Testing, testing, testing - updates!

Experiences from an automated testing environment for Samba on Gluster

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Setting up of an automated testing environment for Samba on Gluster

Introductions

Implementation

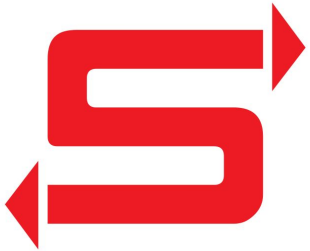
Results

Future

GlusterFS

- Open Source Scalable Network Filesystem
- Utilises off the shelf hardware
- Access to the filesystem provided by libgfapi, glusterfs-fuse, NFS (ganesha) and SMB (Samba)

Samba



- Export GlusterFS using SMB
- Samba uses vfs_glusterfs module to talk to the Glusterfs cluster.
- Recently added: alternative module vfs_glusterfs_fuse module that uses gluster fuse mount

CTDB

- Turns Samba into a clustered service
- By providing the needed cross-node IPC:
  - clustered TDB database
  - Inter-node messaging
- Additionally: resource management:
  - Monitors nodes
  - Monitors Samba service
  - Manages pool of ip addresses

Challenges for test automation

- Multiple Machines Involved (cluster nodes, clients)
- Multiple Projects Involved (gluster, ctdb, samba)
- Multiple Configuration Options (gluster volume types)

Requirements

- Automate setup of cluster nodes
- Test runner to run various tests
- Run testing periodically / event driven

Additional:

- Provide developer build/test environment (reproduce issues for customer cases)

Gluster Samba Integration

- Github
  - https://github.com/gluster/samba-integration
- Branches
  - master
  - centos-ci
  - samba-build
  - tests

Tools

- CentOS 7/8
  - Easy to add support for different OS
  - New default is CentOS 8
- Vagrant
  - libvirt
- Ansible
  - gluster-ansible

    (https://github.com/gluster/gluster-ansible)

Nightly test RPMs

- Test RPMs for easy installation on nodes.

  Built for CentOS 7 and 8.
- Builds created nightly
- Gluster nightly RPMs from the GlusterFS master branch spec file

Package Repositories

- GlusterFS
  - http://artifacts.ci.centos.org/gluster/nightly/master.repo
- Samba
  - http://artifacts.ci.centos.org/gluster/nightly-samba/samba-nightly-master.repo

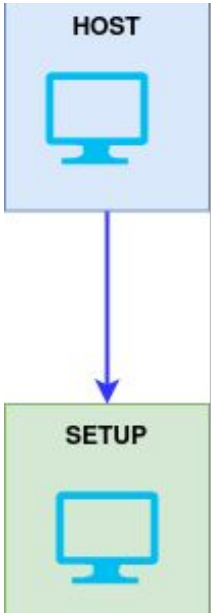
Branch – build: Nightly builds for Samba

- Fetches current samba master
- Creates an SRPM loosely based on fedora rawhide
- Builds RPMs for centos and runs a basic install test
- Lessons learned from nightly master builds in Samba: high frequency of changes, many spec file updates
- Currently adding ability to build main release branches and even specific git tags/hashes

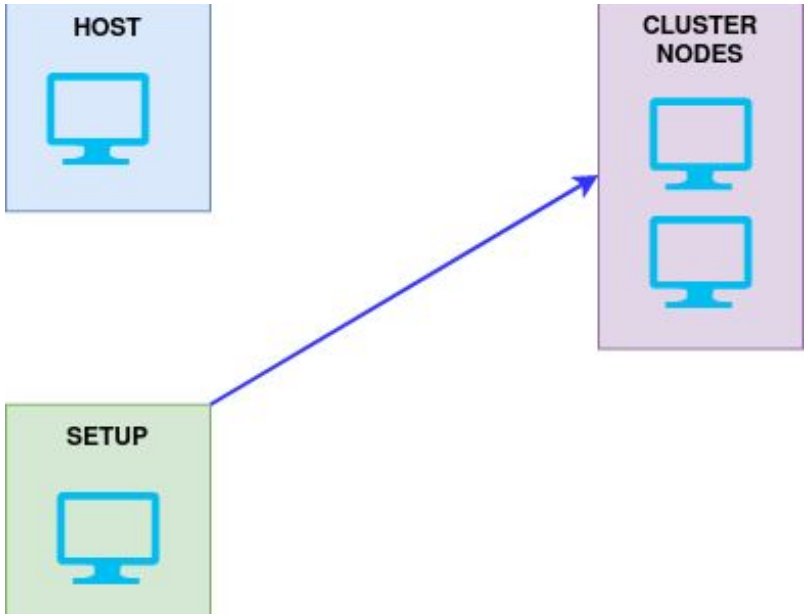
Branch – master: Test machine setup

- Creates virtual machines
- Installs cluster nodes and clients
  - cluster-vars.yml
  - test-info.yml
- Runs tests

