Lustre*测试基础结构概述

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- Lustre*开源社区工具

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Lustre*开源社区工具

- JIRA
  - Bug跟踪和项目管理系统
  - jira.hpdd.intel.com

- Git
  - 源代码管理和版本控制系统
  - git.hpdd.intel.com
  - git clone git://git.hpdd.intel.com/fs/lustre-release.git

- Gerrit
  - 代码审查系统
  - review.hpdd.intel.com

* Some names and brands may be claimed
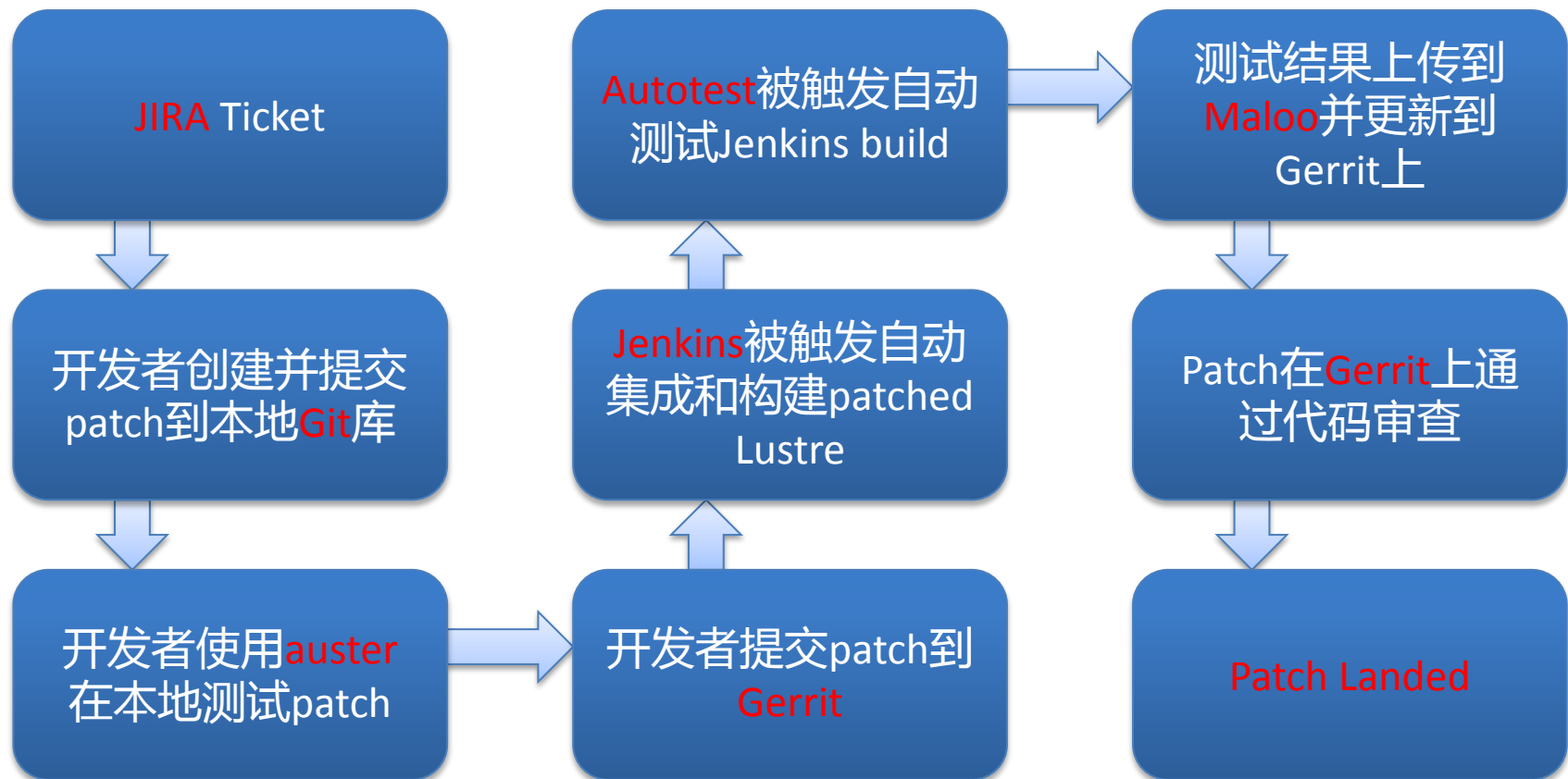as the property of others.

Lustre*开源社区工具（续）

- Jenkins
  - 持续集成和构建系统
  - build.whamcloud.com

- Autotest
  - Lustre的自动测试系统

- Auster
  - Lustre的测试套件

- Maloo
  - Lustre的测试结果数据库
  - maloo.whamcloud.com

Lustre*代码提交流程

JIRA Ticket

开发者创建并提交patch到本地Git库

开发者使用auster在本地测试patch

开发者提交patch到Gerrit

Jenkins被触发自动集成和构建patched Lustre

Autotest被触发自动测试Jenkins build

测试结果上传到Maloo并更新到Gerrit上

Patch在Gerrit上通过代码审查

Patch Landed

* Some names and brands may be claimed
as the property of others.

