

OpenStack Community Activity Report
April-June, 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 April-July 2015 summary of OpenStack Community Activity Report¹

Key findings:

Users community keeps growing

With an increase of more than a 300% in the total number of questions posted in ask.openstack.org, this is the unique communication channels with such measured increase. Other channels such as IRC or mailing lists also grow but slower. Although this is the activity measured for the last year, the last quarter shows a significant activity drop.

Active Core Reviewers are increasing

Although mid-release cycle analysis usually show drops of activity in most of the areas, the total number of active core reviewers has reached a new peak. Up to 339 core reviewers participated in the review process. This shows an increase of around 9% if compared to the previous quarter analysis.

Process keeps stable The time to merge patches for the main projects show similar numbers than in previous quarter. However, Nova seems to be the project out of the common time to review with up to 10 days. On the other hand, Glance is more in line with the rest of the projects if compared to previous quarter. In any case, Glance shows the second highest meadian time to review with up to 7 days.

IRC activity recovers old activity

Due to unknown issues, the total logs analyzed in the last two previous quarters indicated a huge drop of activity. However, last analysis on this data source shows activity in line with previous quarters. Although this is still an unknown issue, the IRC activity has recovered expected activity.

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 second 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 project teams².

| Data source | Activity 365 days | Change (wrt to prev. 365 days) |
|---------------|-------------------------|--------------------------------|
| Gits | 69838 commits | 2% |
| Tickets | 16008 closed tickets | 32% |
| Mailing Lists | 39593 sent emails | 17% |
| Gerrit | 73545 submitted reviews | 24% |
| Askbot | 5707 posted questions | 70% |
| IRC | 1917041 messages | 2% |

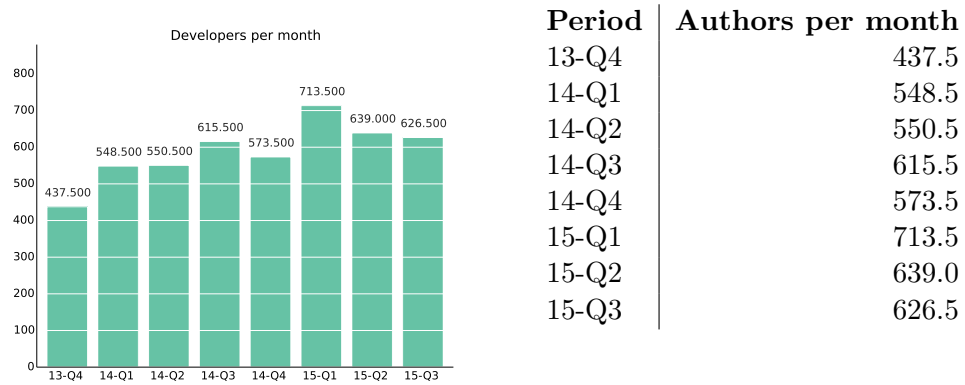
Table 1.1: Activity during the last 365 days and its evolution

The overall activity keeps increasing. Specifically in the case of the

¹The analyzed data sources are available in appendixB

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

Askbot activity where the total number of questions have increased more than a 300%. On the other hand, development activity in terms of commits seems to keep stable as in previous reports. While Gerrit submissions have increased a 20% if compared to the previous 365 days.



In this second quarter of 2015 the mean number of developers active per month has reached a total of 563. It is observed a decrease if compared to the previous quarter. This is an usual behaviour of the community during the mid term releases cycle.

The total number of contributors divided into three sets (core, regular and casual³) follows a similar pattern. This mid term release cycle shows a decrease if compared to previous quarter. However this keeps increasing if compared to the previous mid term cycle (2014-Q4).

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.

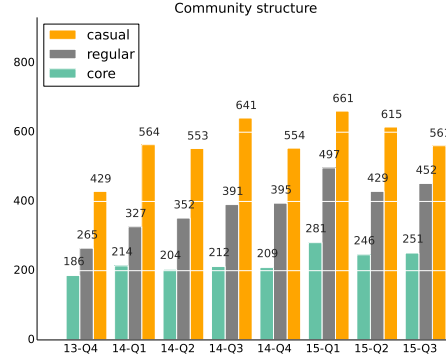


Figure 1.1: Evolution of the last 8 quarters of the core, regular and casual developers (Git activity)

| Period | Core | Regular | Occasional |
|--------|------|---------|------------|
| 13-Q4 | 186 | 265 | 429 |
| 14-Q1 | 214 | 327 | 564 |
| 14-Q2 | 204 | 352 | 553 |
| 14-Q3 | 212 | 391 | 641 |
| 14-Q4 | 209 | 395 | 554 |
| 15-Q1 | 281 | 497 | 661 |
| 15-Q2 | 246 | 429 | 615 |
| 15-Q3 | 251 | 452 | 561 |

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

1.1 Methodological Notes

Main changes with respect to previous reports are the following ones:

- Addition of new repositories: up to 100 of them. Most of them are part of new projects.
- Some of the projects that are detailed in the Governance file may not have a specific report in this analysis. This is due to their current migration under the *official OpenStack infrastructure*.

- Old nomenclature used to have a hierarchy of the projects is now renewed.
 - OpenStack Software now includes all projects and not only the old incubated and integrated ones.
 - Client projects were usually under the 'Clients' chapter. However, each of the client files are now part of each of their correspondent projects.
 - Incubated and integrated sections in the main report has been removed. This nomenclature is not used any more.
 - *specs* files are not included in the analysis.
- Storyboard activity is not measured within this report.

Chapter 2

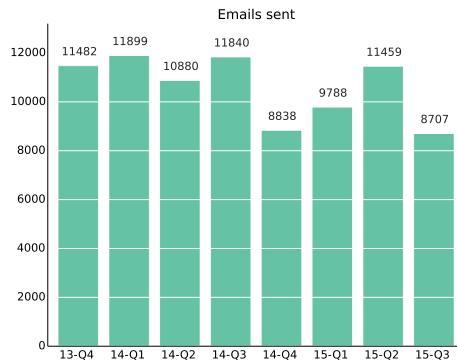
Communication and Support-Related Activities

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.

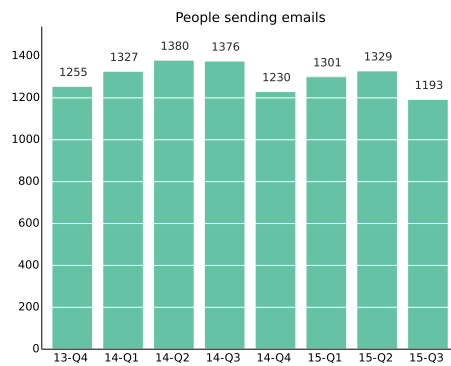
2.1 Mailing Lists

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.