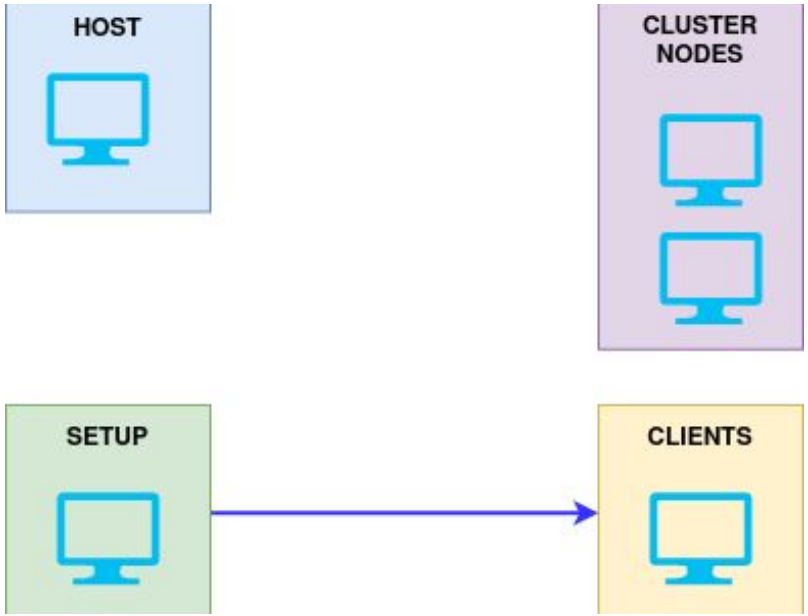
Setup vm setup



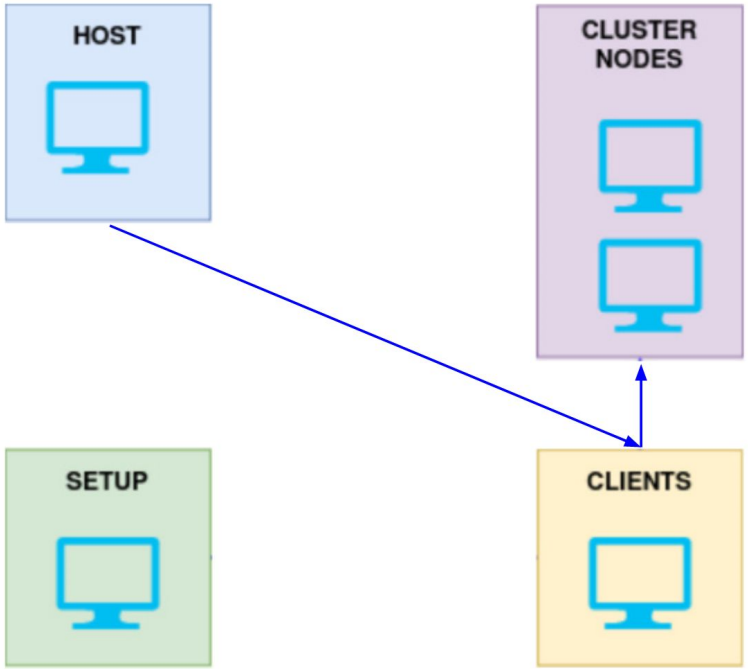
Setup vm Storage0/1



Setup vm Client1



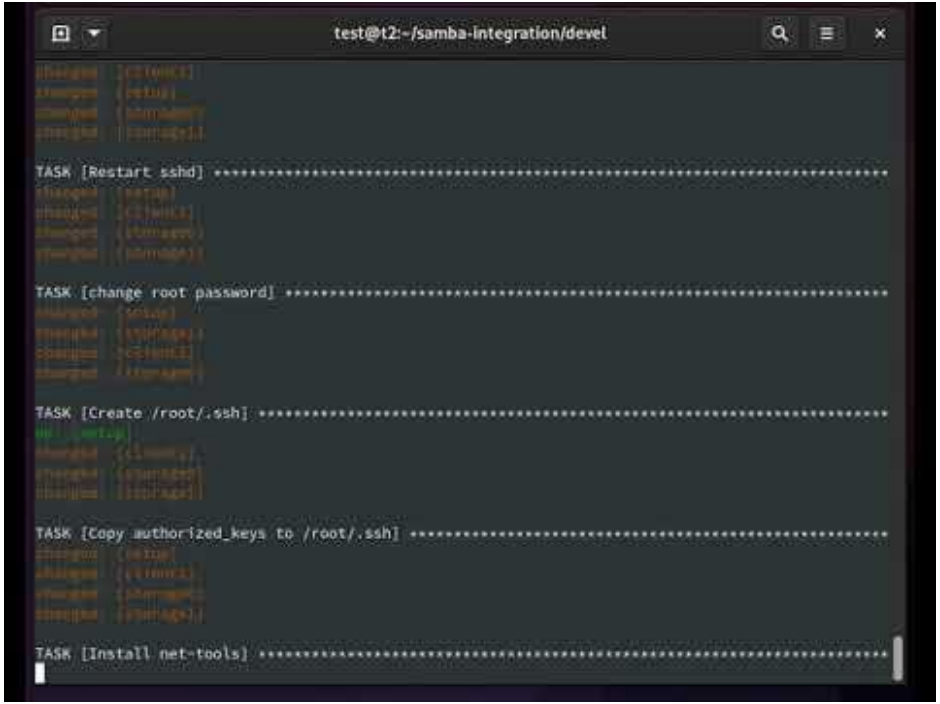
Run Tests



Setup - Update

- Several incremental improvements - better error reporting, multiple OS support, idempotent.
- Additional documentation suggesting setup options in /docs, e.g. descriptions for fedora
- Additional ansible-playbooks in /devel for
  - Ease of access - setup ssh
  - Setup build environment. debugging/instrumentation, etc.

https://www.youtube.com/watch?v=gIQ5speak2w



Branch – tests: Tests

- Executed once the nodes and clients are setup
- Contains the test runner and various tests
- Simple sanity tests using the cifs kernel module
- Smbtorture tests
  - Latest nightly build smbtorture test used

Branch – tests: More tests

- Added more tests:
  - Still focussed on SMB2/3 tests (starting with full testrun of all smbtorture smb2 tests)
- Use Samba selftest infrastructure with lists “knownfail”, “flapping”, etc.
  - Requirement to keep selftest lists in sync with upstream to minimize maintenance burden
- Continuous testing helped to identify the following crucial issues.

Issues fixed: write-behind translator

- samba bz: 14486

  smbtorture:smb2.rw.rw1
- Write corruption caused due to performance translator, write-behind.
- Samba refuses to connect if it detects the translator
- Disable write-behind translator.
  - Automatically disabled with the latest version
  - Manually disable with older versions
  - RHGS update 3.5.4 ships precaution mechanism

Issues fixed: metadata cache

- Glusterfs: Issue Tracker - 1991

  smbtorture tests: smb2.create.aclfile and others
- Glusterfs mdcache bug.
- `performance.cache-samba-metadata`causes translator to cache Samba specific attributes (e.g. user.DOSATTRIB)
- Windows machines cannot set Permissions. Extended attribute `security.NTACL`was not being fetched correctly.

And then came the pathref changes...

- Pathref changes mean major VFS rewrite
- Replace path-based with handle-based operations
- https://www.samba.org/~slow/SMB_VFS.html
- See dedicated talk by Ralph Böhme on thursday

Issues fixed: pathref changes #1

- Open file directory failure
- Glusterfs needs specific open flag passed down to open call