5

(intel) Intel HPDD Code Review

Change-Id:	Iea57167346627eeb85ac40c17f3ea4596b3ebbe5
Owner	Andreas Dilger
Project	fs/lustre-release
Branch	master
Topic	
Uploaded	Aug 24, 2013 6:55 AM
Updated	Sep 27, 2013 5:39 AM
Status	**Merged**

⭐ *Commit Message*   *Permalink*

LU-14 utils: allow formatting OST without VIRGIN flag

When reformatting a new target to replace an existing target, the "mkfs.lustre --replace" option allows formatting an OST (or MDT?) with the same index as a previously used OST without setting the LDD_F_VIRGIN flag.

This is required in the case where an OST was lost due to massive corruption or critical hardware failure. Otherwise, the newly formatted target will try to register with the MGS as a new target, but will be refused by the MGS due to having an already-used index.

The OFD code skips precreating all of the objects in the filesystem if the MDS requests an object ID too much larger than the current LAST_ID. In this case (which can happen if the OST is replaced or restored from an older backup) only the most recent objects are precreated, and the deletion of orphans from a too-large precreate is left to lfsck.

Signed-off-by: Andreas Dilger <andreas.dilger@intel.com>
Change-Id: Iea57167346627eeb85ac40c17f3ea4596b3ebbe5
Reviewed-on: http://review.whamcloud.com/7443
Tested-by: Hudson
Tested-by: Maloo <whamcloud.maloo@gmail.com>
Reviewed-by: Sebastien Buisson <sebastien.buisson@bull.net>
Reviewed-by: Alex Zhuravlev <alexey.zhuravlev@intel.com>
Reviewed-by: Oleg Drokin <oleg.drokin@intel.com>

Reviewer	Verified	Code-Review
Andreas Dilger		
Hudson	✓	
Maloo	+1	
Sebastien Buisson		+1
Alex Zhuravlev		+1
Oleg Drokin		✓
Gerrit Gatekeeper		

Maloo   Sep 26 1:23 AM

Patch Set 5:

Rosso Autotest has started the test process

Maloo   Sep 26 9:51 AM

Patch Set 5: Verified

Tests received by maloo, run on CentOS release 6.4/x86_64: (https://maloo.whamcloud.com/test_sessions/8684195e-264a-11e3-8d26-52540035b04c). Ran 14 tests. No failures.

Maloo 上的测试结果报告

Session for group review (wtm-22vm6, Andreas Dilger)

Uploaded by: Rosso Autotest.

Reason: landing.

14 test sets passed out of 14.

Code review references

- gerrit:7443
  - id: 6d0be5b8e3d5daf238f027abd150940268fe01ba
  - change_no: 7443

- jira:LU-14
  - id: LU-14

Test sets

Name	Test group	Test host	Branch	Arch / Lustre Version	Run at (UTC)	Duration	Subtests passed	Bugs	Links	User	Status
sanity-hsm	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-26 01:01:35	1283	85/85		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
runtests	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-26 00:57:40	227	1/1		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
mmp	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-26 00:51:37	363	10/10		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
lnet-selftest	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-26 00:46:25	311	1/1		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
lustre-rsync-test	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-26 00:28:45	1051	14/14		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
sanity-sec	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-26 00:26:36	129	7/7		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
sanity-quota	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 23:25:04	3684	36/36		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
insanity	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 23:01:01	1434	16/16		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
replay-ost-single	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 22:49:30	682	14/14		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
recovery-small	review	Lustre-22vm6	• master	• x86_64,el6,inkern	2013-09-25 22:14:42	2079	67/67		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
conf-sanity	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 20:19:38	6903	109/109		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
replay-single	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 19:25:04	3274	125/125		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
sanityn	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 18:57:23	1661	133/133		gerrit:7443, jira:LU-14	Andreas Dilger	PASS
sanity	review	wtm-22vm6	• master	• x86_64,el6,inkern	2013-09-25 17:44:37	4366	470/470		gerrit:7443, jira:LU-14	Andreas Dilger	PASS

Test nodes

Lustre*自动测试系统 – Autotest

- 监视和获取Jenkins build

- 管理和分配测试资源

- 安装和配置测试集群

- 执行Lustre测试套件

- 获取和上传测试结果

Autotest的特点

- ## 分布式并行测试

  – 测试集群分布在Colorado, DuPont, New Mexico, Jülich, Indiana University等

  – 并行测试不同的Jenkins builds

  – 并行测试同一个Jenkins build的不同配置（ldiskfs, zfs, DNE mode, etc.）

Fully Automatic

Autotest的特点（续）

- 灵活性
  - 可以被部署在任何一个支持Lustre*文件系统的集群上
  - 根据测试需求自动分发测试任务到相应的测试集群上
    - Lustre patches和releases在Colorado和DuPont进行测试
    - OpenSFS NRE 任务在OpenSFS集群上进行测试
    - ……
  - 同一个Jenkins build可以在不同的测试集群上进行测试
    - DNE mode在OpenSFS集群上进行测试

