Gerrit @ LibreOffice

David Ostrovsky
Outline

- Motivation to introduce Gerrit
- Decentralized CI Infrastructure
- Add Gerrit to CI Infrastructure
- Gerrit plugin API
- Gerrit Buildbot plugin
Introduction of Gerrit for LibreOffice: Motivation
Patches Lost in Space: the old workflow

- A patch is intended to:
  - Be mailed to the dev-@mailinglist
  - Being picked up by a developer with commit rights and be
    - Checked for a valid license
  - Reviewed for Goodness
  - Applied, Build, Tested and Pushed
  - Reported back to the mailing list that this is in now

- Reality: fdo#40946
Does it hurt?

- Duplication of work
- Frustration
- Scaring away newcomers
- Makes some kinds of work very hard or painful for everyone
How does Gerrit help?

- Automatic Patch Uploads
- Integration in a wide range of communication channels
- Human Review
- Bot Verification

Thus:
- Find errors early and before they cause too much pain
Gerrit@LibreOffice

- Gerrit version: 2.8.3
- one core project
- many other projects (cpp unit, ...)
- 80 committers
- review workflow is optional on master
- review workflow is mandatory for release branches
LibreOffice CI Infrastructure
Decentralized CI Infrastructure

- Independent tinderboxes that periodically check master and release branches
- Multiple checks for the same commits on the same platforms possible
- Build and configuration logic is located locally in tinbuild2 script
- Report results to tinderbox master per fire and forget
- Buildbot server presents results in a web page
- In failure case spam all committers from all changes since last successful build
Decentralized CI Infrastructure
# Decentralized CI Infrastructure

## Tinderbox Status Page tree: MASTERCreated at: Tue Oct 16 21:50

**Add to Notice Board**

**Regenerate HTML Pages**

**Administratethis tree (MASTER)**

**Tinderbox index**

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Tinderboxes ...

- Tinderboxes have different speeds.
- Tinderboxes know nothing of each other.
- Tinderboxes cannot communicate or coordinate.
- The slowest and rarest tinderboxes (Windows) are the most valuable.
LibreOffice CI Infrastructure with Gerrit
Queue manager is needed to distribute build jobs between tinderboxes
One patch set must be checked only once for each platform
Tinbuild2 must be taught to talk to queue manager
Results from all tinderboxes are gathered and combined result is reported back to gerrit
A patch set is approved only when all check jobs were successful
Decentralized CI Infrastructure with gerrit 2/3

- Tinderbox_1
- Tinderbox_2
- Tinderbox_...
- Tinderbox_n

Queue manager → gerrit
Decentralized CI Infrastructure with gerrit 3/3

- Reusing existing infrastructure
- Buildbot taught to talk to queue manager
- Different strategies for gerrit patch verification vs. master check
  - Prefer gerrit verification
  - Prefer master check
Queue manager's feature set

- Consumption gerrit-stream events
- Communication API/protocol for tinderboxes
- Job scheduler
- Build log publication and visualization
- Queue pipeline visualization
- Documentation
- Nice to have: Gerrit UI integration/extension
  - dedicated channel for patch set verifications
  - during review process specific configuration can be selected to be checked, i.e. with-java
Gerrit Plugin Architecture
Gerrit Plugin Architecture

- Extension points for gerrit plugin:
  - SSH commands under plugin's own namespace
    ```
    ssh gerrit plugin-name some-really-cool-command --foo bar baz
    ```
  - Servlets under plugin's own namespace
    ```
    https://review.gerrit.net/plugins/plugin-name/page.html
    ```
  - UiAction (since 2.8)
    ```
    Cherry Pick  Rebase  Abandon  Schedule...
    ```
  - JS API / Html fragments (since 2.9)
Gerrit Buildbot Plugin
Build Trigger strategies

- Patch set created event
- Positive review from member of specific group
- Manually
  - The one actually used in LO set up
Buildbot plugin in a nutshell

- **Schedule a build per SSH command or UI:**
  ```
  ssh gerrit buildbot schedule --project core <sha1>
  ```

- **Poll the queue per SSH command:**
  ```
  ssh gerrit buildbot get --project core --platform linux
  ```

- **Report result and publish log per SSH command:**
  ```
  cat result.log.gz | ssh gerrit buildbot put --ticket 4711 --failed
  ```

- **Show queue content per SSH command or UI:**
  ```
  ssh gerrit buildbot show --project core
  ```
Gerrit Buildbot Plugin

The diagram illustrates the integration of Gerrit with Buildbot and Jenkins.