- Rewrite had O_DIRECTORY overwritten by O_RDONLY, so directory open didn't work for gluster
- https://gitlab.com/samba-team/samba/-/merge_requests/1751

Issues fixed: pathref changes #2

- samba-integration IT: 128

  smbtorture:

  smb2.compound_find.compound_find_related
- Caused due to addition of the pathref changes which breaks the GlusterFS backend functionality.
- Missing stat call in mkdir path, also related to pathref changes
- https://gitlab.com/samba-team/samba/-/merge_requests/1754

Issues fixed: pathref changes #3

- samba bz: 14662

  smbtorture: smb2.create.mkdir-dup
- Regression caused by the pathref patches.
- Resource destroyer overwrites the errno which is required in the subsequent code.
- Issue was not noticed by local filesystems, only when using gluster
- Fixed upstream and patches backported to stable releases.

Lessons learned:

- Testing framework is an enormous win for identifying regressions very early (saving QE manual testing time)
- Difficult to test and check every single push to upstream (major rewrites, incomplete patchsets, work in progress)
- Also focus on release branch testing where Samba code base has stabilized and matured

Centos-ci – what are we running / testing?

- Nightly:
  - Full clustered test run from master
  - build samba RPMs from master
- Github PRs trigger full cluster test for all branches except the samba-build branch
- Extending testing matrix for stable branches (WIP)
  - Varying samba specfiles
  - Potentially different tests (and knownfail) lists

CentOS CI Environment

- https://ci.centos.org/
- Free Jenkins based bare metal machines for open source projects to build CI / test infrastructures
- https://wiki.centos.org/QaWiki/CI/GettingStarted
- Using: Gluster Space (for now)
- Job definitions: https://github.com/gluster/centosci/

Future road map

- Tests! Tests! Tests! - increasing numbers (fulltest?)
- Test matrix, different config options, different branches
- Include multiple SMB sharing options

  (vfs_gluster, vfs_glusterfs_fuse, vfs_acl_xattr, vfs_fruit)
- Plugin other distributed file systems

  (add support for ceph?)
- Centos-ci:
  - Get samba space?
  - Use in gitlab? (not so easy...)

Thank You

Questions?

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