers (no vot- ing CI)	43
Eugeniya Kudryashova 2015-01-29	[openstack-dev] [api][nova] Openstack HTTP error codes	42
Matthew Booth 2015-02-04	[openstack-dev] [all][oslo.db][nova] TL; DR Things everybody should know about Galera	39
cpallares 2015-01-05	[openstack-dev] [Glance] IRC logging	38
Ian Cordasco 2015-02-16	[openstack-dev] [sta- ble][requirements] External dependency caps introduced in 499db6b	35
Salvatore Orlando 2015-03-09	[openstack-dev] [api][neutron] Best API for generating sub- nets from pool	34
jaypipes 2015-03-07	[openstack-dev] [nova][api] Microversions. And why do we need API extensions for new API functionality?	33
Sean Dague 2015-03-11	[openstack-dev] [nova] read- out from Philly Operators Meetup	33

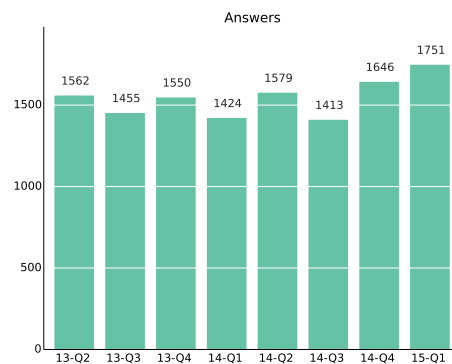
Initial Author and Date	Subject	Diff. People
rbtnollins 2015-02-25	[openstack-dev] [all] Re-evaluating the suitability of the 6 month release cycle	25
liuxinguo@huawei.com 2015-03-21	[openstack-dev] [cinder] Request ex- emption for removal of NetApp FC drivers (no voting CI)	23
Dean Troyer 2015-01-30	[openstack-dev] [Openstack- operators] [all][log] Openstack HTTP error codes	23
Jeremy Stanley 2015-02-12	[openstack-dev] [all][tc] Lets keep our community open lets fight for it	22
Thierry Carrez 2015-01-14	[openstack-dev] [Glance] IRC log- ging	21
vishvananda 2015-02-05	[openstack-dev] Deprecation of in tree EC2 API in Nova for Kilo re- lease	20
Akihiro MO- TOKI 2015-03-07	[openstack-dev] [neutron] Proposal to add Ihara Hrachyshka as a Neu- tron Core Reviewer	19
rbtnollins 2015-02-24	[openstack-dev] [stable][all] Revisit- ing the 6 month release cycle	18
Zhi Yan Liu 2015-03-13	[openstack-dev] [Glance] Proposal to change Glance meeting time.	18
rodrigodsousa 2015-02-13	[openstack-dev] [Keystone] Propos- ing Marek Denis for the Keystone Core Team	17

2.2 Questions and Answers

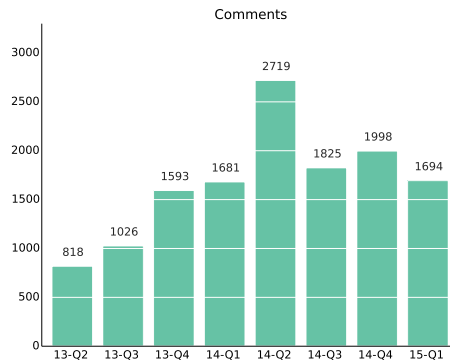
The following charts show activity in the Ask OpenStack site. Total number of questions, number of answers, number of comments and people sending questions are depicted. In addition four tables represent the hot topics activity in the Ask OpenStack site. Those show information about the top visited questions, 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-Q2	873
13-Q3	983
13-Q4	1143
14-Q1	1302
14-Q2	1516
14-Q3	1589
14-Q4	1588
15-Q1	1618



Period	Answers
13-Q2	1562
13-Q3	1455
13-Q4	1550
14-Q1	1424
14-Q2	1579
14-Q3	1413
14-Q4	1646
15-Q1	1751



Period	Comments
13-Q2	818
13-Q3	1026
13-Q4	1593
14-Q1	1681
14-Q2	2719
14-Q3	1825
14-Q4	1998
15-Q1	1694



Period	People asking
13-Q2	510
13-Q3	565
13-Q4	654
14-Q1	754
14-Q2	810
14-Q3	822
14-Q4	818
15-Q1	861

- Top visited questions.

Question subject	Visits
failed to allocate the networks not+	585
juno centos 7 ceph how to+	510
adding a new datacentre swift object+	496
heat scaling are the scale up+	405
migrate vms from ovirt to openstack+	342
attempt to install nova docker driver+	311
neutron error unable to create tunnel+	308
why the bufferedhttpresponse stops proceeding requests+	304
ubuntu 1404 all in one vm+	303
openstack instance high availabilityhow to make+	302

- Top questions with more comments.

