Testing, testing, testing - Updates 2024

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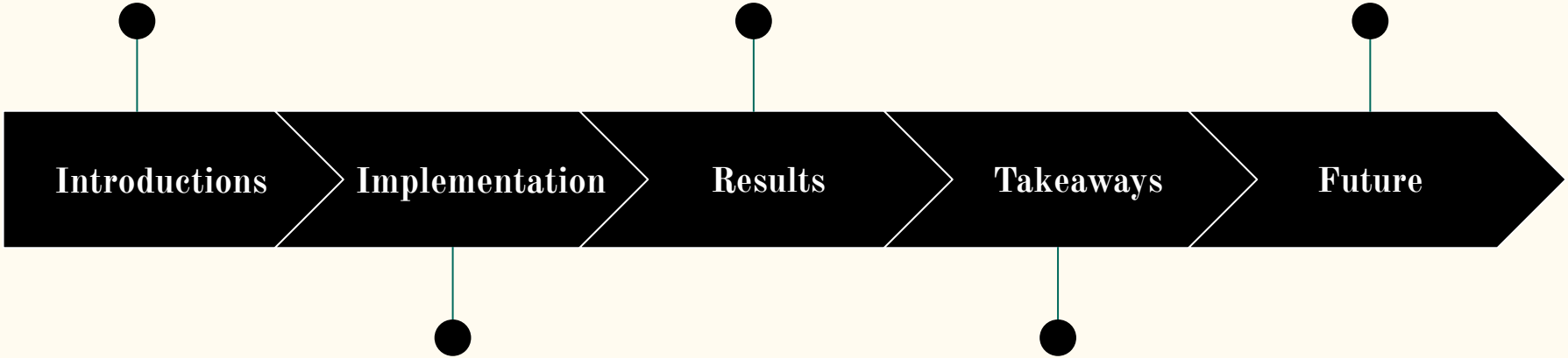
Agenda

Overview on different projects involved and challenges

What have been accomplished?

Go through the list of planned tasks ahead



Detailed walkthrough on entire infrastructure

What have we learnt?

Introductions

Samba

- Free software suite for interoperability using SMB/CIFS for Linux and Unix
- Export distributed file systems
- Access methods to include both VFS interface and locally available mount points

CTDB

- Turns samba into clustered service
- Provides the needed cross-node IPC
  - clustered tdb
  - internode messaging
- Additionally, resource management:
  - monitor nodes
  - monitor samba and other services
  - manages pool of ip addresses

Gluster

- Open source scalable network file system
- Utilises off the shelf hardware
- Access to the file system via libgfapi, glusterfs-fuse, NFS(Ganesha) and SMB(Samba)
- Unfortunately no longer in active development

Ceph

- Open source scalable network file system
- Utilises off the shelf hardware
- Access to the file system via libcephfs, ceph-fuse, ceph kmod, NFS(Ganesha)
- Ceph SMB manager module in development

GPFS

- General Parallel File System
- Proprietary clustered file system
- IBM Storage Scale product.
- Designed for high performance workloads

Challenges to test automation

- Multiple machines involved(cluster nodes, clients)
- Multiple projects involved (ceph, samba, ctdb)
- Multiple file systems (cephfs, gpfs, xfs)
- Multiple access methods (VFS interface, kernel mount)

Requirements

- ❏ Automate setup of cluster
- ❏ Test runner to run various tests
- ❏ Running tests periodically / event driven

Implementation

Gluster/Samba-Integration

- ★ Project to test the Gluster Integration for Samba
- ★ Single repo, different branches
  - building packages, setting up the environment and running the tests.
- ★ Gluster no longer in active development

Samba Integration Testing

- ★ New home under SINK[Samba-IN-Kubernetes]
  - https://github.com/samba-in-kubernetes/
- ★ Components split into individual repos
  - Samba-Build
  - Samba-Integration-Testing-Environment
  - Samba-Integration-Testing-Test-Cases

Samba-build

- ★ Repository on GitHub
  - https://github.com/samba-in-kubernetes/samba-build
- ★ Nightly builds
- ★ RPMs available for download
  - https://artifacts.ci.centos.org/samba/pkgs/

Samba-Integrated-Testing Environment

- ★ Ansible playbooks to bring up the test cluster
  - https://github.com/samba-in-kubernetes/sit-environment
- ★ Virtual machines as nodes
- ★ Currently uses vagrant with libvirt plugin
  - plan to remove vagrant and use just libvirt
- ★ Setup of file system

SIT-Environment updates

- ★ Highly modular and configurable
  - File system or samba specific options
- ★ Dynamically created cluster configuration
  - distribution of memory and CPU
- ★ Support for heterogeneous cluster in terms of host OS
  - added support for CentOS Stream 9 - new default
- ★ Allow direct access to filesystem from clients