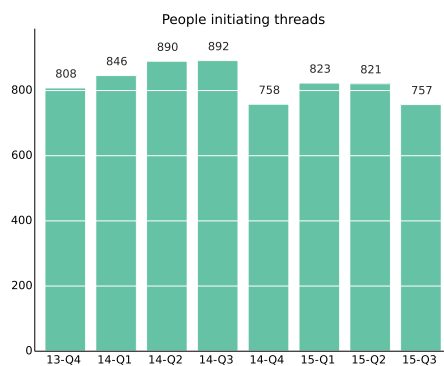
2.1. MAILING LISTS



| Period | Emails |
|--------|--------|
| 13-Q4 | 11482 |
| 14-Q1 | 11899 |
| 14-Q2 | 10880 |
| 14-Q3 | 11840 |
| 14-Q4 | 8838 |
| 15-Q1 | 9788 |
| 15-Q2 | 11459 |
| 15-Q3 | 8707 |



| Period | People |
|--------|--------|
| 13-Q4 | 1255 |
| 14-Q1 | 1327 |
| 14-Q2 | 1380 |
| 14-Q3 | 1376 |
| 14-Q4 | 1230 |
| 15-Q1 | 1301 |
| 15-Q2 | 1329 |
| 15-Q3 | 1193 |

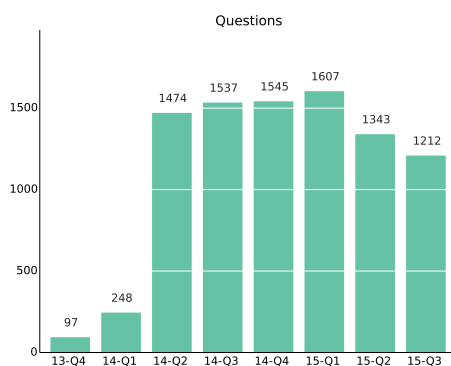


| Period | People |
|--------|--------|
| 13-Q4 | 808 |
| 14-Q1 | 846 |
| 14-Q2 | 890 |
| 14-Q3 | 892 |
| 14-Q4 | 758 |
| 15-Q1 | 823 |
| 15-Q2 | 821 |
| 15-Q3 | 757 |

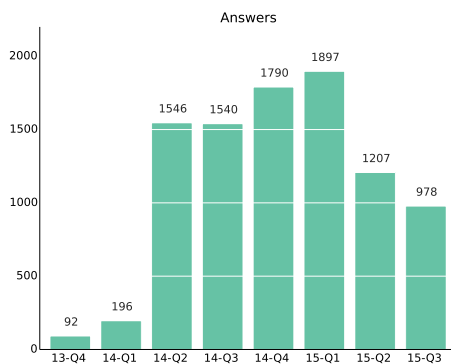
| Initial Author and Date | Subject | Number Messages |
|-----------------------------------|---|--------------------|
| Tristan Cacqueray 2015-09-17 | [openstack-dev] [all][elections] PTL nomination period is now over | 55 |
| Monty Taylor 2015-09-15 | [openstack-dev] [nova][neutron][devstack] New proposed 'default' network model | 45 |
| Tamara Johnston 2015-09-02 | [OpenStack Foundation] [Di- versity] re: Diversity Work- group APAC 2015-08-27 | 41 |
| Tang Chen 2015-07-08 | [openstack-dev] [CI] How to set a proxy for zuul. | 36 |
| Matt Riedemann 2015-09-23 | [openstack-dev] [nova][cinder] how to handle AZ bug 1496235? | 33 |
| Kyle Mestery 2015-08-12 | [openstack-dev] [neutron] I am pleased to propose two new Neutron API/DB/RPC core reviewers! | 32 |
| Banashankar KV 2015-09-21 | [openstack-dev] [neu- tron][lbaas] - Heat support for LbaasV2 | 30 |
| Monty Taylor 2015-07-06 | ERROR | 28 |
| Vladimir Kozhukalov 2015-09-08 | [openstack-dev] [Fuel] Re- move MOS DEB repo from master node | 28 |
| Thierry Carrez 2015-08-03 | [openstack-dev] [stable] [infra] How to auto-generate stable release notes | 27 |

2.2 Questions and Answers

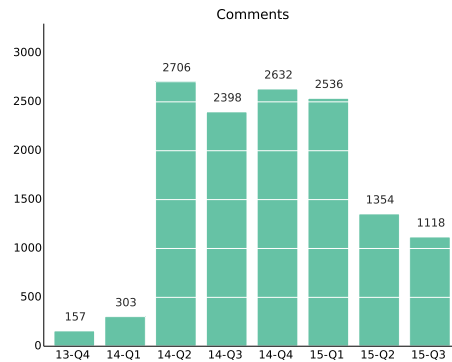
The following charts show activity in the Ask OpenStack site. Total number of questions, number of answers, number of comments and people sending questions are depicted. In addition four tables represent the hot topics activity in the Ask OpenStack site. Those show information about the top visited questions,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



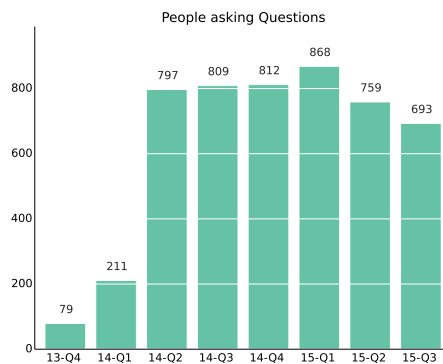
| Period | Questions |
|--------|-----------|
| 13-Q4 | 97 |
| 14-Q1 | 248 |
| 14-Q2 | 1474 |
| 14-Q3 | 1537 |
| 14-Q4 | 1545 |
| 15-Q1 | 1607 |
| 15-Q2 | 1343 |
| 15-Q3 | 1212 |



| Period | Answers |
|--------|---------|
| 13-Q4 | 92 |
| 14-Q1 | 196 |
| 14-Q2 | 1546 |
| 14-Q3 | 1540 |
| 14-Q4 | 1790 |
| 15-Q1 | 1897 |
| 15-Q2 | 1207 |
| 15-Q3 | 978 |



| Period | Comments |
|--------|----------|
| 13-Q4 | 157 |
| 14-Q1 | 303 |
| 14-Q2 | 2706 |
| 14-Q3 | 2398 |
| 14-Q4 | 2632 |
| 15-Q1 | 2536 |
| 15-Q2 | 1354 |
| 15-Q3 | 1118 |



| Period | People asking |
|--------|---------------|
| 13-Q4 | 79 |
| 14-Q1 | 211 |
| 14-Q2 | 797 |
| 14-Q3 | 809 |
| 14-Q4 | 812 |
| 15-Q1 | 868 |
| 15-Q2 | 759 |
| 15-Q3 | 693 |

- Top visited questions.

