
The Xen Code Review Process

The 56th CREST Open Workshop

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/me

GrimoireLab (CHAOSS Community)

InnerSource Commons

PhD in Free Software Engineering
(Mozilla Foundation projects)

Founder of Bitergia, CDO



Software Development Analytics

for your peace of mind



/grimoirelab



Source Code Management

Git, Baazar(*), Mercurial(*) (*exporting to git)



Issues / Tasks Management

Bugzilla, GitHub Issues, JIRA, Maniphest, Redmine



Source Code Review

Gerrit, GitHub Pull Requests



Mailing lists / Forums

Askbot, Discourse, Gmane, Hyperkitty, mbox files, NNTP, Piplermail, Stack Exchange



Continuous Integration

Jenkins



Synchronous Conferencing

IRC (Supybot), Slack, Telegram



Wikis

Confluence, MediaWiki



Meetings Management

Meetup



Others

RSS

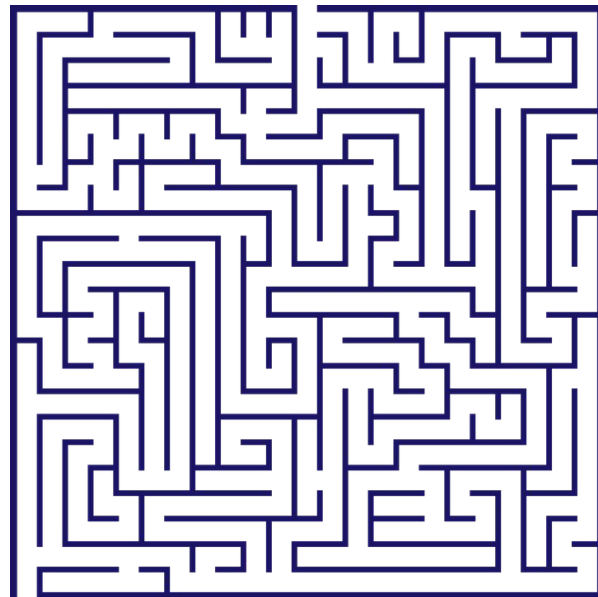
Motivation

/motivation

Growth of dev. activity and delays

Complaints from contributors and maintainers

Surveys to understand the root causes



/motivation

Code contributions are more complex

Lack of reviewers

Lower quality code from new contributors

More discussions in the lists

Misunderstanding due to diverse languages

No clear conclusions leading to division

Some ways to fix this:

- Training for newcomers [2014]
- Architecture/design reviews [2014]
- Governance [2014, 2016]
- Seek for help => Bitergia [2015]

Code Review in the Xen Community

/patch cycle

- [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *David Vrabel*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Ian Campbell*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *David Vrabel*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Ian Jackson*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Wei Liu*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Andrew Cooper*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Andrew Cooper*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Andrew Cooper*
 - Re: [Xen-devel] [PATCH] libxc: try to find last used pfn when migrating, *Juergen Gross*



/patchset cycle

- [Xen-devel] [PATCH v9 0/9] Introduce HVM without dm and new boot ABI, *Roger Pau Monne*
 - [Xen-devel] [PATCH v9 1/9] xen/x86: set the vPMU interface based on the presence of a lapic, *Roger Pau Monne*
 - Re: [Xen-devel] [PATCH v9 1/9] xen/x86: set the vPMU interface based on the presence of a lapic, *Boris Ostrovsky*
 - [Xen-devel] [PATCH v9 2/9] xen/x86: make sure the HVM callback vector is correctly set, *Roger Pau Monne*
 - [Xen-devel] [PATCH v9 3/9] xen/x86: allow disabling all emulated devices inside of Xen, *Roger Pau Monne*
 - [Xen-devel] [PATCH v9 4/9] libxc: allow creating domains without emulated devices., *Roger Pau Monne*
 - [Xen-devel] [PATCH v9 5/9] xen/x86: allow HVM guests to use hypercalls to bring up vCPUs, *Roger Pau Monne*
 - Re: [Xen-devel] [PATCH v9 5/9] xen/x86: allow HVM guests to use hypercalls to bring up vCPUs, *Julien Grall*
 - [Xen-devel] [PATCH v9 6/9] libxc/xen: introduce a start info structure for HVMlite guests, *Roger Pau Monne*
 - Re: [Xen-devel] [PATCH v9 6/9] libxc/xen: introduce a start info structure for HVMlite guests, *Jan Beulich*
 - [Xen-devel] [PATCH v9 7/9] libxc: switch xc_dom_elfloader to be used with HVMlite domains, *Roger Pau Monne*
 - [Xen-devel] [PATCH v9 8/9] libxl: allow the creation of HVM domains without a device model., *Roger Pau Monne*
 - [Xen-devel] [PATCH v9 9/9] libxl: add support for migrating HVM guests without a device model, *Roger Pau Monne*
 - Re: [Xen-devel] [PATCH v9 9/9] libxl: add support for migrating HVM guests without a device model, *Andrew Cooper*
 - Re: [Xen-devel] [PATCH v9 9/9] libxl: add support for migrating HVM guests without a device model, *Roger Pau Monne*
 - Re: [Xen-devel] [PATCH v9 9/9] libxl: add support for migrating HVM guests without a device model, *Wei Liu*