Samba-Integrated-Testing Test cases

- ★ Separate repository
  - https://github.com/samba-in-kubernetes/sit-test-cases/
- ★ All kinds of tests
- ★ Nightly tests

SIT-Test cases updates

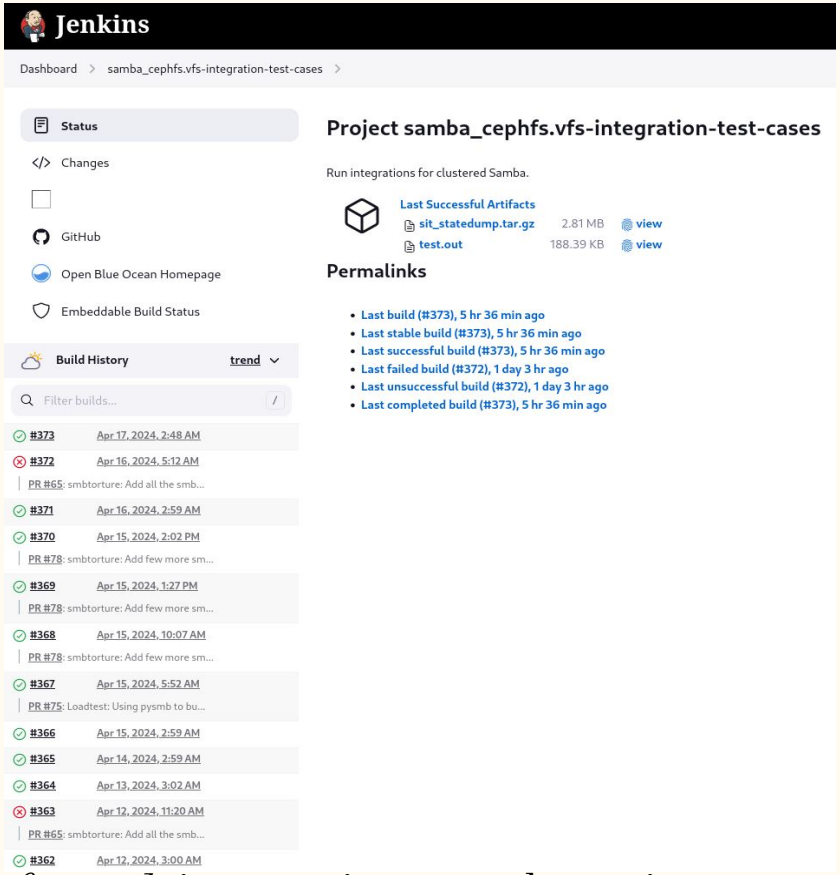
- ★ pytest as test runner
  - tox
- ★ Easier to add new tests
- ★ Use platform independent code
- ★ New IO tests
- ★ Containerized testing
- ★ SMBTorture: additional coverage

CentOS CI

- CI infrastructure from CentOS project
  - dedicated space
  - https://jenkins-samba.apps.ocp.cloud.ci.centos.org
- Pool of bare metal machines
- Jenkins based pipeline
  - customized job definitions and configurations
  - https://github.com/samba-in-kubernetes/samba-centosci

CI/CD workflow

- Nightly runs
  - build samba rpms from master
  - clustered test run
- GitHub PR triggered
  - sanity tests on https://github.com/samba-in-kubernetes/sit-environment
  - full test run on https://github.com/samba-in-kubernetes/sit-test-cases
- File system test matrix includes:
  - cephfs
  - cephfs.vfs
  - gpfs
  - gpfs.vfs
  - gpfs.scale
  - xfs



