Lustre Autotest and Maloo

Andreas Dilger <adilger@Whamcloud.com>
Whamcloud Development Infrastructure

► JIRA Issue Tracking
► Git
► Gerrit Change Review
► Jenkins Build Server
► Maloo Test Results Repo
► Q & A
Multiple Separate Lustre Development Systems

► JIRA for issue tracking (bugs, features, improvements) for code and docs
  • Gerrit posts patch submission and landing automatically to JIRA ticket in commit message

► Gerrit tracks patches and reviews for all Lustre projects
  • Whamcloud developers have an internal OpenID provider
  • Community developers use Google OAuth2 or other OpenID provider
  • Use Settings->Link Another Identity to add new identity to account

► Jenkins for automated build
  • servers: e17.9, e18.7, e19.1 x86_64
  • clients: e17.9, e18.7, e19.1, sles15sp4, ubuntu2004; x86_64, aarch64, ppc1e64

► Multiple Autotest test sessions launched for successful patch build
  • All enforced sessions must pass
  • Optional sessions do not need to pass, but should still be reviewed

► Maloo tracks test results from Autotest
  • Posts into Gerrit when sessions are started
  • Posts into Gerrit when session is complete
  • Marks patch Verified: -1 if any enforced session fails
Autotest Test Sessions

The following sessions will be run for build 94313 patch 9

**Enforced:**
- review-udisks on el8.7-x86_64/udisks servers and clients
- review-zfs on el8.7-x86_64/zfs servers and clients
- review-dne-part-1 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-2 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-3 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-4 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-5 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-6 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-7 on el8.7-x86_64/2diskfs servers and clients
- review-dne-zfs-part-1 on el8.7-x86_64/zfs servers and clients
- review-dne-zfs-part-2 on el8.7-x86_64/zfs servers and clients
- review-dne-zfs-part-3 on el8.7-x86_64/zfs servers and clients
- review-dne-zfs-part-4 on el8.7-x86_64/zfs servers and clients
- review-dne-zfs-part-5 on el8.7-x86_64/zfs servers and clients
- review-dne-zfs-part-6 on el8.7-x86_64/zfs servers and clients
- review-dne-zfs-part-7 on el8.7-x86_64/zfs servers and clients
- review-udisks-arch on el8.7-x86_64/2diskfs servers and clients
- review-dne-seulinux-sys-part-1 on el8.7-x86_64/zdiskfs servers and clients
- review-dne-seulinux-sys-part-2 on el8.7-x86_64/zdiskfs servers and clients
- review-udisks-ubuntu on el8.7-x86_64/2diskfs servers and ubuntu2004-x86_64/2diskfs clients

**Optional:**
- review-dne-part-8 on el8.7-x86_64/2diskfs servers and clients
- review-dne-part-9 on el8.7-x86_64/2diskfs servers and clients
- review-udisks on el8.7-x86_64/2diskfs servers and scls15ep3-x86_64/2diskfs clients
- review-udisks-ubuntu on el8.7-x86_64/2diskfs servers and ubuntu2204-x86_64/2diskfs clients

**20 or more test sessions per patch!**
- Multiple sessions *enforced* for master patches
- Multiple sessions *optional* for arches, distros

**Enforced test sessions must pass**
- Custom Test-Parameters: runs are *enforced*

**Optional sessions are *optional***
- Run to improve coverage before all tests pass
- Working toward passing and enforcement
- Do not resubmit optional sessions

**Janitor only -1 for failures in modified tests**

**Please use test resources wisely**
- 170 tests, 13500 subtests, 150h+ *per patch*

Maloo Test Queue: https://testing.whamcloud.com/test_queue?jobs=lustre-reviews&builds=94313&commit=Apply+Filter
Maloo Results: https://testing.whamcloud.com/test_sessions/related?jobs=lustre-reviews&builds=94313#redirect
Control Autotest Sessions with Test-Parameters

Test-Parameters: testlist=sanityn env=ONLY=16,HONOR_EXCEPT=y
Test-Parameters: serverversion=2.14 testlist=sanityn env=ONLY=16,HONOR_EXCEPT=
Fixes: 7905359296 ("LU-15748 osc: falloate interop for 2.14 clients")
Signed-off-by: Andreas Dilger <adilger@whamcloud.com>
Change-Id: I327183025a8de6fd814a7c2929365497153ebbe5