Question subject	Comments
neutron solution without promiscuous mode+	5
ceilometer api does not list meters+	5
permission denied in dhcp agent+	5
sahara stuck in waiting then goes+	5
glance api fails to start and+	5
import kvm vm to openstack ceph+	5
solved cannot access console of instance+	5
the server has either erred or+	5
instances stuck in buildspawning state+	5
nova list all tenants faced error+	5

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

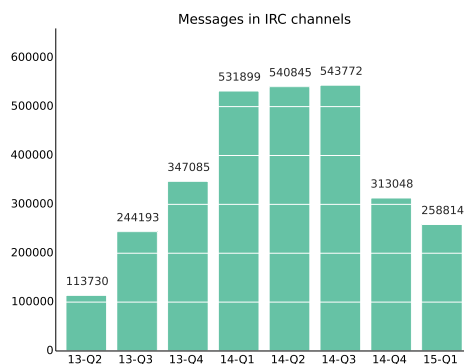
Question subject	People participating
instance error launching instance gives error+	7
instances stuck in buildspawning state+	7
guide for installing swift alone+	7
what is the difference between single+	6
icehouse on fedora21+	6
instance and image+	6
dhcp request does not reach tapxxx+	5
where does high level openstack discussion+	5
keystone endpoint create 500 error+	5
does neutron br int accepts nova+	5

- Top tags

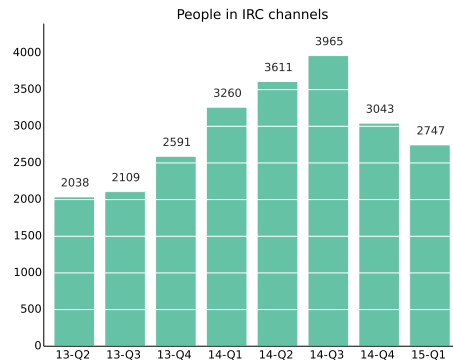
Tag name	Ocurrences
forum	816
OpenStack	815
community	684
Ask	655
gerrit	619
stackforge	431
cloud	423
iaas	242
ovs	192
branch	171
create	63
ad	49
soft-lockup	38
neutron-rootwrap	37
packstack	36

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-Q2	113730
13-Q3	244193
13-Q4	347085
14-Q1	531899
14-Q2	540845
14-Q3	543772
14-Q4	313048
15-Q1	258814



Period	People
13-Q2	2038
13-Q3	2109
13-Q4	2591
14-Q1	3260
14-Q2	3611
14-Q3	3965
14-Q4	3043
15-Q1	2747

IRC id

jroll
 clarkb
 Anita Kuno
 morganfainberg
 openstack
 NoBodyCam
 Devananda
 dhellmann
 Lucas Alvares Gomes
 Angus Salkeld
 rameshg87
 Monty Taylor
 John Dickinson
 Thierry Carrez
 Sam-I-Am

Messages sent

5549
 4172
 4105
 4074
 3960
 3761
 3760
 3417
 3309
 3120
 3005
 2859
 2707
 2624
 2492

Chapter 3

Details on OpenStack Integrated and Incubated projects

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

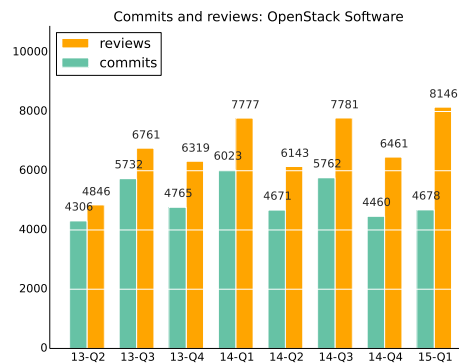
- activity: centered in the following metrics: commits from git activity, submitted, merge and abandoned reviews from the review system and opened and closed tickets from the issue tracking system.
- community: active core reviewers in gerrit, active authors in git and top ten developers and top ten 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.