/challenges

Patch Series = Thread (but not always)

Versions [PATCH vX Y/Z] (not regular)

Patch number (Y of Z) [PATCH vX Y/Z] (not regular)

Matching threads and commits (commits timestamps)

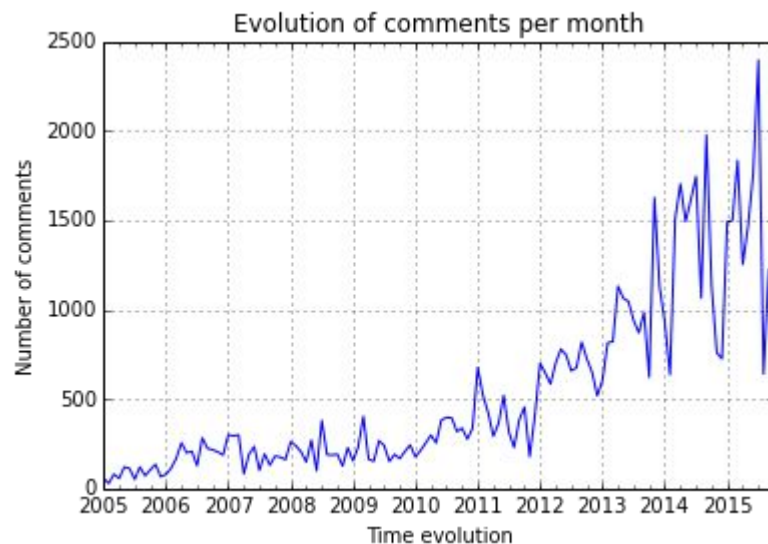
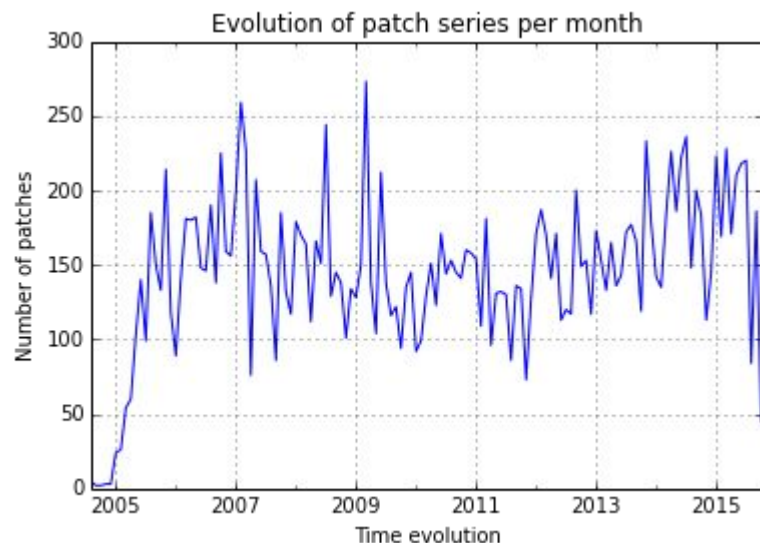