► Use the Test-Parameters: tag in a commit message:
  • Test-Parameters: testlist=sanity,racer # run additional test scripts, one session per line
  • ... env=ONLY=32,ONLY_REPEAT=50 # set env vars (run specific subtest many times)
  • ... ostfstype=zfs # use specific backing fstype
  • ... clientversion=2.12.9 # old client new server interop
  • ... serverversion=2.14 # new client old server interop
  • ... mdscount=4 mdtcount=8 ostcount=8 # change server counts for DNE testing

► Use trivial keyword only for limited testing test scripts, man pages, build, etc.
  • ... trivial # runs only sanity, Inet-selftest, now also aarch64
  • ... testlist=recovery-small,replay-single # supplement with sessions, configs as needed

https://wiki.whamcloud.com/display/PUB/Changing+Test+Parameters+with+Gerrit+Commit+Messages
Adding Follow-Up Test Sessions Easily (New)

- [Follow-Up] creates a new empty patch
- Add Test-Parameters as needed
- Good to add test sessions to existing patches
- Useful when patch already finished testing
- Merge Test-Parameters into patch if refresh
- Patch marked "Work-In-Progress", cannot land

LU-15748 tests: extra testing

Test-Parameters: testlist=racer env=DURATION=900
Test-Parameters: testlist=racer env=DURATION=900
Test-Parameters: testlist=racer env=DURATION=900
Test-Parameters: testlist=racer env=DURATION=900
Test-Parameters: testlist=racer env=DURATION=900
Gerrit Patch Status

jenkins
Patch Set 14: Verified+1 Build Successful https://build.whamcloud.com/job/lustre-reviews/89569/ : SUCCESS

Maloo
Patch Set 14: The following sessions will be run for build 89569 patch 14 Enforced: - review-ldiskfs on el8.5-x86_64

Maloo
Patch Set 14: Passed enforced test custom-102 on CentOS 8.5/x86_64, CentOS 8.5/x86_64 uploaded by Onyx Autotest from onyx-13

Maloo
Patch Set 14: Passed enforced test custom-101 on CentOS 8.5/x86_64 uploaded by Trevis Autotest from trevis-60

Lustre G... Janitor
Patch Set 14: Initial testing succeeded. Succeeded: - runtests@ldiskfs+DNE runtests-ssk@ldiskfs+SharedKey run

Maloo
Patch Set 14: Passed enforced test review-dne-part-7 on CentOS 8.5/x86_64 uploaded by Trevis Autotest from trevis-60

Maloo
Patch Set 14: Passed enforced test review-dne-zfs-part-7 on CentOS 8.5/x86_64 uploaded by Onyx Autotest from onyx-13

Lustre G... Janitor
Patch Set 14: Testing has completed with errors! IMPORTANT: these tests appear to be new failures unique to this

Maloo
Patch Set 14: Passed enforced test review-ldiskfs on CentOS 8.5/x86_64, SLES 15.3/x86_64 uploaded by Trevis Autotest from trevis-60

Maloo
Patch Set 14: Passed enforced test review-dne-zfs-part-2 on CentOS 8.5/x86_64 uploaded by Trevis Autotest from trevis-60

► Custom tests are numbered in order starting at custom-101
► Lustre Gerrit Janitor is a separate test system that runs under loads that provoke race conditions
► Janitor test sessions may finish quickly and supply early feedback
► Janitor only adds Verified -1 for failures on tests added/modified in a patch, but failures should still be reviewed for correctness
► Optional test sessions are not required to pass for a test to land
Monitoring Test Results in Maloo

Patch Set 9:
The following sessions will be run for build 89713 patch 9

Enforced:
- review-idiskfs-dne on el8.5-x86_64/idiskfs servers and clients
- review-idiskfs-dne-arm on el8.5-x86_64/idiskfs servers and el8.5-aarch64/idiskfs clients
- custom on el8.5-x86_64/idiskfs servers and clients