| Question subject | Visits |
|---|--------|
| how openstack communicates with hyper v+ | 1336 |
| openstack deployment on two nodes with+ | 353 |
| no internet connectivity on instances with+ | 286 |
| launching a docker instance in openstack+ | 282 |
| problems with swift and keystone on+ | 280 |
| how to setup swift with commvault+ | 237 |
| how to change keystone endpoint urls+ | 228 |
| how can i use a snapshot+ | 199 |
| status fix released+ | 197 |
| kvm or qemu+ | 183 |

- Top questions with more comments.

| Question subject | Comments |
|---|----------|
| openstack deployment on two nodes with+ | 5 |
| windows instance freezes after attaching a+ | 5 |
| not able to boot instance with+ | 5 |
| importerror cannot import name i18n+ | 5 |
| instance is forever in scheduling state+ | 5 |
| keystone error 500 when creating identity+ | 5 |
| juno neutron dvr and multiple external+ | 5 |
| glance in combination with docker provokes+ | 5 |
| neutron qrouters not passing traffic onto+ | 5 |
| how does the libvirtxml file generate+ | 5 |

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

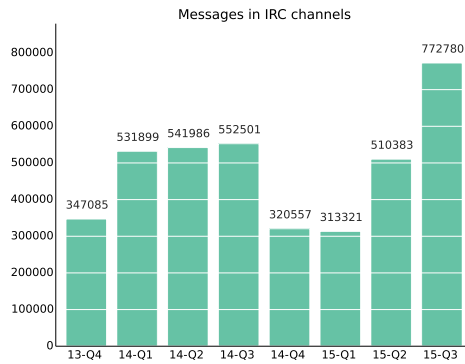
| Question subject | People participating |
|---|----------------------|
| glance unable to create image+ | 7 |
| no internet connectivity on instances with+ | 6 |
| kilo install error create the service+ | 6 |
| error no valid host was found+ | 5 |
| is it possible to create instance+ | 5 |
| can i have vps based cloud+ | 5 |
| configure to open horizon on https+ | 5 |
| docker and tenant gre network+ | 5 |
| load balancer in openstack kilo+ | 5 |
| why you are using openstack+ | 4 |

- Top tags

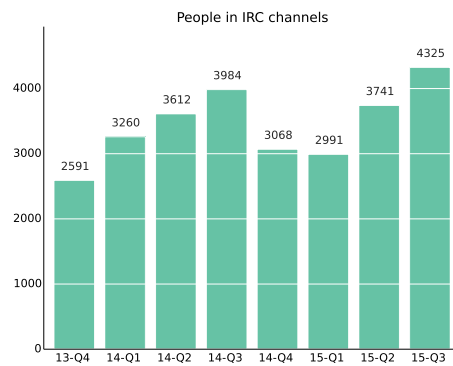
| Tag name | Ocurrences |
|----------|------------|
|----------|------------|

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-Q4 | 347085 |
| 14-Q1 | 531899 |
| 14-Q2 | 541986 |
| 14-Q3 | 552501 |
| 14-Q4 | 320557 |
| 15-Q1 | 313321 |
| 15-Q2 | 510383 |
| 15-Q3 | 772780 |



| Period | People |
|--------|--------|
| 13-Q4 | 2591 |
| 14-Q1 | 3260 |
| 14-Q2 | 3612 |
| 14-Q3 | 3984 |
| 14-Q4 | 3068 |
| 15-Q1 | 2991 |
| 15-Q2 | 3741 |
| 15-Q3 | 4325 |

| IRC id | Messages sent |
|----------------|---------------|
| sdake | 14124 |
| SamYaple | 13236 |
| openstack | 11713 |
| clarkb | 10546 |
| mriedem | 9655 |
| anteaya | 7758 |
| fungi | 7730 |
| jroll | 7356 |
| EmilienM | 7145 |
| jgriffith | 6304 |
| mordred | 6076 |
| lifeless | 5581 |
| johnthetubaguy | 5503 |
| lucasagomes | 5477 |
| sdague | 5426 |

Chapter 3

Details on OpenStack Software

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

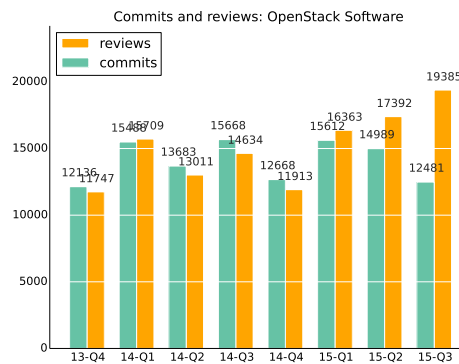
- activity: centered in the following metrics: commits from git activity, submitted, merge and abandoned reviews from the review system and opened and closed tickets from the issue tracking system.
- community: active core reviewers in gerrit, active authors in git and top ten developers and top ten 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 project teams are provided in separate documents on git.openstack.org/cgit/openstack-infra/activity-board/tree/reports/2015-q

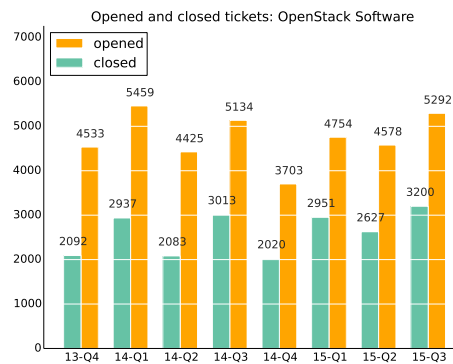
3.1 Overview of OpenStack Project Teams

3.2 Activity

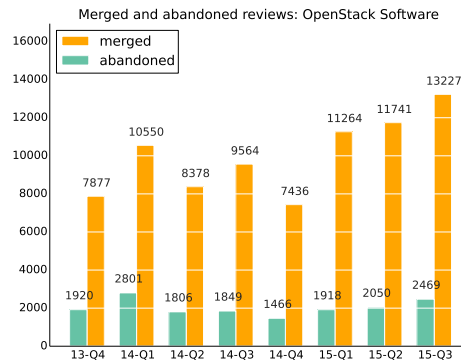
Commits in Git, submitted, merged and abandoned reviews in Gerrit and opened and closed issues in Launchpad.



| Period | Commits | Reviews |
|--------|---------|---------|
| 13-Q4 | 12136 | 11747 |
| 14-Q1 | 15488 | 15709 |
| 14-Q2 | 13683 | 13011 |
| 14-Q3 | 15668 | 14634 |
| 14-Q4 | 12668 | 11913 |
| 15-Q1 | 15612 | 16363 |
| 15-Q2 | 14989 | 17392 |
| 15-Q3 | 12481 | 19385 |