/challenges

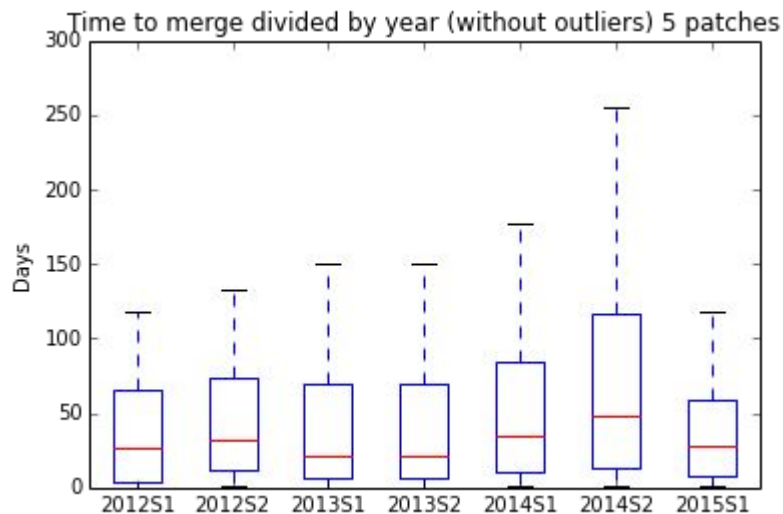
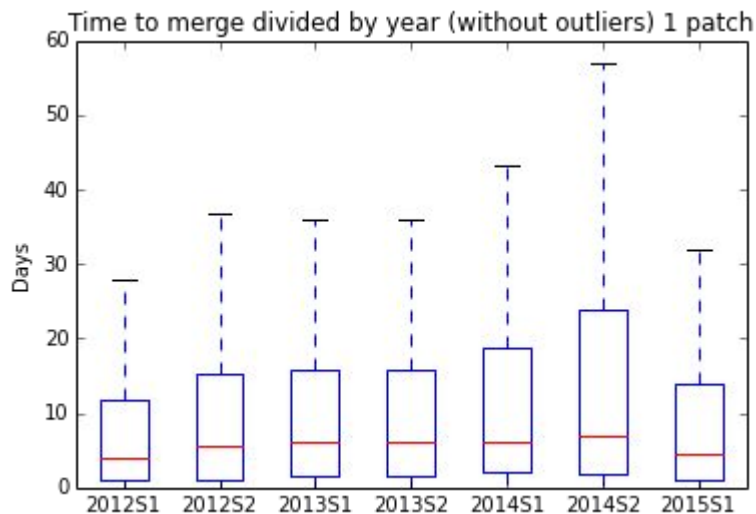
'Acked-by' : '^Acked-by:(?P<value>.+)\$',
'Cc' : '^Cc:(?P<value>.+)',
'Fixes' : '^Fixes:(?P<value>.+)\$',
'From' : '^[Ff]rom:(?P<value>.+)\$',
'Reported-by' : '^Reported-by:(?P<value>.+)\$',
'Tested-by' : '^Tested-by:(?P<value>.+)\$',
'Reviewed-by' : '^Reviewed-by:(?P<value>.+)\$',
'Release-Acked-by' : '^Release-Acked-by:(?P<value>.+)\$',
'Signed-off-by' : '^Signed-off-by:(?P<value>.+)\$',
'Suggested-by' : '^Suggested-by:(?P<value>.+)\$',

Initial Findings

/initial findings



/initial findings



Large patches = Longer to review (exponential)

More Steps

/more steps

Definition of Use cases

- Community [Encourage desired behavior]
- Performance [Spot issues early]
- Backlog [Optimize process and focus]

/more steps: community

Community use case

- Identify top reviewers
- Identify imbalances
- Identify post-ack comments

/more steps: performance

Performance use case

- Identify delays due to large number of reviews
- Identify delays due to large Patch Series

/more steps: backlog

Backlog use case

- Merged and not-merged
- Identify nearly completed Patch Series
- Identify Hot/Warm/Tepid... Patch Series