Maloo Test Queue: https://testing.whamcloud.com/test_queue?jobs=lustre-reviews&builds=89713&commit=Apply+Filter
Maloo Test Results: https://testing.whamcloud.com/test_sessions?jobs=lustre-reviews&builds=89713&start_date=2022-09-25#redirect

- Permanently keeps results for all patches
- Logs are kept as long as possible (months), longer for test failures if space available

<table>
<thead>
<tr>
<th>Job</th>
<th>Build/Patch</th>
<th>Seq/Idx</th>
<th>Test Group</th>
<th>Distro</th>
<th>Review</th>
<th>Suite/Test</th>
<th>Started</th>
</tr>
</thead>
<tbody>
<tr>
<td>lustre-reviews</td>
<td>89713:9</td>
<td>1:28</td>
<td>review-idiskfs-dne</td>
<td>server: el8.5-x86_64/idiskfs, clients: el8.5-x86_64/idiskfs</td>
<td>73232604d</td>
<td>sanity test_31j</td>
<td>2022-09-25 21:24 (+1 hour)</td>
</tr>
<tr>
<td>lustre-reviews</td>
<td>89713:9</td>
<td>1:29</td>
<td>review-idiskfs-dne-arm</td>
<td>server: el8.5-x86_64/idiskfs, clients: el8.5-aarch64/idiskfs</td>
<td>73232604d</td>
<td>sanity test_24u</td>
<td>2022-09-25 21:24 (+1 hour)</td>
</tr>
<tr>
<td>lustre-reviews</td>
<td>89713:9</td>
<td>1:101</td>
<td>custom</td>
<td>server: el8.5-x86_64/idiskfs, clients: el8.5-x86_64/idiskfs</td>
<td>73232604d</td>
<td>conf-sanity test_20</td>
<td>2022-09-25 21:24 (+1 hour)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Host</th>
<th>Group</th>
<th>User</th>
<th>Branches</th>
<th>Change</th>
<th>Builds</th>
<th>Run at (UTC)</th>
<th>Created at (UTC)</th>
<th>Test Sets</th>
</tr>
</thead>
</table>
Reviewing Test Failures in Maloo

[^] Review test failures
[^] Associate known failures to existing bugs
[^] Raise new bug for new test failures
[^] Help track common failures/rates/trends
[^] Quick search for subtest failures by clicking on failed subtest name

**Error:** 'buffered io, not write rpc: grants mismatch: 12656640, expected 4218880'  
**Failure Rate:** 1.05% of most recent 95 runs, 5 skipped (all branches)

**OST 1, OST 2, OST 3, OST 4, OST 5, OST 6, OST 7, OST 8 (trevis-100vm9)**
- sanity.test_64f.debug.trevis-100vm9.log [Download | Show | Preview 50]
- sanity.test_64f.debug_log.trevis-100vm9.1664078772.log [Download | Show | Preview 50]

**MDS 1, MDS 3 (trevis-100vm10)**
- sanity.test_64f.debug.trevis-100vm10.log [Download | Show | Preview 50]
- sanity.test_64f.debug_log.trevis-100vm10.1664078772.log [Download | Show | Preview 50]
- sanity.test_64f.dmesg.trevis-100vm10.1664078772.log [Download | Show | Preview 50]
- sanity.test_64f.dmesg.trevis-100vm10.log [Download | Show | Preview 50]
- sanity.test_64f.journal.trevis-100vm10.log [Download | Show | Preview 50]
- sanity.test_64f.stack_trace.trevis-100vm10.log [Download | Show | Preview 50]

**Bugs**
No bugs

[Associate bug... ]  [Raise bug... ]  [Retest...]
Search Test Results in Maloo

- Start search from Results menu
  - Select Test or Subtest search

- May need to increase date range to find occasional failures for subtest

- Check for other similar failures with associated LU ticket to speed up failure analysis

- Some failures are caused by prior errors (e.g., 'mount failed')

- Repeated failures for same patch or ticket indicate patch regression
# Associate Failures with Multiple Patches

While reviewing your own patch, also associate the same LU ticket for other similar test failures:

- Helps other developers
- Improves failure analysis

## Table of Test Results

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Date</th>
<th>Duration</th>
<th>Code</th>
<th>Error</th>
<th>Bugs</th>
<th>Links</th>
<th>Test log</th>
</tr>
</thead>
<tbody>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-25</td>
<td>3604</td>
<td>1</td>
<td>buffered io, not write rpc: grants mis</td>
<td></td>
<td>[gerrit:47131, jira:LU-8151]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-20</td>
<td>3602</td>
<td>1</td>
<td>buffered io, not write rpc: grants mis</td>
<td></td>
<td>[gerrit:47121, jira:LU-15777]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-19</td>
<td>10</td>
<td>1</td>
<td>direct io with grant allocation: grant</td>
<td>LU-13847</td>
<td>[gerrit:48579, jira:LU-16165]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-13</td>
<td>14</td>
<td>1</td>
<td>direct io with grant allocation: grant</td>
<td></td>
<td>[gerrit:43707, jira:LU-14139]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-13</td>
<td>3602</td>
<td>1</td>
<td>buffered io, not write rpc: grants mis</td>
<td>LU-13847</td>
<td>[gerrit:48287, jira:LU-16087]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-07</td>
<td>3601</td>
<td>1</td>
<td>buffered io, not write rpc: grants mis</td>
<td>LU-13847</td>
<td>[gerrit:48445, jira:EX-5398]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-05</td>
<td>3601</td>
<td>1</td>
<td>buffered io, not write rpc: grants mis</td>
<td></td>
<td>[gerrit:45890, jira:LU-15058]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-02</td>
<td>3</td>
<td>1</td>
<td>mount failed</td>
<td></td>
<td>[gerrit:46334, jira:EX-4567]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-09-01</td>
<td>3</td>
<td>1</td>
<td>mount failed</td>
<td></td>
<td>[gerrit:46334, jira:EX-4567]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-08-29</td>
<td>3</td>
<td>1</td>
<td>mount failed</td>
<td></td>
<td>[gerrit:46334, jira:EX-4567]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-08-29</td>
<td>3603</td>
<td>1</td>
<td>buffered io, not write rpc: grants mis</td>
<td>LU-13847</td>
<td>[gerrit:48278, jira:LU-16087]</td>
<td>Preview 50</td>
</tr>
<tr>
<td>test_64f</td>
<td>FAIL</td>
<td>2022-08-29</td>
<td>2</td>
<td>1</td>
<td>mount failed</td>
<td></td>
<td>[gerrit:45122, jira:LU-14958]</td>
<td>Preview 50</td>
</tr>
</tbody>
</table>
Limit Maloo Search Incrementally

- Very useful when looking for test regressions
- Limit or increase search dates to find when failure started
  - Broad searches with large date ranges/many results will timeout, limit searches to specific subtest and status
- Limit branch, architecture, filesystem to isolate effects
- "git log --oneline --after YYYY-MM-DD --before YYYY-MM-DD" to find related patch landings
Keep Patches Moving Forward

► Developers are responsible for their own patches
  • Update patches to address inspection comments
  • Remind inspectors to review patches, review/fix/resubmit failed testing sessions

► Provide inspection feedback for others in a timely manner
  • Helps everyone benefit from effort put into development

► After inspection, help move patch to next state
  • Two or more inspectors on the patch? Add another inspector, or ping others
  • Tests have passed or triaged? Retests need to be done within 7 days before build expires

► Good inspections avoid more effort finding defects later
  • Chance to find and fix latent bugs, cleanup nearby code
Autotest Failures Affect Everyone

- Need to identify all test failures on a patch before resubmitting
  - Don't just spam resubmit button, or assume others will fix test failures
  - Patch may otherwise be adding new intermittent bugs
- **Associate** or **Raise** bugs in Maloo for all test failures
- Search for similar failures via Maloo, JIRA, associate with failure(s)
  - Can be done more efficiently in batches
- **Data needed to prioritize bugs causing the most failures**
  - This speeds up fixing the most frequent failures
  - This in turn speeds up every other patch testing and landing
Using Git and Gerrit
Managing Branches

- Keep patches for independent changes on separate branches
- A git "branch" is just a pointer to some series of commits
- Each commit or rebase moves pointer to new tip of the branch
- All of the old commits/branches stay in repository, unreferenced
  - `git checkout branch` # check out specific branch
  - `git branch {new_branch}` # create new, **keep current branch**
  - `git checkout -b {new_branch}` # create new branch and move there
  - `git status` # show modified/staged/untracked
Finding Branches