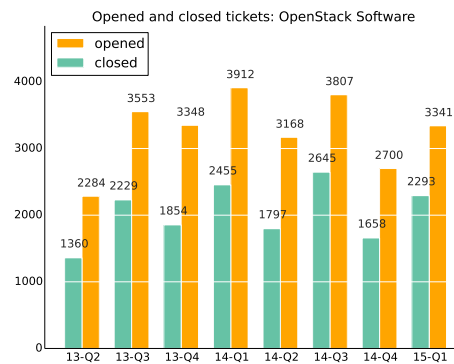
3.1 Overview of OpenStack Programs

3.2 Activity

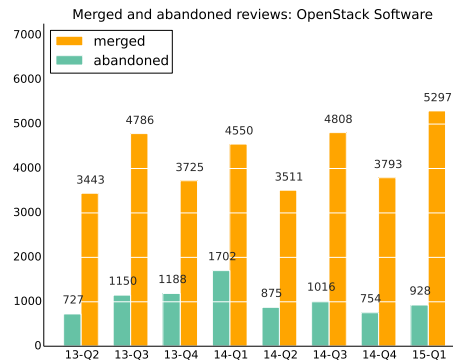
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



Period	Commits	Reviews
13-Q2	4306	4846
13-Q3	5732	6761
13-Q4	4765	6319
14-Q1	6023	7777
14-Q2	4671	6143
14-Q3	5762	7781
14-Q4	4460	6461
15-Q1	4678	8146



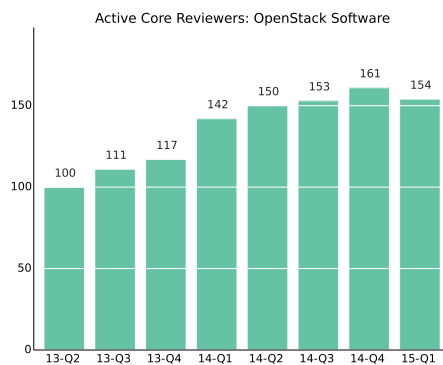
Period	Closed	Opened
13-Q2	1360	2284
13-Q3	2229	3553
13-Q4	1854	3348
14-Q1	2455	3912
14-Q2	1797	3168
14-Q3	2645	3807
14-Q4	1658	2700
15-Q1	2293	3341



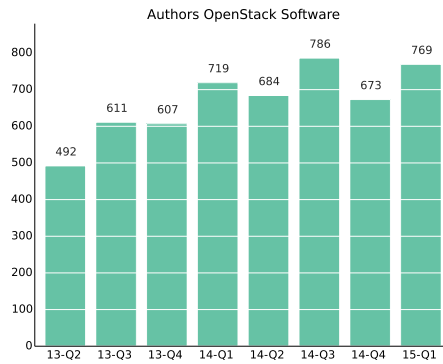
Period	Merged	Abandoned
13-Q2	3443	727
13-Q3	4786	1150
13-Q4	3725	1188
14-Q1	4550	1702
14-Q2	3511	875
14-Q3	4808	1016
14-Q4	3793	754
15-Q1	5297	928

3.3 Community

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



Period	Active Core
13-Q2	100
13-Q3	111
13-Q4	117
14-Q1	142
14-Q2	150
14-Q3	153
14-Q4	161
15-Q1	154

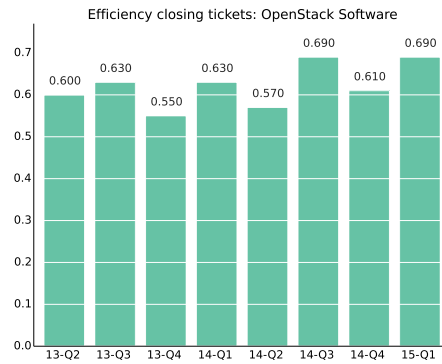


Period	Authors
13-Q2	492
13-Q3	611
13-Q4	607
14-Q1	719
14-Q2	684
14-Q3	786
14-Q4	673
15-Q1	769

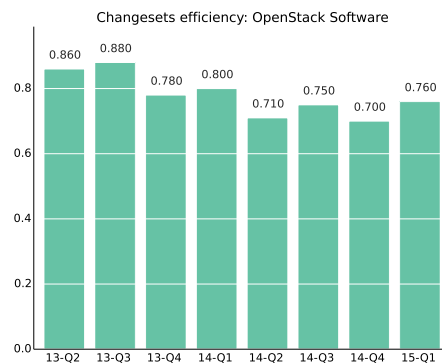
Commit (s)	Author	Commit (s)	Organizations
85	Brant Knudson	753	Red Hat
74	Angus Salkeld	635	IBM
63	Ihar Hrachyshka	525	Mirantis
59	Matt Riedemann	503	HP
59	Steve Martinelli	322	Rackspace
58	Valeriy Ponomaryov	140	Intel
54	Juan Antonio Osorio Robles	116	Cisco Systems
52	Davanum Srinivas	101	Huawei
52	Kiall Mac Innes	80	VMware
48	Dan Smith	78	NEC

3.4 Process

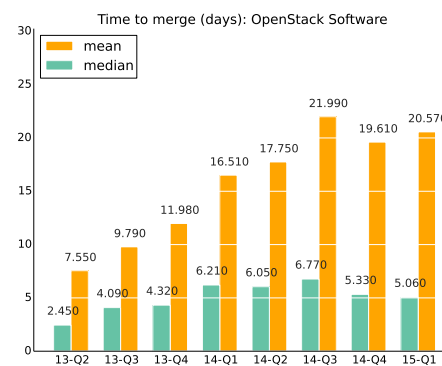
Efficiency closing changesets and tickets, time to review (mean and median), number of patchsets (iterations) per changeset and study on the time waiting for a reviewer or submitter action in the patchset review process.