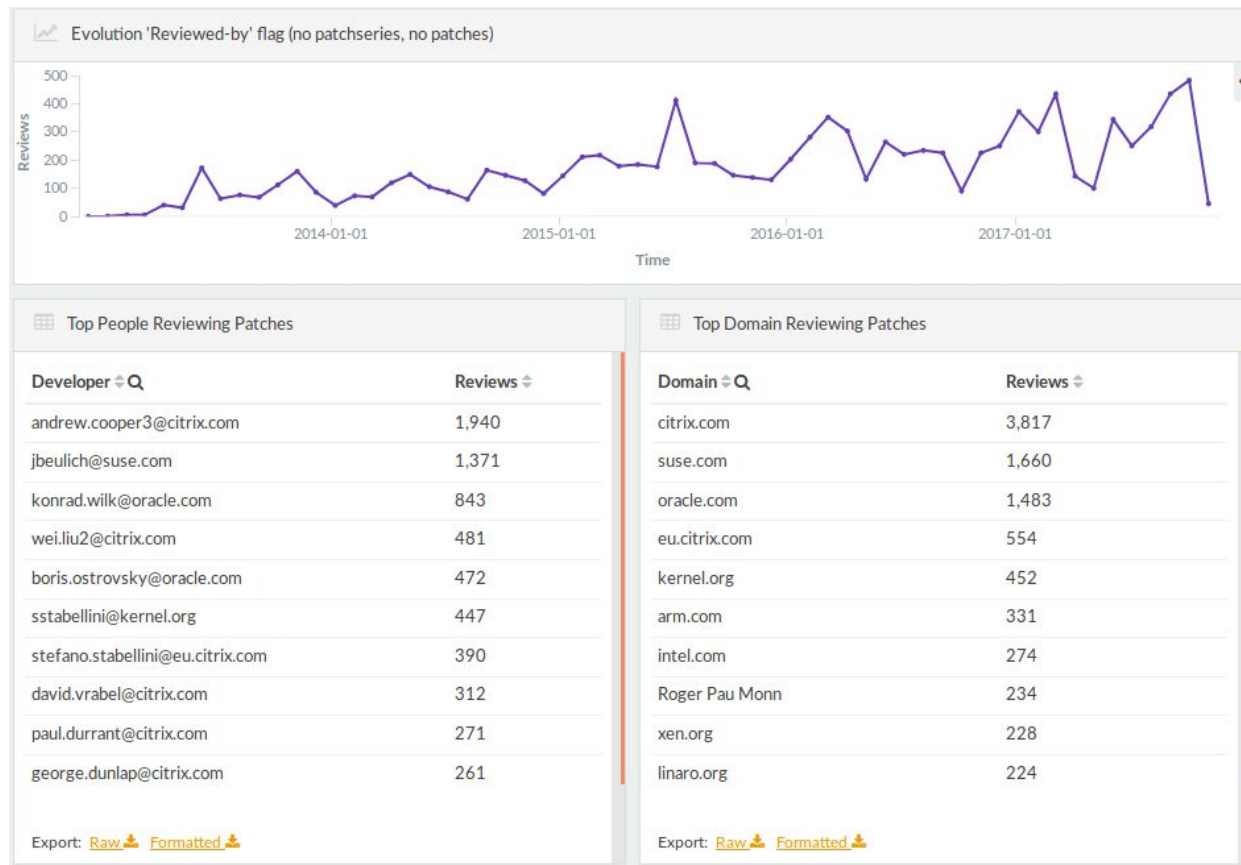
Outcomes

[xen.biterg.io]