1. **Upload gerrit patch**
   - Patch Author
   - : Reviewer

2. **Review +n gerrit patch**

3. **Patch set created event is consumed**

4. **Comment Added Event is consumed**

5. **Log result is set and build number is returned**

6. **Log result is published to Jenkins**

7. **new ssh command set-external-build-result**

8. **Once all tasks are built, combined verify status is reported back to gerrit with build log url pointed to gerrit**

The diagram shows the flow of events from the gerrit patch upload to the final build log report in Jenkins.
Documentation: per SSH

```
ssh logerrit buildbot put --help
buildbot put [---] [--failed (-f)] [--help (-h)] [--log (-l) -|LOG] [--succeed (-s)] --ticket (-t) TICKET

- -- : end of options
- --failed (-f) : specify this option if job failed
- --help (-h) : display this help text
- --log (-l) -|LOG : url of the job log page or - for standard input
- --succeed (-s) : specify this option if job was successful
- --ticket (-t) TICKET : ticket of the job
```
Documentation per web UI

Documentation: web page

get-task - Get a task from platform specific queue

NAME

get-task - Get a task from platform specific queue.

SYNOPSIS

```
ssh -p <port> <host> buildbot get-task
    [-f <NAME> | -p <NAME>]
    [--platform <NAME> | -e <NAME>]
```

DESCRIPTION

To get a task for building buildbot connect to buildbot plugin and poll a task from a platform specific. Once the task is spoiled, it is removed from the buildbot. If result is not reported and timeout defined in buildbot.config is expired the task status is timed out.

Once the task is executed, buildbot returns the status and log with report command.

Note: Platform can be one from {windows | linux | mac}.

ACCESS

Caller must be a member of the privileged ‘Administrators’ group, or have been granted the ‘View Queue’ global capability.

SEE ALSO

- report

Buildbot

Part of Gerrit Buildbot Plugin
Using reviewer channel for patch set verification
firehose

- Results are presented in gerrit's comment table
- Nice to have: Show CI verification status table on gerrit's change screen: don't mix human reviews and bot verifications

Search for status:open

<table>
<thead>
<tr>
<th>ID</th>
<th>Subject</th>
<th>Owner</th>
<th>Project</th>
<th>Branch</th>
<th>Updated</th>
<th>CR</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>f0124a79c</td>
<td>Documentation fdo#51793 another one</td>
<td>David Ostrovsky</td>
<td>foo</td>
<td>master</td>
<td>Aug 16</td>
<td>+1</td>
<td>+1</td>
</tr>
</tbody>
</table>

David Ostrovsky
- Uploaded patch set 6.
- Patch Set 6: Build 423fb1f4 on LINUX started at 21:01:41.386
- Patch Set 6: Build 423fb1f4 on WINDOWS started at 21:02:42.531
- Patch Set 6: Build 423fb1f4 on MAC started at 21:02:46.442
- Patch Set 6: Build 423fb1f4 on WINDOWS complete at 21:08:23.616, status ...
- Patch Set 6: Build 423fb1f4 on LINUX complete at 21:08:38.749, status ...
- Patch Set 6: Build 423fb1f4 on MAC complete at 21:08:51.499, status true ...

David Ostrovsky
- Patch Set 6: Looks good to me, approved

Build 423fb1f4 on WINDOWS complete, status true log: [https://review.idaia.de/plugins/buildbot-1.0/log?file=423fb1f4_WINDOWS.log](https://review.idaia.de/plugins/buildbot-1.0/log?file=423fb1f4_WINDOWS.log)

Build 423fb1f4 on LINUX complete, status true log: [https://review.idaia.de/plugins/buildbot-1.0/log?file=423fb1f4_LINUX.log](https://review.idaia.de/plugins/buildbot-1.0/log?file=423fb1f4_LINUX.log)

Build 423fb1f4 on MAC complete, status true log: [https://review.idaia.de/plugins/buildbot-1.0/log?file=423fb1f4_MAC.log](https://review.idaia.de/plugins/buildbot-1.0/log?file=423fb1f4_MAC.log)
Dedicated communications channel for patch set verifications

- Talk later today to implement this as a core feature or as a plugin
Log file publication modes

- Buildbot publish mode: local directory / servlet
  - Doesn't play nice with multi-master
- Jenkins publish mode: delegate publishing to Jenkins instance
  - external–monitor–job
Buildbot publish mode:

- Local directory and servlet

Started by user David Ostrovsky
Building remotely on Numpy in workspace /home/david/numpy/workspace/LO-Mingw64
Fetching changes from 1 remote Git repository
Fetching upstream changes from git://anongit.freedesktop.org/libreoffice/core
Commencing build of Revision 978ad4e6478f4db2a9f3fffcdadaa4462e0c (origin/feature/gbuild_ure)
Checking out Revision 978ad4e6478f4db2a9f3fffcdadaa4462e0c (origin/feature/gbuild_ure)
[LO-Mingw64] $ /bin/sh -xe /tmp/hudson623123257865418180.sh
+ export LANG=C
+ LANG=C
+ ccache -M 10
Set cache size limit to 10.0 Gbytes
+ ccache -s
cache directory /home/david/.ccache
cache hit (direct) 73373
cache hit (preprocessed) 1787
cache miss 66332
called for link 10300
called for preprocessing 13525
compile failed 2842
preprocessor error 1239
couldn't find the compiler 1
bad compiler arguments 589
unsupported source language 66
autoconf compile/link 8850
unsupported compiler option 6112
no input file 14389
files in cache 40800
cache size 2.5 Gbytes
Submit a job per RPC

Submit a run programatically

The above command submits the execution and its result by sending XML to HTTP. This means you can submit an execution record from any program.