Autotest的特点（续）

- 一致性和可重复性

  - 每个测试会话(test session)都在专属的测试环境中执行

    - 从安装操作系统开始

    - 出现严重错误时，自动重建测试环境

  - 在相同的测试环境和测试流程下，测试结果是一致的

  - 更容易发现回归错误和重现Bug

Autotest的特点（续）

- 测试可定制
  - 在git commit message里加入"Test-Parameters"
    - 定制Client/MDT/OST个数，网络类型，后端文件系统类型，Client/Server的Lustre版本等等
    - 定制的测试会话是对缺省的"review"测试会话的补充

```
Commit Message                                    Permalink

LU-3332 tests: Add DNE support to sanity-scrub

sanity-scrub only exercises MDT 0.  This patch enhances it to also
test OI scrub on the other MDTs, if available.

Test-Parameters: mdtcount=2 testlist=sanity-scrub
Change-Id: Ic11abf964a85892f3c772cc1a12f3e94c8f2a256
Signed-off-by: wang di <di.wang@intel.com>
Signed-off-by: Li Wei <wei.g.li@intel.com>
```

Autotest的特点（续）

- Test-Parameters范例
  - 互操作性测试

    Test-Parameters: clientjob=lustre-b2_1 clientbuildno=215 \
    testgroup=full

  - In-kernel OFED IB 网络测试

    Test-Parameters: nettypes=o2ib testlist=parallel-scale

  - 只运行某个测试用例

    Test-Parameters: envdefinitions=ONLY=27 testlist=sanity

Lustre[*]测试套件 – Auster

- 封装和驱动Lustre的功能/回归测试用例集
  - sanity, conf-sanity, replay-single, sanity-quota, etc.
  - 1200+ 测试用例
  - 源代码树的lustre/tests目录和lustre-{client-,}tests-*.rpm

- 可以指定测试配置文件和日志目录

- 可以指定或跳过一个或一组测试用例

- 可以指定重复运行一个或一组测试用例的次数

- 可以指定是否将测试结果上传到Maloo

- ……

Lustre*测试框架

- 测试环境变量
    - mds_HOST, ost_HOST, RCLIENTS, NETTYPE, FSTYPE, etc.
    - 变量的缺省值定义在lustre/tests/cfg/{local,ncli}.sh中
    - 变量的非缺省值可以通过以下两种方式定义和使用：
        - 在cfg/目录下自定义一个测试配置文件，把文件名通过"-f name"选项或"NAME=name"变量的方式传递给auster
          e.g., auster -v -r -s -k -f my_config -g test-groups/regression
          e.g., NAME=my_config bash auster -v -r -s -k -g test-groups/full

        - 直接定义变量的值并传递给auster
          e.g., PDSH="pdsh -S -w" NAME=ncli RCLIENTS="client[2-8]" mds_HOST=mds
               ost_HOST=oss bash auster -d /test_logs -v -r -s -k sanity --only 71

Lustre*测试框架（续）

- 公用函数库
  - lustre/tests/{test-framework,functions}.sh
    - 初始化测试环境变量
    - 在远程的测试节点上执行命令或函数
    - format/set up/clean up Lustre文件系统
    - 设置debug level/size
    - 错误处理
    - 与Lustre features相关的公用函数
    - 与MPI程序相关的公用函数等等
  - 用于编写新的Lustre测试用例

Lustre*测试框架（续）

- 测试用例范例

```
test_183() { # LU-2275
        [[ $(lustre_version_code $SINGLEMDS) -lt $(version_code 2.3.56) ]] &&
                skip "Need MDS version at least 2.3.56" && return

        mkdir -p $DIR/$tdir || error "creating dir $DIR/$tdir failed"
        echo aaa > $DIR/$tdir/$tfile

#define OBD_FAIL_MDS_NEGATIVE_POSITIVE    0x148
        do_facet $SINGLEMDS $LCTL set_param fail_loc=0x148

        ls -l $DIR/$tdir && error "ls succeeded, should have failed"
        cat $DIR/$tdir/$tfile && error "cat succeeded, should have failed"

        do_facet $SINGLEMDS $LCTL set_param fail_loc=0
        # ......
}
run_test 183 "no crash or request leak in case of strange dispositions"
```

参考资料

- Lustre* Patch Landing Process
  https://wiki.hpdd.intel.com/display/PUB/Submitting+Changes

- Changing Test Parameters with Git Commit Messages
  https://wiki.hpdd.intel.com/display/PUB/Changing+Test+Parameters+with+Gerrit+Commit+Messages

- Test Environment Variables
  https://wiki.hpdd.intel.com/display/PUB/Lustre+Test+Tools+Environment+Variables

谢谢！

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