/outcomes

Top Reviewers

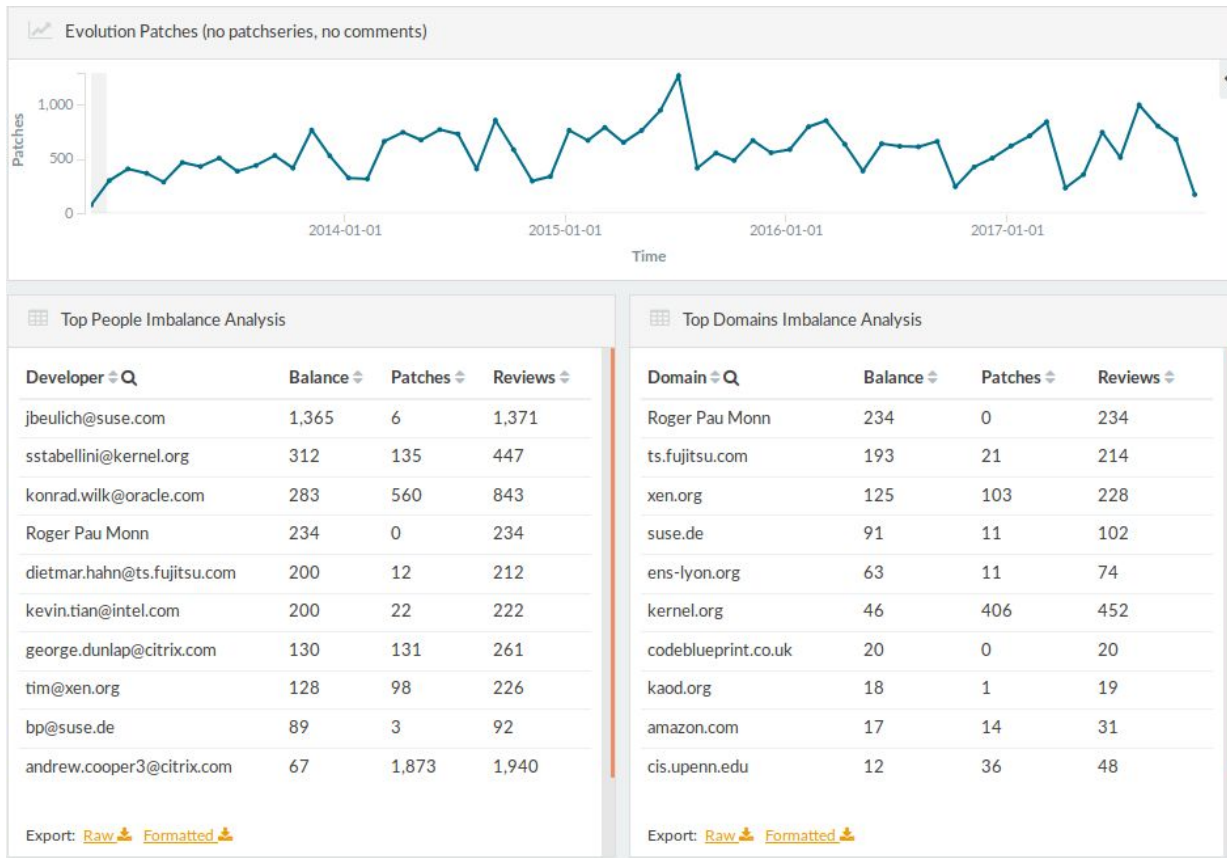
[xen.biterg.io]



/outcomes

Imbalances

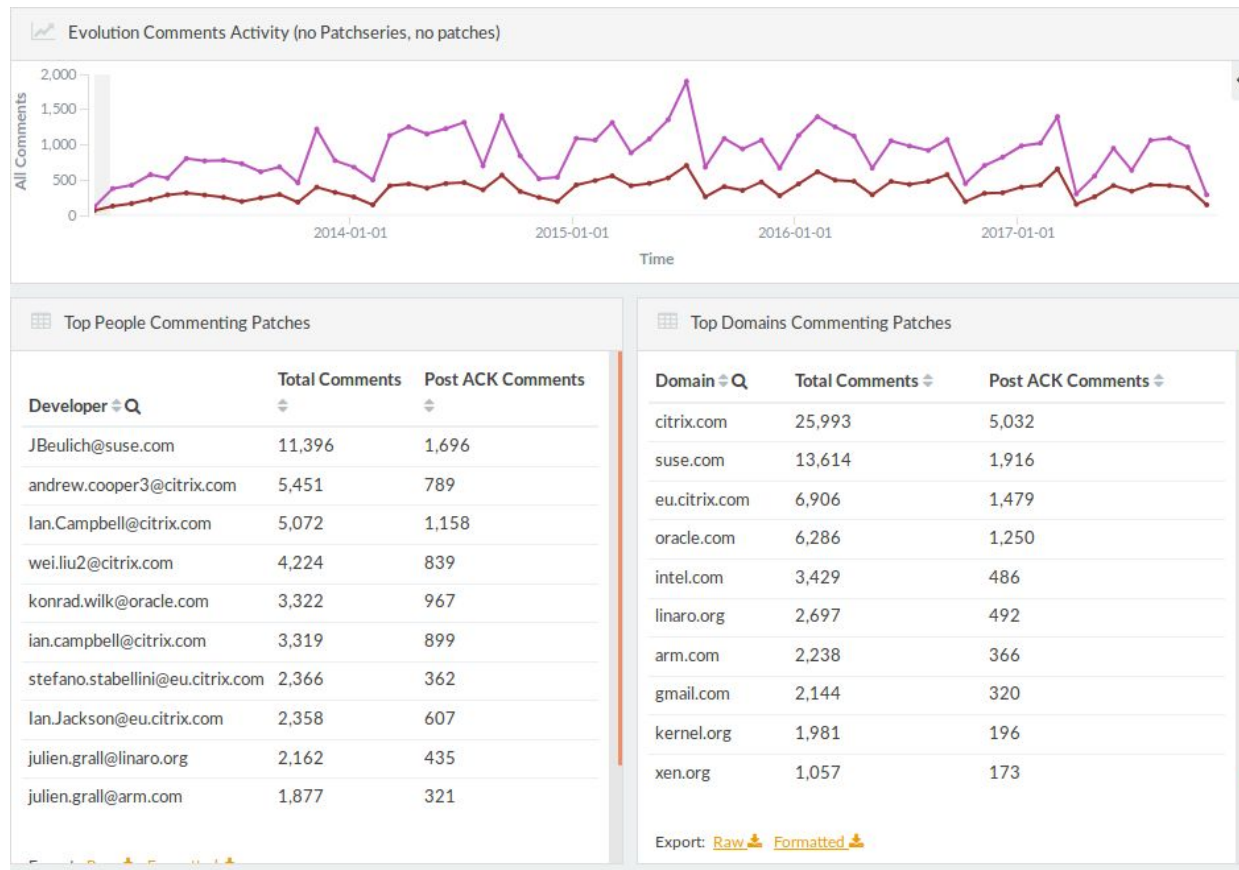
[xen.biterg.io]