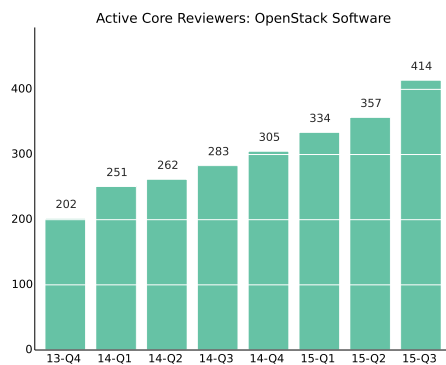
| Period | Closed | Opened |
|--------|--------|--------|
| 13-Q4 | 2092 | 4533 |
| 14-Q1 | 2937 | 5459 |
| 14-Q2 | 2083 | 4425 |
| 14-Q3 | 3013 | 5134 |
| 14-Q4 | 2020 | 3703 |
| 15-Q1 | 2951 | 4754 |
| 15-Q2 | 2627 | 4578 |
| 15-Q3 | 3200 | 5292 |



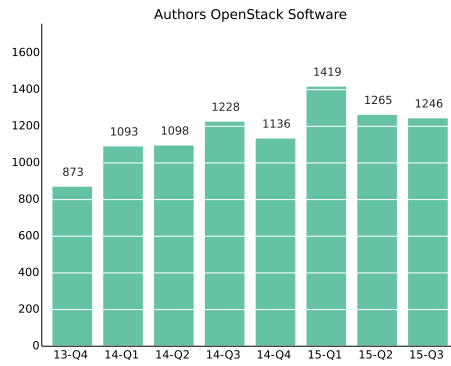
| Period | Merged | Abandoned |
|--------|--------|-----------|
| 13-Q4 | 7877 | 1920 |
| 14-Q1 | 10550 | 2801 |
| 14-Q2 | 8378 | 1806 |
| 14-Q3 | 9564 | 1849 |
| 14-Q4 | 7436 | 1466 |
| 15-Q1 | 11264 | 1918 |
| 15-Q2 | 11741 | 2050 |
| 15-Q3 | 13227 | 2469 |

3.3 Community

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



| Period | Active Core |
|--------|-------------|
| 13-Q4 | 202 |
| 14-Q1 | 251 |
| 14-Q2 | 262 |
| 14-Q3 | 283 |
| 14-Q4 | 305 |
| 15-Q1 | 334 |
| 15-Q2 | 357 |
| 15-Q3 | 414 |

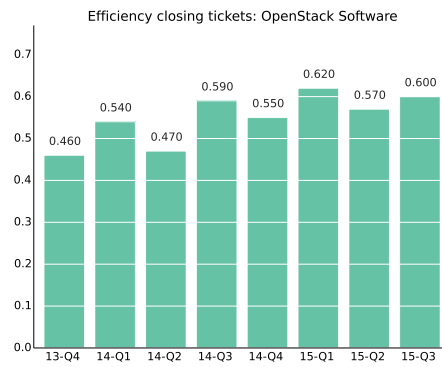


| Period | Authors |
|--------|---------|
| 13-Q4 | 873 |
| 14-Q1 | 1093 |
| 14-Q2 | 1098 |
| 14-Q3 | 1228 |
| 14-Q4 | 1136 |
| 15-Q1 | 1419 |
| 15-Q2 | 1265 |
| 15-Q3 | 1246 |

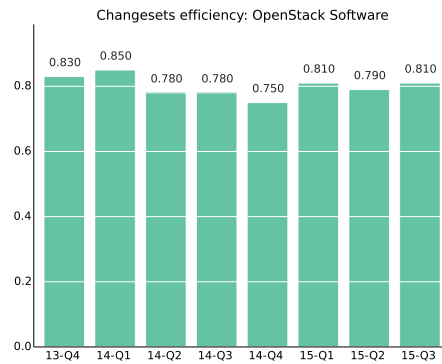
| Commit (s) | Author | Commit (s) | Organizations |
|------------|------------------------|------------|------------------------|
| 1303 | OpenStack Proposal Bot | 2184 | Red Hat |
| 258 | Doug Hellmann | 2070 | HP |
| 230 | Tim Buckley | 1471 | OpenStack Foundation |
| 210 | Emilien Macchi | 1160 | Mirantis |
| 157 | Monty Taylor | 978 | IBM |
| 155 | Andreas Jaeger | 439 | Rackspace |
| 143 | Matt Riedemann | 398 | Huawei |
| 128 | Colleen Murphy | 312 | Cisco |
| 128 | Mehdi Abaakouk | 310 | NEC |
| 127 | David Pursehouse | 308 | VMWare |
| | | 268 | Intel |
| | | 255 | Fujitsu |
| | | 213 | StackOps Technologies |
| | | 169 | SUSE |
| | | 154 | Puppet Labs |
| | | 136 | 99cloud |
| | | 131 | Individual |
| | | 129 | Sony Mobile |
| | | 90 | NTT |
| | | 73 | GNU |
| | | 70 | Internap |
| | | 70 | Midokura |
| | | 69 | NetApp |
| | | 68 | VA Linux Systems Japan |
| | | 66 | Centrin |
| | | 64 | B1 Systems |
| | | 61 | Nicira |
| | | 56 | UnitedStack |
| | | 54 | NTT Data |
| | | 51 | Big Switch Networks |
| | | 51 | Thales |
| | | 42 | SwiftStack |
| | | 41 | Cloudscaling |
| | | 41 | eNovance |
| | | 41 | SAP |
| | | 38 | Ericsson |
| | | 36 | Metacloud |
| | | 35 | Orange |
| | | 33 | eBay |
| | | 32 | EMC |
| | | 29 | Xemeti |
| | | 26 | Alcatel-Lucent |
| | | 26 | Mellanox Technologies |
| | | 26 | Objectif-libre |
| | | 25 | JHU APL |

3.4 Process

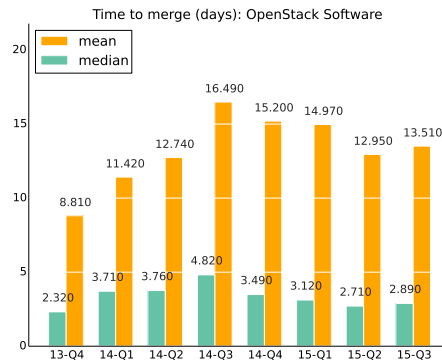
Efficiency closing changesets and tickets, time to review (mean and median), number of patchsets (iterations) per changeset and study on the time waiting for a reviewer or submitter action in the patchset review process.