► Show local branches

```bash
# git branch -lv
b_test5    5fefbd1078 LU-15548 tests: skip conf-sanity/131 for older servers
b_def_mask 5efdbeab24 LU-9859 libcfs: add "default" keyword for debug mask
b_comma_list 76cffe0f2c LU-12597 tests: remove need for comma_list
master     1b09fb2296 LU-16062 ldlm: improve bl_timeout for prolong
```

► Show all remote branches

```bash
# git branch -alv
[as above, plus]
remotes/origin/HEAD-> origin/master
remotes/prime/b2_13 a298f8c137 New release 2.13.0
remotes/prime/b2_14 e1635c6af8 New release 2.14.0
```
Searching in Git

- `git diff [-w]`  # show current change (no whitespace changes)
- `git diff --cached`  # show "git add" changes that are staged for commit
- `git log [BRANCH|PATH]`  # show commits (branch/dir/file)
- `git log -S STRING`  # search commits in patches that add/remove specific string
- `git log --grep REGEXP`  # search commit messages with regular expression
- `git grep REGEXP`  # show all files in repository with regular expression
- `git log -S STRING --patch`  # print patch/diff with each log message
- `git show [-w] [COMMIT]`  # show specific commit (no whitespace)
- `git describe [COMMIT]`  # name [of COMMIT] relative to tag (e.g. v2_14_57-26-g54d4cca6)
Finding Change History of Code

- Shows history of commits that modified some line number
  ```
  # git blame lustre/obdclass/class_obd.c
  52257a67e4d (Liu Xuezhao 2012-07-10 21:13:26 +0800 96)
  829dd8b39a8 (Nathan Rutman 2009-05-28 00:00:48 +0000 97)
  5707f919e41 (James Simmons 2013-09-27 10:24:42 -0400 99)
  5707f919e41 (James Simmons 2013-09-27 10:24:42 -0400 100)
  54d4cca6cb0 (Arshad Hussain 2021-03-21 06:32:07 +0530 101)
  ```
- Show history of commits before a specific commit, ignore whitespace changes
  ```
  # git blame -w lustre/obdclass/class_obd.c {commit}~1
  ```
- Show patches landed between specific dates
  ```
  # git log --after 2022-09-10 --before 2022-09-12
  ```
Searching for patches is very flexible

- A few basic keywords are useful to know
- Many options available (state, content, age, reviews)
- Default to search for word in commit message

- open change #12345
  review 12345
- find commit messages for specific text
  review LU-12250
- find merged patches owned by specific user
  review owner:bzzz is:merged
- find open patches modifying specific file
  review file:lustre_idl.h is:open

https://review.whamcloud.com/Documentation/user-search.html
Commit Message Should Describe Patch Well

▶ Patch summary line should be useful by itself
  • Appears in many patch summaries ("git log --oneline", "git reflog", etc.)

▶ What should be in the commit message?
  • What problem/feature does this patch address?
  • Usage/test that triggered problem, with error messages/stack
  • Performance improvements resulting from patch
  • How it is being fixed, clear description of tricky code

▶ Fixes: label finds related patches when searching by hash or LU ticket

▶ Why is the commit message content important?
  • Initial inspectors understand the patch more quickly
  • Gatekeeper understands importance of the patch
  • Anyone dealing with the patch later has some guidance

https://wiki.whamcloud.com/display/PUB/Commit+Comments
Committing Changes

► Install Git commit hooks for patch verification before push to Gerrit

```
# ln -sf ../../contrib/git-hooks/commit-msg .git/hooks
# ln -sf ../../contrib/git-hooks/prepare-commit-msg .git/hooks
```

► Read the comments provided by prepare-commit-msg hook!

```
# git add [PATH ...]                # stage specified file(s) or dirs for commit
# git add [-u]                       # stage all changes for commit
# git commit -av                     # stage and commit all changes, show diff
# git commit -av --amend             # add current changes to previous commit
# git reset --hard {BRANCH|HEAD~n}   # revert to branch, or last n commits
# git cherry-pick {BRANCH|COMMIT}    # copy specific patch to current branch
```
Committing Partial Changes