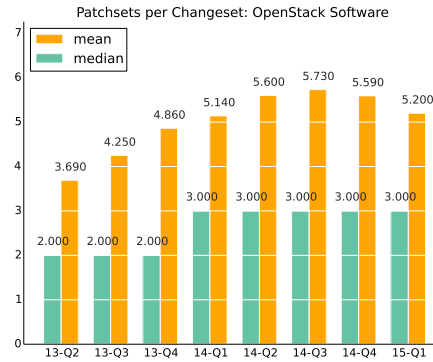
Period	Closed/Opened
13-Q2	0.6
13-Q3	0.63
13-Q4	0.55
14-Q1	0.63
14-Q2	0.57
14-Q3	0.69
14-Q4	0.61
15-Q1	0.69



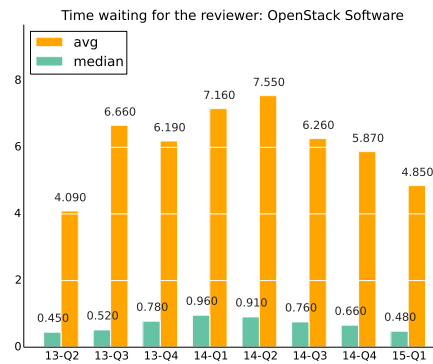
Period	(Aband. and Merg.)/Subm.
13-Q2	0.86
13-Q3	0.88
13-Q4	0.78
14-Q1	0.8
14-Q2	0.71
14-Q3	0.75
14-Q4	0.7
15-Q1	0.76



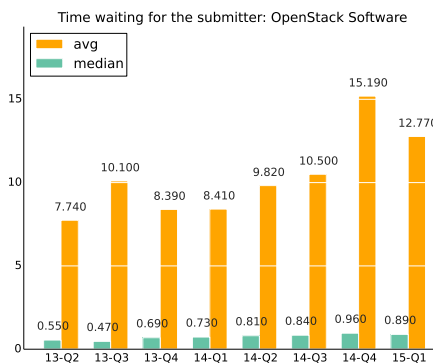
Period	Median	Mean
13-Q2	2.45	7.55
13-Q3	4.09	9.79
13-Q4	4.32	11.98
14-Q1	6.21	16.51
14-Q2	6.05	17.75
14-Q3	6.77	21.99
14-Q4	5.33	19.61
15-Q1	5.06	20.57



Period	Median	Mean
13-Q2	2.0	3.69
13-Q3	2.0	4.25
13-Q4	2.0	4.86
14-Q1	3.0	5.14
14-Q2	3.0	5.6
14-Q3	3.0	5.73
14-Q4	3.0	5.59
15-Q1	3.0	5.2



Period	Median	Mean
13-Q2	0.45	4.09
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	6.26
14-Q4	0.66	5.87
15-Q1	0.48	4.85

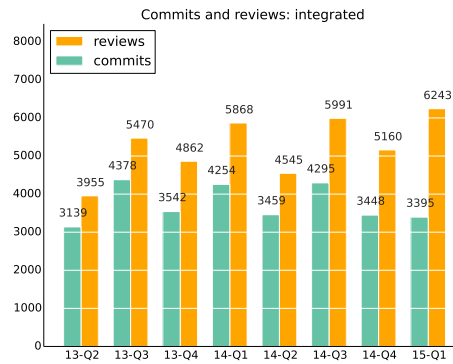


Period	Median	Mean
13-Q2	0.55	7.74
13-Q3	0.47	10.1
13-Q4	0.69	8.39
14-Q1	0.73	8.41
14-Q2	0.81	9.82
14-Q3	0.84	10.5
14-Q4	0.96	15.19
15-Q1	0.89	12.77