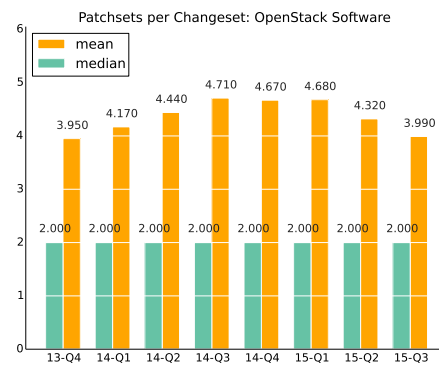
| Period | Closed/Opened |
|--------|---------------|
| 13-Q4 | 0.46 |
| 14-Q1 | 0.54 |
| 14-Q2 | 0.47 |
| 14-Q3 | 0.59 |
| 14-Q4 | 0.55 |
| 15-Q1 | 0.62 |
| 15-Q2 | 0.57 |
| 15-Q3 | 0.6 |



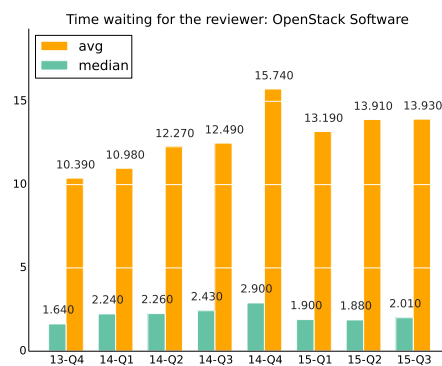
| Period | (Aband. and Merg.)/Subm. |
|--------|--------------------------|
| 13-Q4 | 0.83 |
| 14-Q1 | 0.85 |
| 14-Q2 | 0.78 |
| 14-Q3 | 0.78 |
| 14-Q4 | 0.75 |
| 15-Q1 | 0.81 |
| 15-Q2 | 0.79 |
| 15-Q3 | 0.81 |



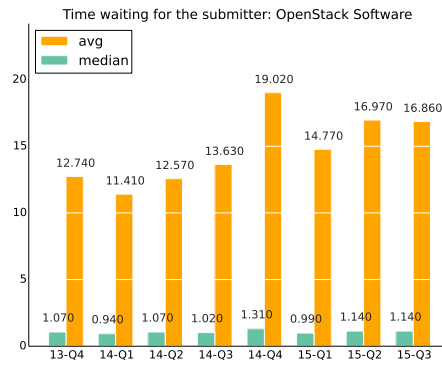
| Period | Median | Mean |
|--------|--------|-------|
| 13-Q4 | 2.32 | 8.81 |
| 14-Q1 | 3.71 | 11.42 |
| 14-Q2 | 3.76 | 12.74 |
| 14-Q3 | 4.82 | 16.49 |
| 14-Q4 | 3.49 | 15.2 |
| 15-Q1 | 3.12 | 14.97 |
| 15-Q2 | 2.71 | 12.95 |
| 15-Q3 | 2.89 | 13.51 |



| Period | Median | Mean |
|--------|--------|------|
| 13-Q4 | 2.0 | 3.95 |
| 14-Q1 | 2.0 | 4.17 |
| 14-Q2 | 2.0 | 4.44 |
| 14-Q3 | 2.0 | 4.71 |
| 14-Q4 | 2.0 | 4.67 |
| 15-Q1 | 2.0 | 4.68 |
| 15-Q2 | 2.0 | 4.32 |
| 15-Q3 | 2.0 | 3.99 |



| Period | Median | Mean |
|--------|--------|-------|
| 13-Q4 | 1.64 | 10.39 |
| 14-Q1 | 2.24 | 10.98 |
| 14-Q2 | 2.26 | 12.27 |
| 14-Q3 | 2.43 | 12.49 |
| 14-Q4 | 2.9 | 15.74 |
| 15-Q1 | 1.9 | 13.19 |
| 15-Q2 | 1.88 | 13.91 |
| 15-Q3 | 2.01 | 13.93 |



| Period | Median | Mean |
|--------|--------|-------|
| 13-Q4 | 1.07 | 12.74 |
| 14-Q1 | 0.94 | 11.41 |
| 14-Q2 | 1.07 | 12.57 |
| 14-Q3 | 1.02 | 13.63 |
| 14-Q4 | 1.31 | 19.02 |
| 15-Q1 | 0.99 | 14.77 |
| 15-Q2 | 1.14 | 16.97 |
| 15-Q3 | 1.14 | 16.86 |

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/python-barbicanclient |
| 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 | scm | git://git.openstack.org/openstack/python-kiteclient |
| barbican | scr | review.openstack.org_openstack/barbican |
| barbican | scr | review.openstack.org_openstack/python-kiteclient |
| barbican | scr | review.openstack.org_openstack/python-barbicanclient |
| barbican | scr | review.openstack.org_openstack/castellan |
| barbican | scr | review.openstack.org_openstack/kite |

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>

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| ceilometer | its | https://bugs.launchpad.net/python-ceilometerclient |
| ceilometer | its | https://bugs.launchpad.net/ceilometer |
| ceilometer | scm | git://git.openstack.org/openstack/aodh |
| ceilometer | scm | https://github.com/openstack/python-ceilometerclient.git |
| ceilometer | scm | git://git.openstack.org/openstack/gnocchi |
| ceilometer | scm | https://github.com/openstack/ceilometer.git |
| ceilometer | scm | git://git.openstack.org/openstack/ceilometermiddleware |
| ceilometer | scr | review.openstack.org_openstack/ceilometer |
| ceilometer | scr | review.openstack.org_openstack/gnocchi |
| ceilometer | scr | review.openstack.org_openstack/ceilometermiddleware |
| ceilometer | scr | review.openstack.org_openstack/aodh |
| ceilometer | scr | review.openstack.org_openstack/python-ceilometerclient |
| ChefOpenStack | its | https://bugs.launchpad.net/openstack-chef |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-block-storage |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-data-processing |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-network |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-telemetry |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-compute |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-image |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-ops-database |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-client |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-database |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-object-storage |
| ChefOpenStack | scm | git://git.openstack.org/openstack/openstack-chef-repo |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-bare-metal |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-dashboard |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-integration-test |

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| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-orchestration |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-common |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-identity |
| ChefOpenStack | scm | git://git.openstack.org/openstack/cookbook-openstack-ops-messaging |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-database |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-object-storage |
| ChefOpenStack | scr | review.openstack.org_openstack/openstack-chef-repo |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-dashboard |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-integration-test |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-orchestration |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-common |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-identity |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-ops-messaging |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-bare-metal |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-data-processing |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-network |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-telemetry |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-compute |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-image |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-ops-database |
| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-block-storage |

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| ChefOpenStack | scr | review.openstack.org_openstack/cookbook-openstack-client |
| cinder | its | https://bugs.launchpad.net/cinder |
| cinder | its | https://bugs.launchpad.net/python-cinderclient |
| cinder | scm | https://github.com/openstack/python-cinderclient.git |
| cinder | scm | git://git.openstack.org/openstack/os-brick |
| cinder | scm | https://github.com/openstack/cinder.git |
| cinder | scr | review.openstack.org_openstack/cinder |
| cinder | scr | review.openstack.org_openstack/python-cinderclient |
| cinder | scr | review.openstack.org_openstack/os-brick |
| Common Libraries | its | https://bugs.launchpad.net/oslo.db |
| Common Libraries | its | https://bugs.launchpad.net/oslo.messaging |
| Common Libraries | its | https://bugs.launchpad.net/oslo.rootwrap |
| Common Libraries | its | https://bugs.launchpad.net/oslospinx |
| 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 | its | https://bugs.launchpad.net/oslo.cache |
| Common Libraries | its | https://bugs.launchpad.net/oslo.i18n |
| Common Libraries | its | https://bugs.launchpad.net/pbr |
| Common Libraries | its | https://bugs.launchpad.net/oslo.serialization |
| Common Libraries | its | https://bugs.launchpad.net/oslotest |
| Common Libraries | its | https://bugs.launchpad.net/oslo.context |
| Common Libraries | its | https://bugs.launchpad.net/hacking |
| 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/oslo.concurrency |
| Common Libraries | its | https://bugs.launchpad.net/oslo.log |
| Common Libraries | its | https://bugs.launchpad.net/taskflow |
| Common Libraries | its | https://bugs.launchpad.net/oslo.utils |
| Common Libraries | its | https://bugs.launchpad.net/pylockfile |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.serialization |
| Common Libraries | scm | git://git.openstack.org/openstack/pylockfile |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.vmware |
| 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.service |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.policy |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.vmware |