► Add individual patch hunks

```
# git add -p
diff --git a/obd_support.h b/obd_support.h
@@ -482,6 +482,8 @@ int obd_alloc_fail(const void *
    #define OBD_FAIL_LFSCK_NO_AUTO    0x160b
    #define OBD_FAIL_LFSCK_NO_DOUBLESCAN 0x160c

+#define OBD_FAIL_FID_MAPPING       0x1500
+
    /* Assign references to moved code to reduce code changes */
    #define OBD_FAIL_PRECHECK(id)     CFS_FAIL_PRECHECK(id)
    #define OBD_FAIL_CHECK(id)        CFS_FAIL_CHECK(id)

Stage this hunk [y,n,q,a,d,/,e,?]?
```
Rebasing Patches

- Patches should be kept up-to-date with master
- WC Checkpatch marks patches `{Verified: -1}` that don't apply
- Multiple dependent patches in a single series
  
  ```
  # git rebase [-i] {master|b2_15}  # edit/reorder patches (interactively)
  # git add -u                      # add updated file(s) to commit
  # git rebase {--continue|--abort} # apply or discard changes
  # git rebase --skip               # drop current patch entirely
  # git rebase --onto BRANCH        # rebase onto a new branch
  ```
Rebasing a Patch or Series

► Rebase last two patches

```bash
# git rebase -i {master|HEAD~2}
pick 4043c3c3bd LU-12885 llite: add enum ll_file_flags for clarity
fixup fc350ac3f4 LU-12885 mds: add enums for MDS_OPEN flags
reword 27723374a3 LU-16073 utils: double snapshot_mount fix
```

# Rebase fc350ac3f4.. 4043c3c3bd onto 27723374a3
# Commands:
#  p, pick = use commit
#  r, reword = use commit, but edit the commit message
#  e, edit = use commit, but stop for amending
#  s, squash = use commit, but meld into previous commit
#  f, fixup = like "squash", but discard this commit's log message
#  x, exec = run command (the rest of the line) using shell
# These lines can be re-ordered; they are executed top to bottom.

► Can also change patch ordering in this way
(Re)basing Another Patch onto an Existing Change

```bash
# git fetch ... && git checkout -b b_new_patch FETCH_HEAD # checkout patch (#1, #2, #3)
# git cherry-pick {my patch}
# git log
# git push ... HEAD:refs/for/master
```

Do not rebase new branch onto latest master before submitting

- Original developer should rebase or land their patch first

Can also do simple rebase in Gerrit with [Rebase] button

- "Change parent revision" and specify patch number
- Cannot resolve patch conflicts directly in Gerrit

# apply new patch on top
# verify old commit hash is same (#4)
# push new patch to Gerrit

► Can also do simple rebase in Gerrit with [Rebase] button

- "Change parent revision" and specify patch number
- Cannot resolve patch conflicts directly in Gerrit
What To Do When Things Go Wrong

- All old commits/branches remain in the repository

```bash
# git reflog
3c96fb63e9 HEAD@{49}: rebase: LU-11721 tests: enable full debugging for sanity
da6cf33 HEAD@{1}: commit: LU-2468 libcfs: quiet debug messages
0b3e852 HEAD@{2}: checkout: moving from b_cleanup9 to b_cleanup7
5ea4d20 HEAD@{3}: rebase finished: returning to refs/heads/b_cleanup9
5ea4d20 HEAD@{4}: rebase: LU-1798 tests: don't set jobid if not changing
0b3e852 HEAD@{5}: checkout: moving from b_cleanup9 to 0b3e852a58^0
```

- If things go really badly, you can abort rebase and start again

```bash
# git rebase --abort
```
Extracting and Sharing Changes

- Default values in $HOME/.gitconfig or .git/config in local repository
  
  ```
  [user]
  name = Andreas Dilger
  email = adilger@whamcloud.com

  [sendemail]
  smtpserver = shawmail.cg.shawcable.net
  smtpserverport = 25
  confirm = compose

  [core]
  abbrev=12

  [pretty]
  fixes=Fixes: %h ("%s")

  [format]
  pretty=fuller
  ```
Thank You