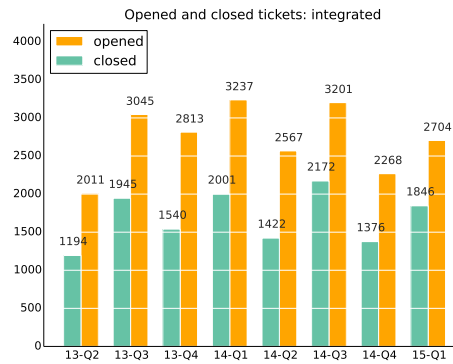
3.4.1 OpenStack Integrated Programs

3.5 Activity

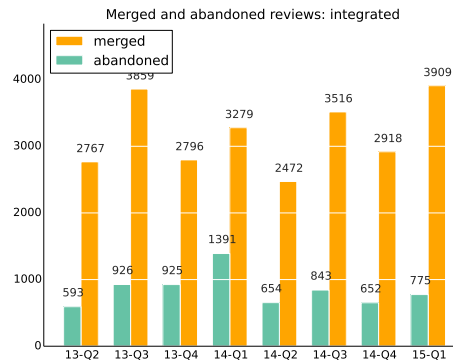
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



Period	Commits	Reviews
13-Q2	3139	3955
13-Q3	4378	5470
13-Q4	3542	4862
14-Q1	4254	5868
14-Q2	3459	4545
14-Q3	4295	5991
14-Q4	3448	5160
15-Q1	3395	6243



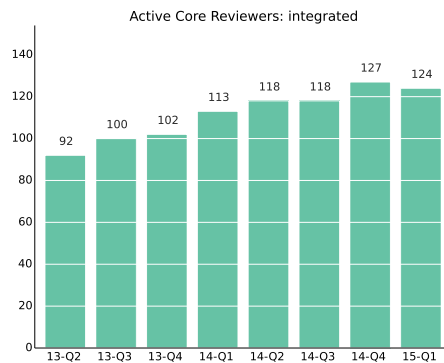
Period	Closed	Opened
13-Q2	1194	2011
13-Q3	1945	3045
13-Q4	1540	2813
14-Q1	2001	3237
14-Q2	1422	2567
14-Q3	2172	3201
14-Q4	1376	2268
15-Q1	1846	2704



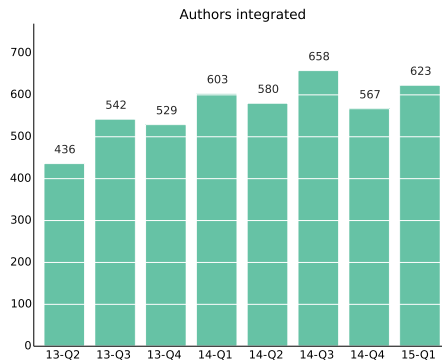
Period	Merged	Abandoned
13-Q2	2767	593
13-Q3	3859	926
13-Q4	2796	925
14-Q1	3279	1391
14-Q2	2472	654
14-Q3	3516	843
14-Q4	2918	652
15-Q1	3909	775

3.6 Community

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



Period	Active Core
13-Q2	92
13-Q3	100
13-Q4	102
14-Q1	113
14-Q2	118
14-Q3	118
14-Q4	127
15-Q1	124



Period	Authors
13-Q2	436
13-Q3	542
13-Q4	529
14-Q1	603
14-Q2	580
14-Q3	658
14-Q4	567
15-Q1	623

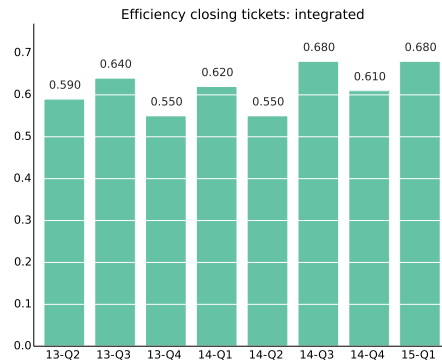
Commit (s)	Author
74	Angus Salkeld
72	Brant Knudson
61	Ihar Hrachyshka
58	Matt Riedemann
58	Steve Martinelli
50	Davanum Srinivas
48	Dan Smith
41	Armando Migliaccio
40	Gordon Chung
38	Sean Dague

Commit (s)	Organizations
574	IBM
565	Red Hat
388	Mirantis
337	HP
160	Rackspace
109	Intel
102	Cisco Systems
84	Huawei
80	VMware
57	NEC

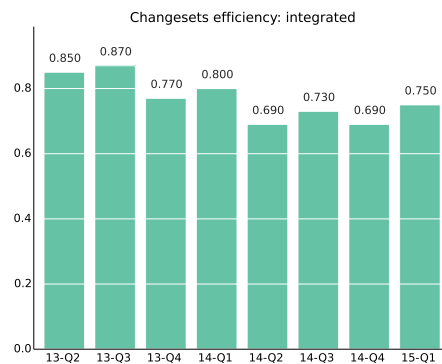
3.7 Process

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.