The format is explained below:

```xml
<run>
  <log encoding="hexBinary">...hex binary encoded console output...</log>
  <result>... integer indicating the error code. 0 is success and everything else is failure</result>
  <duration>... milliseconds it took to execute this run ...</duration>
  <displayName>... The name to be displayed rather than the build number ...</displayName>
  <description>... Description of the build ...</description>
</run>
```

New SSH command contributed to Jenkins

Submit a run per CLI

The easiest option is for the execution can be submitted per CLI/ssh command. The gzipped log file can be transported through pipe:

```
$ cat result.log.gz | ssh jenkins set-external-build-result --display 7d552c4ba_Linux_tb21 --job buildbot --result 1
```

Sometimes build number is needed, as the calling program might need to put an URL to the submitted build. The CLI command above returns the new sample for it here.
Jenkins publish mode 2/2

Jenkins

Console Output

Started
jenkins_task_ticket: b26069ea2_MacOSX
jenkins_task_branch: master
jenkins_task_ref: refs/changes/70/8478/5

Build: OK

Reading autogen.lastrun. Please rename it to autogen.input to avoid this message.

Running ./configure with '--with-external-tar=/lo/lo_external_tar' '--with-package-format-dmg'

**************************************************************
* *
* Running LibreOffice build configuration. *
* **************************************************************

checking build system type... x86_64-apple-darwin12.5.0
checking host system type... x86_64-apple-darwin12.5.0
checking for product name... LibreOfficeDev
checking for product version... 4.3
checking for grep that handles long lines and -e... /usr/bin/grep
checking for grep... /usr/bin/grep
checking for sed... /usr/bin/sed
checking whether build target is Release Build... no
checking whether to sign windows build... no
checking for awk... no
checking for mawk... no
checking for awk... no
checking for awk... awk
checking for awk... /usr/bin/awk
checking for bash... /bin/sh
checking for GNU or BSD tar... gnutar
checking for tar's option to strip components... --strip-components
checking how to build and package galleries... internal src images for desktop
checking for ccache... /opt/lo/bin/ccache
checking whether version of ccache is suitable... yes, 3.1.9
checking gcc home... /usr
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables... c
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether gcc accepts -g... yes
cHECKING FOR GCC OPTION TO ACCEPT ISO C89... none needed
checking for gcc... /usr/bin/gcc
### LibreOffice gerrit bot
**Patch Set 1:**
MacOSX build started for 896d7bdef on tb21 at Feb-28 09:42

### LibreOffice gerrit bot
**Patch Set 1:**
Windows build started for 896d7bdef on tb39 at Feb-28 09:46

### LibreOffice gerrit bot
**Patch Set 1:**
MacOSX SUCCESS (896d7bdef)
Build on tb21 at Feb-28 10:42: [https://ci.libreoffice.org/job/buildbot/0](https://ci.libreoffice.org/job/buildbot/0)

### LibreOffice gerrit bot
**Patch Set 1:**
Linux SUCCESS (896d7bdef)
Build on tb33 at Feb-28 11:00: [https://ci.libreoffice.org/job/buildbot/0](https://ci.libreoffice.org/job/buildbot/0)

### LibreOffice gerrit bot
**Patch Set 1:**
Windows SUCCESS (896d7bdef)
Build on tb39 at Feb-28 11:11: [https://ci.libreoffice.org/job/buildbot/0](https://ci.libreoffice.org/job/buildbot/0)

### LibreOffice gerrit bot
**Patch Set 1:** Verified+1
Build 896d7bdef:
- on Windows SUCCESS: [https://ci.libreoffice.org/job/buildbot/0](https://ci.libreoffice.org/job/buildbot/0)
- on Linux SUCCESS: [https://ci.libreoffice.org/job/buildbot/0](https://ci.libreoffice.org/job/buildbot/0)
- on MacOSX SUCCESS: [https://ci.libreoffice.org/job/buildbot/0](https://ci.libreoffice.org/job/buildbot/0)
Future development

- Persistence
- Presents results in own table on CS2
- Allow platforms to be configurable
- Idle timeout
- Engaged time out
Questions ?