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| Common Libraries | scm | git://git.openstack.org/openstack-dev/oslo-cookiecutter |
| 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.db |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.context |
| Common Libraries | scm | git://git.openstack.org/openstack/automaton |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.log |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.utils |
| 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.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/oslo.rootwrap |
| Common Libraries | scm | git://git.openstack.org/openstack/taskflow |
| Common Libraries | scm | git://git.openstack.org/openstack/oslo.concurrency |
| Common Libraries | scm | git://git.openstack.org/openstack/futurist |
| 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/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/tooz |
| Common Libraries | scm | git://git.openstack.org/openstack/mox3 |
| Common Libraries | scr | review.openstack.org_openstack/oslo.middleware |
| Common Libraries | scr | review.openstack.org_openstack-dev/pbr |
| Common Libraries | scr | review.openstack.org_openstack/oslo.versionedobjects |
| Common Libraries | scr | review.openstack.org_openstack/oslo.i18n |
| Common Libraries | scr | review.openstack.org_openstack/stevedore |
| 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 |
| Common Libraries | scr | review.openstack.org_openstack/futurist |
| 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-incubator |
| Common Libraries | scr | review.openstack.org_openstack/oslo.vmware |
| Common Libraries | scr | review.openstack.org_openstack/taskflow |

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| Common Libraries | scr | review.openstack.org_openstack/oslo.context |
| Common Libraries | scr | review.openstack.org_openstack/mox3 |
| Common Libraries | scr | review.openstack.org_openstack/oslo.messaging |
| Common Libraries | scr | review.openstack.org_openstack-dev/hacking |
| Common Libraries | scr | review.openstack.org_openstack/oslo.utils |
| Common Libraries | scr | review.openstack.org_openstack/oslo.db |
| Common Libraries | scr | review.openstack.org_openstack/pylockfile |
| Common Libraries | scr | review.openstack.org_openstack/oslo.service |
| 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/oslo.config |
| Common Libraries | scr | review.openstack.org_openstack/oslo.sphinx |
| Common Libraries | scr | review.openstack.org_openstack/oslo.concurrency |
| Common Libraries | scr | review.openstack.org_openstack/automaton |
| 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 | 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-common |
| Deployment | scm | git://git.openstack.org/openstack/tripleo-puppet-elements |
| Deployment | scm | git://git.openstack.org/openstack/os-refresh-config |
| Deployment | scm | https://github.com/openstack/tripleo-incubator.git |
| 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-common |

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| Deployment | scr | review.openstack.org_openstack/tripleo-image-elements |
| Deployment | scr | review.openstack.org_openstack/diskimage-builder |
| Deployment | scr | review.openstack.org_openstack/dib-utils |
| 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 | its | https://bugs.launchpad.net/python-designateclient |
| designate | scm | git://git.openstack.org/openstack/designate-dashboard |
| designate | scm | git://git.openstack.org/openstack/designate |
| designate | scm | git://git.openstack.org/openstack/python-designateclient |
| designate | scr | review.openstack.org_stackforge/python-designateclient |
| designate | scr | review.openstack.org_openstack/designate |
| designate | scr | review.openstack.org_openstack/designate-dashboard |
| Documentation | its | https://bugs.launchpad.net/openstack-manuals |
| Documentation | its | https://bugs.launchpad.net/openstack-api-site |
| 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 | 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 | 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 |

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| Documentation | scr | review.openstack.org_openstack/security-doc |
| Documentation | scr | review.openstack.org_openstack/openstack-doc-tools |
| 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 |
| glance | its | https://bugs.launchpad.net/python-glanceclient |
| glance | its | https://bugs.launchpad.net/glance |
| glance | scm | https://github.com/openstack/python-glanceclient.git |
| glance | scm | git://git.openstack.org/openstack/glance_store |
| glance | scm | https://github.com/openstack/glance.git |
| glance | scr | review.openstack.org_openstack/python-glanceclient |
| glance | scr | review.openstack.org_openstack/glance_store |
| glance | scr | review.openstack.org_openstack/glance |
| heat | its | https://bugs.launchpad.net/heat-cfn-tools |
| heat | its | https://bugs.launchpad.net/heat |
| heat | its | https://bugs.launchpad.net/python-heatclient |
| heat | its | https://bugs.launchpad.net/heat-templates |
| heat | scm | git://git.openstack.org/openstack-dev/heat-cfnclient |
| heat | scm | git://git.openstack.org/openstack/heat-cfn-tools |
| heat | scm | git://git.openstack.org/openstack/heat-templates |
| heat | scm | https://github.com/openstack/python-heatclient.git |
| heat | scm | https://github.com/openstack/heat.git |
| heat | scm | git://git.openstack.org/openstack/heat-translator |
| heat | scr | review.openstack.org_openstack/heat |
| heat | scr | review.openstack.org_openstack/heat-cfn-tools |
| heat | scr | review.openstack.org_openstack/heat-translator |
| heat | scr | review.openstack.org_openstack/heat-templates |
| heat | scr | review.openstack.org_openstack/python-heatclient |
| heat | scr | review.openstack.org_openstack/heat-templates |
| horizon | its | https://bugs.launchpad.net/tuskar-ui |
| horizon | its | https://bugs.launchpad.net/horizon |
| horizon | its | https://bugs.launchpad.net/django-openstack-auth |
| horizon | scm | https://github.com/openstack/horizon.git |
| horizon | scm | git://git.openstack.org/openstack/tuskar-ui |
| horizon | scm | git://git.openstack.org/openstack/django-openstack_auth |
| horizon | scm | git://git.openstack.org/openstack/django-openstack-auth-kerberos |