/outcomes

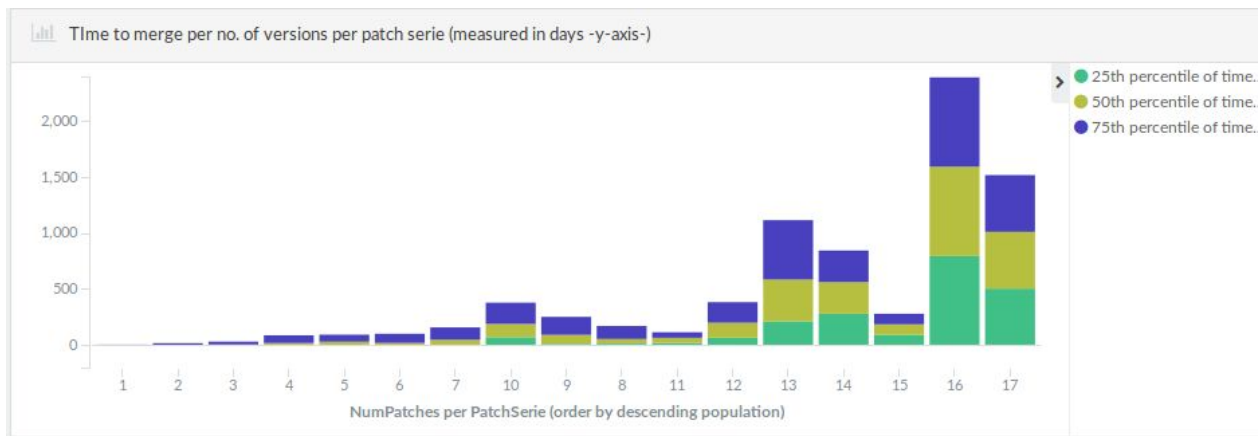
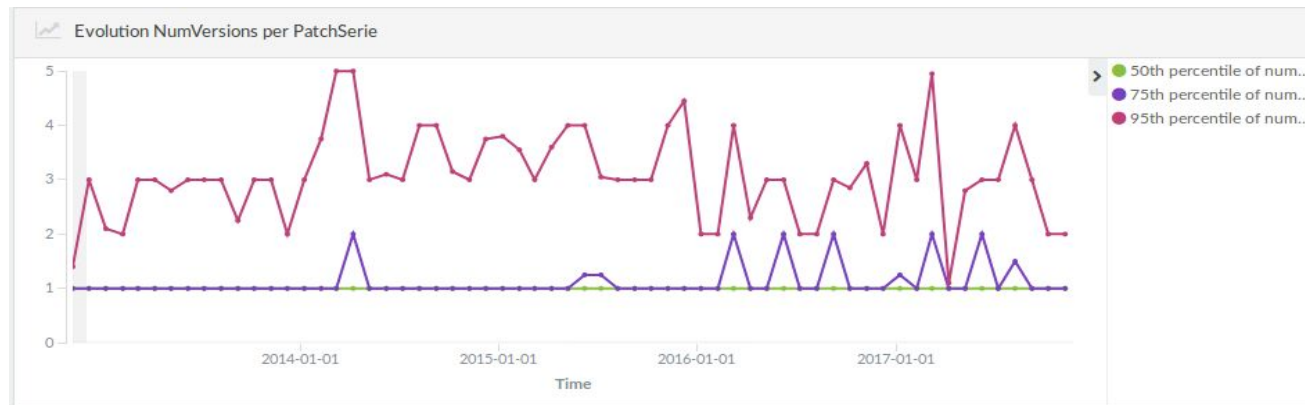
Post ACK Comments