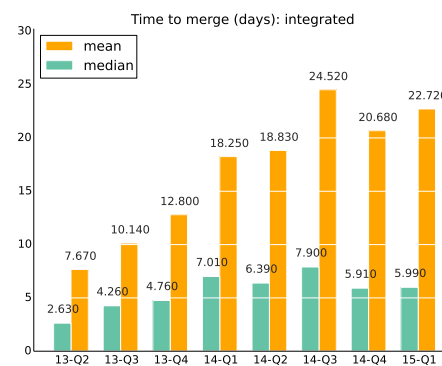
3.7. PROCESS



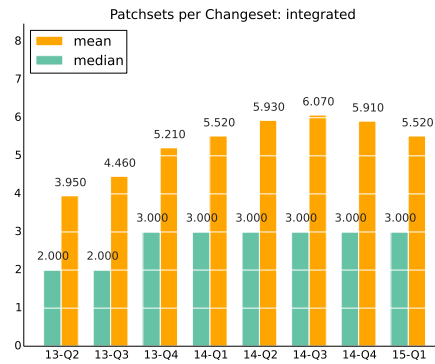
Period	Closed/Opened
13-Q2	0.59
13-Q3	0.64
13-Q4	0.55
14-Q1	0.62
14-Q2	0.55
14-Q3	0.68
14-Q4	0.61
15-Q1	0.68



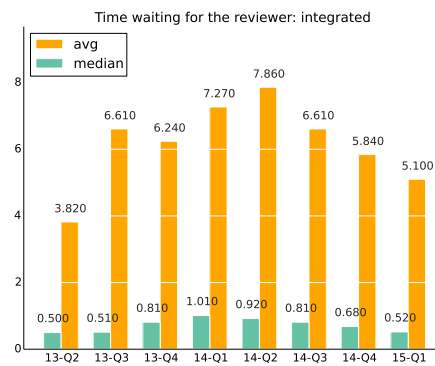
Period	(Aband. and Merg.)/Subm.
13-Q2	0.85
13-Q3	0.87
13-Q4	0.77
14-Q1	0.8
14-Q2	0.69
14-Q3	0.73
14-Q4	0.69
15-Q1	0.75



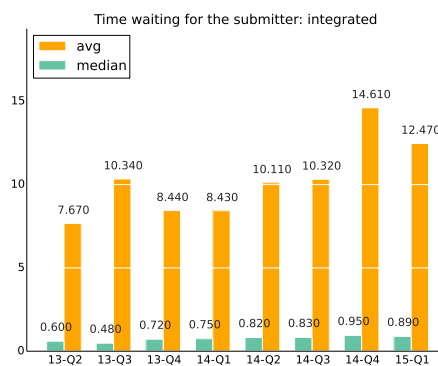
Period	Median	Mean
13-Q2	2.63	7.67
13-Q3	4.26	10.14
13-Q4	4.76	12.8
14-Q1	7.01	18.25
14-Q2	6.39	18.83
14-Q3	7.9	24.52
14-Q4	5.91	20.68
15-Q1	5.99	22.72



Period	Median	Mean
13-Q2	2.0	3.95
13-Q3	2.0	4.46
13-Q4	3.0	5.21
14-Q1	3.0	5.52
14-Q2	3.0	5.93
14-Q3	3.0	6.07
14-Q4	3.0	5.91
15-Q1	3.0	5.52



Period	Median	Mean
13-Q2	0.5	3.82
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	6.61
14-Q4	0.68	5.84
15-Q1	0.52	5.1

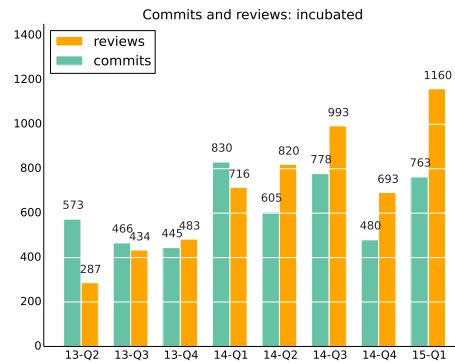


Period	Median	Mean
13-Q2	0.6	7.67
13-Q3	0.48	10.34
13-Q4	0.72	8.44
14-Q1	0.75	8.43
14-Q2	0.82	10.11
14-Q3	0.83	10.32
14-Q4	0.95	14.61
15-Q1	0.89	12.47