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| horizon | scr | review.openstack.org_openstack/django-openstack-auth-kerberos |
| horizon | scr | review.openstack.org_openstack/horizon |
| Infrastructure | its | https://bugs.launchpad.net/openstack-ci |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-subunit2sql |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-httpd |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/activity-board |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-unbound |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-kibana |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/reviewstats |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/os-loganalyze |
| 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-mailman |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/lodgeit |
| Infrastructure | scm | https://github.com/openstack-infra/gerritbot.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-apps_site |
| 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-cgit |
| Infrastructure | scm | https://github.com/openstack-infra/nose-html-output.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/gitdm |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-planet |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-etherpad_lite |
| Infrastructure | scm | https://github.com/openstack-infra/zuul.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/openstackid |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-reviewday |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-statusbot |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-graphite |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-ulimit |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/subunit2sql |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-jenkins |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/nodepool |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/tripleo-ci |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-vinz |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-logrotate |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-pgsql_backup |
| Infrastructure | scm | https://github.com/openstack-infra/gear.git |

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| Infrastructure | scm | git://git.openstack.org/openstack-infra/python-storyboardclient |
| 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-bugdaystats |
| Infrastructure | scm | https://github.com/openstack-infra/jeepyb.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-phabricator |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-packagekit |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-elastic_recheck |
| Infrastructure | scm | https://github.com/openstack-infra/statusbot.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/bindep |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-redis |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-ssh |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-gerritbot |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-sudoers |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/project-config |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-iptables |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/elastic-recheck |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-user |
| 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/openstackweb |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/storyboard |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/shade |
| Infrastructure | scm | https://github.com/openstack-infra/config.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/system-config |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-mediawiki |
| Infrastructure | scm | https://github.com/openstack-infra/gerritlib.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/grafyaml |
| 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-dashboard |
| Infrastructure | scm | https://github.com/openstack-infra/releasestatus.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-zuul |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-project_config |

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| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-exim |
| Infrastructure | scm | https://github.com/openstack/openstack-planet.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-storyboard |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-haveged |
| Infrastructure | scm | git://git.openstack.org/openstack-dev/openstack-nose |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-unattended-upgrades |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-kerberos |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-stackalytics |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/odsreg |
| 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-logstash |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/yaml2ical |
| Infrastructure | scm | https://github.com/openstack-infra/gearman-plugin.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/publications |
| 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-bup |
| Infrastructure | scm | https://github.com/openstack-infra/jenkins-job-builder.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/bugdaystats |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-pip |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-elasticsearch |
| Infrastructure | scm | https://github.com/openstack-infra/zmq-event-publisher.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/ansible-puppet |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-releasestatus |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-ssl_cert_check |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-github |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-tmpreaper |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-jeepyb |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/groups |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/storyboard-webclient |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-vcsrepo |

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| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-log_processor |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/infra-manual |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/openstackid-resources |
| Infrastructure | scm | https://github.com/openstack-infra/devstack-gate.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-diskimage_builder |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-meetbot |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-accessbot |
| Infrastructure | scm | https://github.com/openstack-infra/git-review.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/groups-static-pages |
| 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-drupal |
| Infrastructure | scm | https://github.com/openstack-infra/reviewday.git |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/glean |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-puppet |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-snmpd |
| Infrastructure | scm | git://git.openstack.org/openstack-infra/puppet-gerrit |
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| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-zuul |
| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-ssl_cert_check |
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| Infrastructure | scr | review.openstack.org_openstack-infra/statusbot |
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| Infrastructure | scr | review.openstack.org_openstack-infra/config |

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| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-jeepyb |
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| Infrastructure | scr | review.openstack.org_openstack-infra/yaml2ical |
| Infrastructure | scr | review.openstack.org_openstack-infra/gerritbot |
| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-meetbot |
| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-accessbot |
| Infrastructure | scr | review.openstack.org_openstack-infra/jenkins-job-builder |
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| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-ulimit |
| Infrastructure | scr | review.openstack.org_openstack-infra/puppet-httpd |
| ironic | its | https://bugs.launchpad.net/ironic |
| ironic | scm | https://github.com/openstack/ironic.git |
| ironic | scm | git://git.openstack.org/openstack/bifrost |
| ironic | scm | git://git.openstack.org/openstack/ironic-lib |
| ironic | scm | git://git.openstack.org/openstack/ironic-python-agent |
| ironic | scm | https://github.com/openstack/python-ironicclient.git |
| ironic | scm | git://git.openstack.org/openstack/coreos-image-builder |
| ironic | scr | review.openstack.org_openstack/ironic-python-agent |
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| ironic | scr | review.openstack.org_openstack/bifrost |
| keystone | its | https://bugs.launchpad.net/python-keystoneclient |
| keystone | its | https://bugs.launchpad.net/keystone |
| keystone | scm | https://github.com/openstack/python-keystoneclient.git |
| keystone | scm | git://git.openstack.org/openstack/keystonemiddleware |

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| keystone | scm | git://git.openstack.org/openstack/python-keystoneclient-federation |
| keystone | scm | git://git.openstack.org/openstack/keystonemiddleware |
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| keystone | scm | git://git.openstack.org/openstack/keystoneauth |
| keystone | scm | git://git.openstack.org/openstack/python-keystoneclient-kerberos |
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| Magnetodb | its | https://bugs.launchpad.net/python-magnetodbcclient |
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| Mistral | scm | git://git.openstack.org/openstack/python-mistralclient |
| Mistral | scm | git://git.openstack.org/openstack/mistral-dashboard |
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| Mistral | scr | review.openstack.org_openstack/mistral-extra |

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| murano | scr | review.openstack.org_openstack/murano |
| neutron | its | https://bugs.launchpad.net/python-neutronclient |
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| neutron | scm | git://git.openstack.org/openstack/networking-cisco |
| neutron | scm | git://git.openstack.org/openstack/dragonflow |
| neutron | scm | https://github.com/openstack/neutron.git |
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| neutron | scm | git://git.openstack.org/openstack/networking-midonet |
| neutron | scm | git://git.openstack.org/openstack/vmware-nsx |
| neutron | scm | git://git.openstack.org/openstack/networking-odl |
| neutron | scm | git://git.openstack.org/openstack/python-neutron-pd-driver |
| neutron | scm | git://git.openstack.org/openstack/neutron-vpnaas |
| neutron | scm | git://git.openstack.org/openstack/networking-bgpvpn |
| neutron | scm | git://git.openstack.org/openstack/networking-l2gw |
| neutron | scm | git://git.openstack.org/openstack/octavia |
| neutron | scr | review.openstack.org_openstack/networking-midonet |
| neutron | scr | review.openstack.org_openstack/neutron-vpnaas |
| neutron | scr | review.openstack.org_openstack/vmware-nsx |
| neutron | scr | review.openstack.org_openstack/networking-odl |
| neutron | scr | review.openstack.org_openstack/neutron-fwaas |
| neutron | scr | review.openstack.org_openstack/python-neutron-pd-driver |