vfs_ceph integration sample project page

```
.package create: /root/sit-test-cases/.tox/.package
.package installdeps: setuptools >= 42, wheel
pytest create: /root/sit-test-cases/.tox/pytest
pytest installdeps: pytest, pyyaml, pytest-randomly, iso8601, pysmb
pytest inst: /root/sit-test-cases/.tox/.tmp/package/1/sit-test-cases-0.1.tar.gz
pytest installed: exceptiongroup==1.2.0,importlib_metadata==7.1.0,iniconfig==2.0.0,iso8601==2.1.0,packaging==24.0,pluggy==1.4.0,pyas
package/1/sit-test-cases-0.1.tar.gz,tomli==2.0.1,tqdm==4.66.2,zipp==3.18.1
pytest run-test-pre: PYTHONHASHSEED='2434312385'
pytest run-test: commands[0] | pytest -vrfEsxXpP testcases/
============================= test session starts ==============================
platform linux -- Python 3.9.18, pytest-8.1.1, pluggy-1.4.0 -- /root/sit-test-cases/.tox/pytest/bin/python
cachedir: .tox/pytest/.pytest_cache
Using --randomly-seed=4249636406
rootdir: /root/sit-test-cases
configfile: pyproject.toml
plugins: randomly-3.15.0
collecting ... collected 40 items

testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.mangle] PASSED [  2%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.timestamps] PASSED [  5%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.async_dosmode] PASSED [  7%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.sdread] PASSED [ 10%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.check-sharemode] PASSED [ 12%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.connect] PASSED [ 15%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.secleak] PASSED [ 17%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.rw] PASSED [ 20%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.durable-open-disconnect] PASSED [ 22%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.mkdir] PASSED [ 25%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.openattr] PASSED [ 27%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.sharemode] PASSED [ 30%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.create] PASSED [ 32%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.session-id] PASSED [ 35%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.charset] PASSED [ 37%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.maxfid] PASSED [ 40%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.credits] PASSED [ 42%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.bench] PASSED [ 45%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.maximum_allowed] PASSED [ 47%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.lock] PASSED [ 50%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.rename] PASSED [ 52%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.winattr] PASSED [ 55%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.session] PASSED [ 57%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.winattr2] PASSED [ 60%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.compound_find] PASSED [ 62%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.deny] PASSED [ 65%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.create_no_streams] PASSED [ 67%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.tcon] PASSED [ 70%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.notify-inotify] PASSED [ 72%]
testcases/smbtorture/test_smbtorture.py::test_smbtorture[share-cephfs-vfs-smb2.read] PASSED [ 75%]
testcases/loading/test_loading.py::test_loading[192.168.123.10-share-cephfs-vfs] PASSED [ 77%]
testcases/misc/test_io.py::test_check_io_consistency_premounted[test_dir0] SKIPPED [ 80%]
testcases/misc/test_io.py::test_check_io_consistency[192.168.123.10-share-cephfs-vfs] PASSED [ 82%]
testcases/containers/test_containers.py::test_containers[192.168.123.10-share-cephfs-vfs-ltp] PASSED [ 85%]
testcases/containers/test_containers.py::test_containers[192.168.123.10-share-cephfs-vfs-smallfiles] PASSED [ 87%]
testcases/misc/test_dbm.py::test_dbm_consistency_premounted[test_dir0] SKIPPED [ 90%]
testcases/misc/test_dbm.py::test_dbm_consistency[192.168.123.10-share-cephfs-vfs] PASSED [ 92%]
testcases/misc/test_stress.py::test_check_mnt_stress_premounted[test_dir0] SKIPPED [ 95%]
testcases/misc/test_stress.py::test_check_mnt_stress[192.168.123.10-share-cephfs-vfs] PASSED [ 97%]
testcases/consistency/test_consistency.py::test_consistency[192.168.123.10-share-cephfs-vfs] PASSED [100%]
```

sample *vfs_ceph* test results view

Results

Issues with *vfs_ceph*

- Failure in *smb2.mkdir-dup* on cephfs accessed via *vfs_ceph*
- Absence of SMB_VFS_FSTATAT
- NT_STATUS_NOT_A_DIRECTORY
- Fixed
  - https://gitlab.com/samba-team/samba/-/merge_requests/3478

Issues with *vfs_ceph* (contd..)

- Failure in *smb2.timestamps* on cephfs accessed via *vfs_ceph*
- Incorrect handling of create_time/btime
- Fixed
  - https://gitlab.com/samba-team/samba/-/merge_requests/3553
- Limitation from cephfs
  - https://tracker.ceph.com/issues/65043

Other issues

- Regression !!
  - with *vfs_acl_xattr* loaded
- triggered by preference to CAP_DAC_OVERRIDE over *become_root*
- NT_STATUS_ACCESS_DENIED
- Immediate fix was to revert the changes partially for *vfs_acl_xattr*
  - https://gitlab.com/samba-team/samba/-/merge_requests/3502
  - and eventually for entire samba
    - https://gitlab.com/samba-team/samba/-/merge_requests/3572

Other issues (contd..)

- Absence of proper cleanup in *smb2.maximum_allowed*
  - subtests failed due to left over
- NT_STATUS_OBJECT_NAME_COLLISION
- Fixed
  - https://gitlab.com/samba-team/samba/-/merge_requests/3518

Takeaways

Lessons learned

- ★ Improved developer workflow
- ★ Enormous win for identifying regressions early
  - saves QE time
- ★ Difficulty in testing every push to upstream
  - major rewrites

Future

Roadmap

- GitLab integration
  - webhooks, labels and/or comments based
- Tests! Tests! Tests! increasing numbers
- Focus on stable samba branches

Thank you

Feedback / Questions?

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