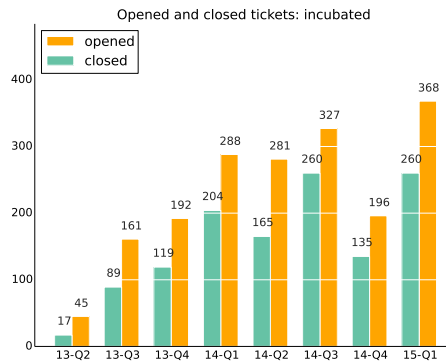
3.7.1 OpenStack Incubated Programs

3.8 Activity

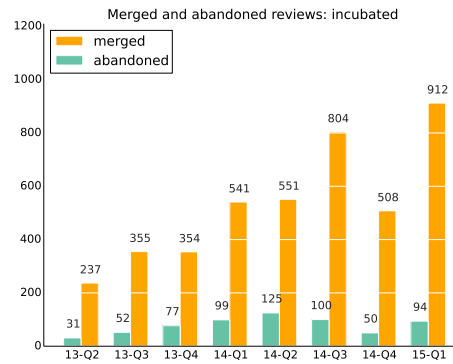
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



Period	Commits	Reviews
13-Q2	573	287
13-Q3	466	434
13-Q4	445	483
14-Q1	830	716
14-Q2	605	820
14-Q3	778	993
14-Q4	480	693
15-Q1	763	1160



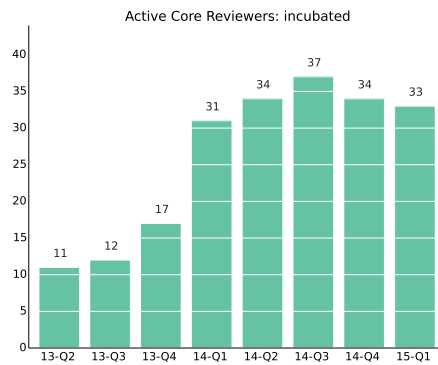
Period	Closed	Opened
13-Q2	17	45
13-Q3	89	161
13-Q4	119	192
14-Q1	204	288
14-Q2	165	281
14-Q3	260	327
14-Q4	135	196
15-Q1	260	368



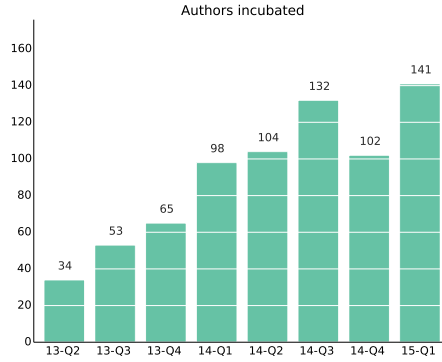
Period	Merged	Abandoned
13-Q2	237	31
13-Q3	355	52
13-Q4	354	77
14-Q1	541	99
14-Q2	551	125
14-Q3	804	100
14-Q4	508	50
15-Q1	912	94

3.9 Community

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



Period	Active Core
13-Q2	11
13-Q3	12
13-Q4	17
14-Q1	31
14-Q2	34
14-Q3	37
14-Q4	34
15-Q1	33

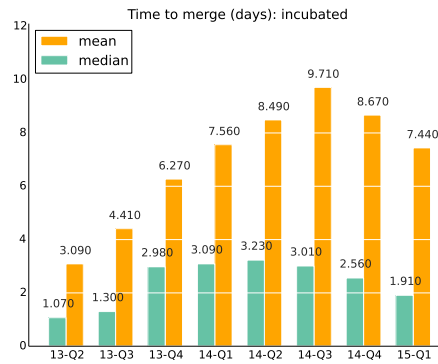


Period	Authors
13-Q2	34
13-Q3	53
13-Q4	65
14-Q1	98
14-Q2	104
14-Q3	132
14-Q4	102
15-Q1	141

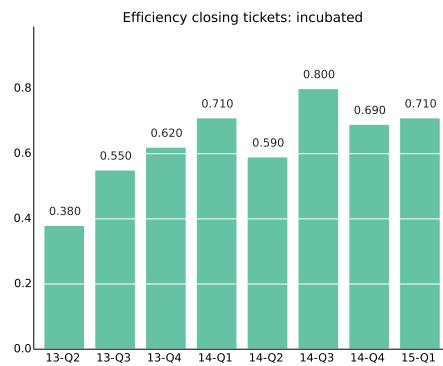
Commit (s)	Author	Commit (s)	Organizations
58	Valeriy Ponomaryov	120	HP
52	Kiall Mac Innes	117	Rackspace
48	Juan Antonio Osorio Robles	83	Mirantis
31	John Vrbanc	55	Red Hat
27	Lucas Alvares Gomes	48	Ericsson
24	Graham Hayes	21	NetApp
22	Ramakrishnan G	20	Intel
20	Vinod Mangalpally	20	Yahoo!
19	Jim Rollenhagen	14	Fujitsu
18	Devananda	11	JHU APL

3.10 Process

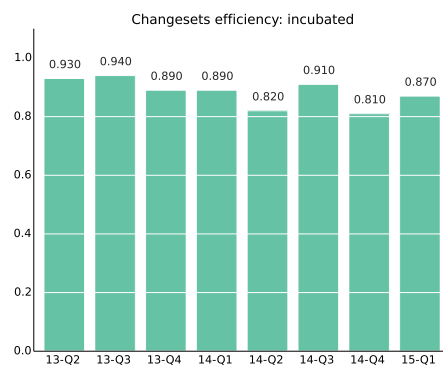
Efficiency closing changesets and tickets, time to review (mean and median), number of patchsets (iterations) per changeset and study on the time waiting for a reviewer or submitter action in the patchset review process.