[xen.biterg.io]



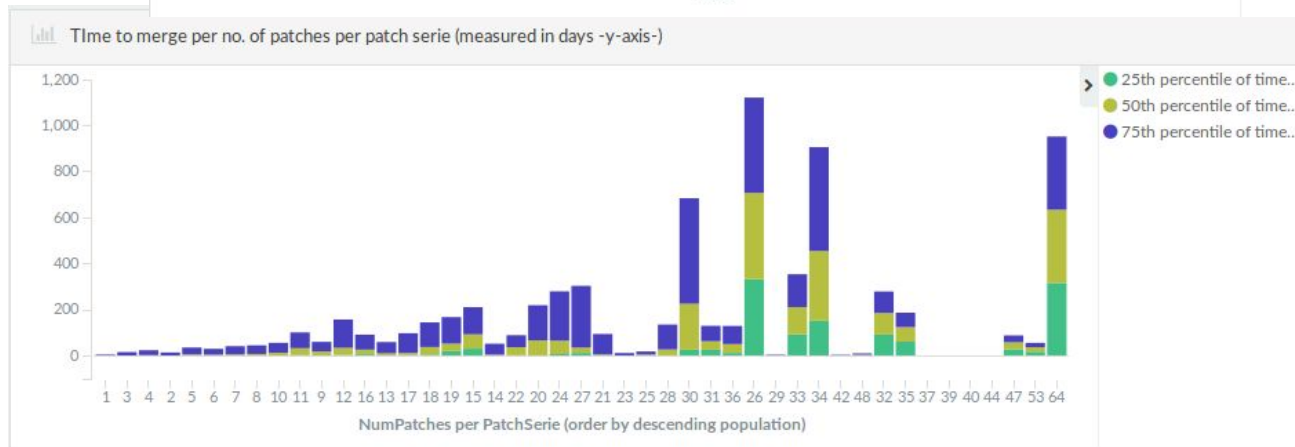
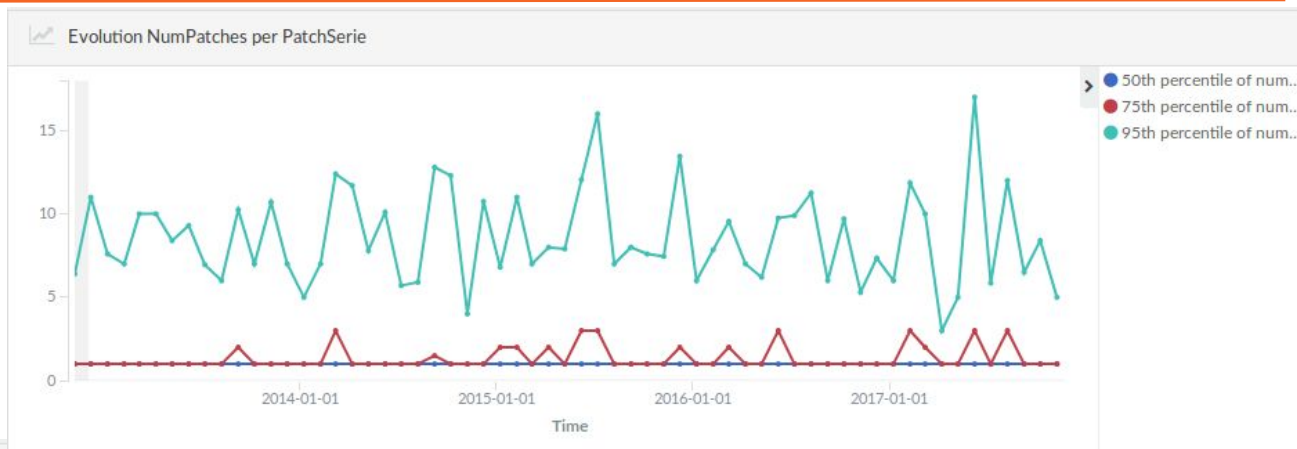
/outcomes