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| neutron | scr | review.openstack.org_openstack/networking-bgpvpn |
| neutron | scr | review.openstack.org_openstack/networking-l2gw |
| neutron | scr | review.openstack.org_openstack/python-neutronclient |
| neutron | scr | review.openstack.org_openstack/octavia |
| neutron | scr | review.openstack.org_openstack/networking-cisco |
| neutron | scr | review.openstack.org_openstack/neutron |
| neutron | scr | review.openstack.org_openstack/neutron-lbaas |
| neutron | scr | review.openstack.org_openstack/dragonflow |
| neutron | scr | review.openstack.org_openstack/networking-ovn |
| neutron | scr | review.openstack.org_openstack/networking-ofagent |
| neutron | scr | review.openstack.org_openstack/networking-sfc |
| nova | its | https://bugs.launchpad.net/python-novaclient |
| nova | its | https://bugs.launchpad.net/nova |
| nova | scm | https://github.com/openstack/python-novaclient.git |
| nova | scm | https://github.com/openstack/nova.git |
| nova | scr | review.openstack.org_openstack/python-novaclient |
| nova | scr | review.openstack.org_openstack/nova |
| OpenStackAnsible | its | https://bugs.launchpad.net/openstack-ansible |
| OpenStackAnsible | scm | git://git.openstack.org/openstack/openstack-ansible |
| OpenStackAnsible | scr | review.openstack.org_openstack/openstack-ansible |
| OpenStackClient | its | https://bugs.launchpad.net/python-openstackclient |
| OpenStackClient | its | https://bugs.launchpad.net/python-cliff |
| OpenStackClient | its | https://bugs.launchpad.net/os-client-config |
| OpenStackClient | scm | git://git.openstack.org/openstack/cliff |
| OpenStackClient | scm | https://github.com/openstack/python-openstackclient.git |
| OpenStackClient | scm | git://git.openstack.org/openstack/os-client-config |
| OpenStackClient | scr | review.openstack.org_openstack/os-client-config |
| OpenStackClient | scr | review.openstack.org_openstack/cliff |
| OpenStackClient | scr | review.openstack.org_openstack/python-openstackclient |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-designate |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-ironic |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-nova |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-tuskar |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-ceilometer |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-heat |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-monasca |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-swift |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-glance |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-keystone |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-openstacklib |

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| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-cinder |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-horizon |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-neutron |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-trove |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-gnocchi |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-manila |
| PuppetOpenStack | its | https://bugs.launchpad.net/puppet-sahara |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-tempest |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-zaqar |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-cinder |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-horizon |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-nova |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-sahara |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-tuskar |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-gnocchi |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-manila |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-openstack-specs |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-tripleo |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-designate |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-ironic |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-openstacklib |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-swift |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-vswitch |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-ceilometer |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-heat |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-neutron |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-openstack-extras |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-trove |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-glance |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-keystone |
| PuppetOpenStack | scm | git://git.openstack.org/openstack/puppet-openstack-cookiecutter |
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| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-openstack-specs |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-tripleo |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-designate |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-ironic |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-openstacklib |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-swift |

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| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-vswitch |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-ceilometer |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-heat |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-neutron |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-openstack_extras |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-trove |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-glance |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-keystone |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-openstack-cookiecutter |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-tempest |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-zaqar |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-cinder |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-horizon |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-nova |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-sahara |
| PuppetOpenStack | scr | review.openstack.org_openstack/puppet-tuskar |
| Quality Assurance | its | https://bugs.launchpad.net/tempest |
| Quality Assurance | its | https://bugs.launchpad.net/devstack |
| Quality Assurance | scm | git://git.openstack.org/openstack/os-testr |
| 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/os-testr |
| 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 |
| Rally | its | https://bugs.launchpad.net/rally |
| Rally | scm | git://git.openstack.org/openstack/rally |
| Rally | scr | review.openstack.org_openstack/rally |
| Release cycle management | scm | git://git.openstack.org/openstack-infra/release-tools |
| Release cycle management | scm | git://git.openstack.org/openstack/requirements |
| Release cycle management | scr | review.openstack.org_openstack/requirements |
| sahara | its | https://bugs.launchpad.net/python-saharaclient |
| sahara | its | https://bugs.launchpad.net/sahara |

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| sahara | scm | git://git.openstack.org/openstack/sahara-image-elements |
| sahara | scm | git://git.openstack.org/openstack/sahara |
| sahara | scm | git://git.openstack.org/openstack/sahara-dashboard |
| sahara | scm | git://git.openstack.org/openstack/python-saharaclient |
| sahara | scm | git://git.openstack.org/openstack/sahara-extra |
| sahara | scr | review.openstack.org_openstack/python-saharaclient |
| sahara | scr | review.openstack.org_openstack/sahara-extra |
| sahara | scr | review.openstack.org_openstack/sahara-image-elements |
| sahara | scr | review.openstack.org_openstack/sahara-dashboard |
| sahara | scr | review.openstack.org_openstack/sahara |
| Searchlight | scm | git://git.openstack.org/openstack/searchlight |
| Searchlight | scr | review.openstack.org_openstack/searchlight |
| Security | scm | git://git.openstack.org/stackforge/bandit |
| Security | scm | git://git.openstack.org/openstack/ossa |
| Security | scm | git://git.openstack.org/stackforge/anchor |
| Security | scr | review.openstack.org_openstack/ossa |
| Security | scr | review.openstack.org_stackforge/bandit |
| Security | scr | review.openstack.org_stackforge/anchor |
| Solum | scm | git://git.openstack.org/openstack/python-solumclient |
| Solum | scm | git://git.openstack.org/openstack/solum |
| Solum | scr | review.openstack.org_openstack/solum |
| Solum | scr | review.openstack.org_openstack/python-solumclient |
| swift | its | https://bugs.launchpad.net/python-swiftclient |
| swift | its | https://bugs.launchpad.net/swift |
| swift | its | https://bugs.launchpad.net/swift-bench |
| swift | scm | git://git.openstack.org/openstack/swift-bench |
| swift | scm | https://github.com/openstack/python-swiftclient.git |
| swift | scm | https://github.com/openstack/swift.git |
| swift | scr | review.openstack.org_openstack/python-swiftclient |
| swift | scr | review.openstack.org_openstack/swift |
| trove | its | https://bugs.launchpad.net/trove |
| trove | scm | git://git.openstack.org/openstack/trove-integration |
| trove | scm | https://github.com/openstack/python-troveclient.git |
| trove | scm | https://github.com/openstack/trove.git |
| trove | scr | review.openstack.org_openstack/python-troveclient |
| trove | scr | review.openstack.org_openstack/trove |
| trove | scr | review.openstack.org_openstack/trove-integration |
| zaqar | its | https://bugs.launchpad.net/zaqar |
| zaqar | its | https://bugs.launchpad.net/python-zaqarclient |
| zaqar | scm | git://git.openstack.org/openstack/zaqar |

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| zaqar | scm | git://git.openstack.org/openstack/python-zaqarclient |
| zaqar | scr | review.openstack.org_openstack/zaqar |
| zaqar | scr | review.openstack.org_openstack/python-zaqarclient |