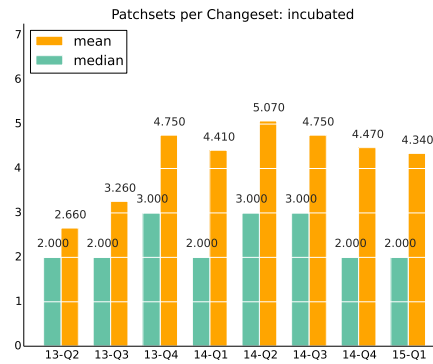
Period	Median	Mean
13-Q2	1.07	3.09
13-Q3	1.3	4.41
13-Q4	2.98	6.27
14-Q1	3.09	7.56
14-Q2	3.23	8.49
14-Q3	3.01	9.71
14-Q4	2.56	8.67
15-Q1	1.91	7.44



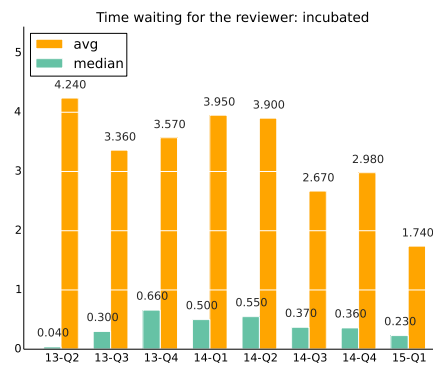
Period	Closed/Opened
13-Q2	0.38
13-Q3	0.55
13-Q4	0.62
14-Q1	0.71
14-Q2	0.59
14-Q3	0.8
14-Q4	0.69
15-Q1	0.71



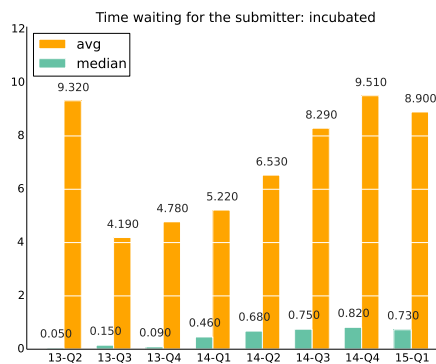
Period	(Aband. and Merg.)/Subm.
13-Q2	0.93
13-Q3	0.94
13-Q4	0.89
14-Q1	0.89
14-Q2	0.82
14-Q3	0.91
14-Q4	0.81
15-Q1	0.87



Period	Median	Mean
13-Q2	2.0	2.66
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	4.47
15-Q1	2.0	4.34



Period	Median	Mean
13-Q2	0.04	4.24
13-Q3	0.3	3.36
13-Q4	0.66	3.57
14-Q1	0.5	3.95
14-Q2	0.55	3.9
14-Q3	0.37	2.67
14-Q4	0.36	2.98
15-Q1	0.23	1.74



Period	Median	Mean
13-Q2	0.05	9.32
13-Q3	0.15	4.19
13-Q4	0.09	4.78
14-Q1	0.46	5.22
14-Q2	0.68	6.53
14-Q3	0.75	8.29
14-Q4	0.82	9.51
15-Q1	0.73	8.9

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
Infrastructure	scr	review.openstack.org_openstack-infra/gear
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Infrastructure	scr	review.openstack.org_openstack-infra/puppet-nodepool
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-github
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-meetbot
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-gerrit
Infrastructure	scr	review.openstack.org_openstack-infra/publications
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
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-puppet
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-snmpd
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-kibana
Infrastructure	scr	review.openstack.org_openstack/openstack-planet
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
Infrastructure	scr	review.openstack.org_openstack-infra/gearman-plugin
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
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-etherpad_lite
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
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-user
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-ansible
Infrastructure	scr	review.openstack.org_openstack-infra/gerritlib
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-logrotate
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
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-apparmor
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-packagekit
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-iptables
Infrastructure	scr	review.openstack.org_openstack-infra/reviewday
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
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-lodgeit
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-asterisk
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-dashboard
Infrastructure	scr	review.openstack.org_openstack-infra/jeepyb
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-mediawiki
Infrastructure	scr	review.openstack.org_openstack-infra/puppet-exim
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