Discussions & Delays



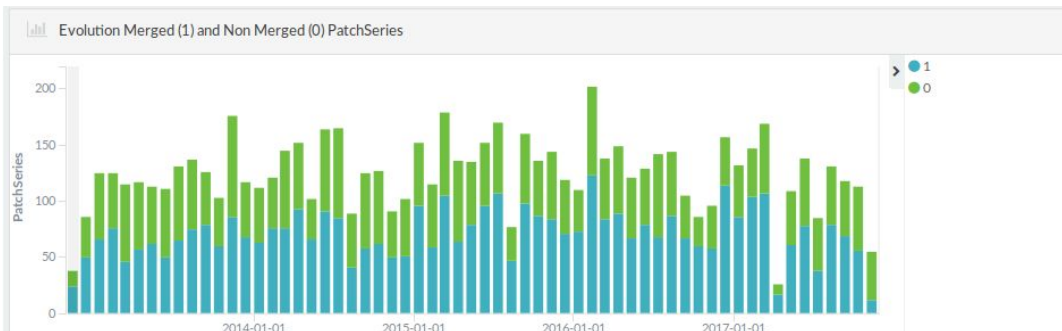
/outcomes

Complexity & Delays



/outcomes

Backlog & Nearly completed



Backlog of Patch Series Merged

Time ± Q	PatchSerie ID ± Q	Subject ± Q	Sender ± Q	Message ID ± Q	% Acked Patches ± Q	No. Acked Patches ± Q	No. Patches ± Q	Count ±
November 12th 2015, 11:06:58.000	9,109	Config.mk: update OVMF changeset	wei.liu2@citrix.com	+ Info	0	0	0	1
November 12th 2015, 11:06:58.000	9,110	Config.mk: update OVMF changeset	wei.liu2@citrix.com	+ Info	100	1	1	1
November 26th 2012, 16:23:43.000	4,528	x86/time: fix scale_delta() inline assembly	JBeulich@suse.com	+ Info	100	1	1	1
November 27th 2012, 00:53:15.000	4,530	libxl: fix a variable underflow in libxl_wait_for_free_memory	ronny.hegewald@online.de	+ Info	100	1	1	1
November 27th 2012, 11:03:39.000	4,533	docs: fix persistent grants doc typo	roger.pau@citrix.com	+ Info	0	0	0	1
November 27th 2012, 11:13:21.000	4,531	xl: xl.conf(5): correct advice re autoballooning vs. dom0_mem	ian.campbell@citrix.com	+ Info	100	1	1	1
November 27th 2012, 12:37:31.000	4,534	vsctiff: allow larger segments-per-request values	JBeulich@suse.com	+ Info	0	0	0	1
November 27th 2012, 16:17:03.000	4,535	libxl: use qemu-xen (upstream QEMU) as device model by default	stefano.stabellini@eu.citrix.com	+ Info	0	0	0	1
November 27th 2012, 16:54:40.000	4,536	MAINTAINERS: Reference stable maintenance policy	ian.campbell@citrix.com	+ Info	100	1	1	1
November 27th 2012, 19:36:41.000	4,537	xen/arm: do not map vGIC twice for dom0	stefano.stabellini@eu.citrix.com	+ Info	0	0	0	1

Export: [Raw](#) [Formatted](#)



Lessons Learned

/lessons learned

Community involvement

Perception is not a good
friend

Good starting point for
others

/references

MSR: Daniel Izquierdo-Cortazar, Lars Kurth, Jesús M. González-Barahona, Santiago Dueñas, Nelson Sekitoleko. Characterization of the Xen project code review process: an experience report. MSR 2016: 386-390

OSCON talk:

[https://conferences.oreilly.com/oscon/oscon-tx-2016/public/schedule/detail/4903](https://conferences.oreilly.com/oscon/oscon-tx-2016/public/schedule/detail/49031)

1

GitHub project: <https://github.com/dicortazar/xen-code-review-analysis>

Live dashboard: <https://xen.biterg.io>



Extra Bonus

/bonus

GrimoireLab: Tools for software development analytics



<https://grimoirelab.github.io>



CHA^{SS}

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