

Comparative Analysis of Open source operating systems for OpenStack cloud platform

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ABSTRACT

A brief analysis on OpenStack cloud against many open source Operating Systems has been presented in this paper. We have performed extensive testing on OpenStack with various test cases. We used tempest which is integration test suite for OpenStack. Tempest has many tests for OpenStack Application Programming Interface validation. We have generated various tests and tests results. The paper describes the concept and characteristics of OpenStack cloud along with various tools like DevStack and Tempest.

Keywords: Analysis, OpenStack, Open source Operating systems, testing.

1. INTRODUCTION

OpenStack is an open source and free software platform for cloud computing mostly used as an Infrastructure as a Service(IaaS). OpenStack improve resource efficiency, improve responsiveness, improve operational efficiency. OpenStack uses various virtual machines as a standard deployment object in cloud computing. It provides abstraction from hardware which increases the flexibility to provide dynamic data centers it results in higher computing efficiency. For Agile Infrastructure various tools can be used to build open source cloud like for configuration tool we can use chef, puppet, juju, salt etc. for cloud software we use OpenStack (Private Cloud), for Monitoring Tools we can use Elasticsearch, Kibana and for storage solution we can use unified distributed storage system called CEPH.

2. OPENSTACK

Every year OpenStack has two summits to release its new version various version of OpenStack are Austin, Bexar, Cactus, Diablo, Essex, Folsom, Grizzly, Havana, Icehouse, Juno, Kilo, Liberty, Mitaka, Newton, Ocata. There is a six month cycle for every release and in between thousands of patches come on daily basis and sometimes these patches are platform dependent for example it support intel processor but not AMD or it can run on debian family operating systems only. So we tested various versions of OpenStack against various operating systems and compare them which operating system is best for OpenStack. This comparison is made based on number of tests passed by respective operating system. OpenStack contains various services some of them are:

- Compute (**Nova**) it is the main part of an IaaS system. It can work on bare metal and on various hypervisor technologies like KVM, Hyper-V, Xen etc.
- Networking (**Neutron**) is responsible for ip addresses and managing networks. It provides support of Software Defined Networking by using OpenvSwitch and OpenFlow. Network node contains ML2 plug-in, OVS Agent, L3 Agent, DHCP Agent, Metadata Agent and Open vSwitch.
- Storage: It can be Block storage called as Cinder or Object storage called as Swift and File storage called as Manilla. Cinder has block-level devices with openstack nova instances. Swift is a redundant object storage system. It is same as S3 in Amazon web Service.
- Identity (**Keystone**) to access the OpenStack services there is a common authentication system for overall cloud system it can integrate with existing directory LDAP.
- Dashboard (**Horizon**) it's a web based dashboard which provide graphical interface.

Other services in OpenStack are for Orchestration project name is Heat, Workflow project name is Mistral, Telemetry project name is ceilometer, Database project name is Trove, Bare Metal provisioning project name is Ironic.

3. TESTING TOOLS

Devstack is use to running OpenStack services. We downloaded latest version of Devstack from git. Most of the OpenStack code is written in python. For OpenStack testing OpenStack integration Test suite which is Tempest Test suite and ready to deploy. We performed unit tests in each project Cinder, Nova, Neutron, Keystone etc.

Tempest is a set of integration tests which can be use to test live OpenStack cloud. It runs on all OpenStack releases. It uses a unified tempest REST client. There are more than 3500+ tests which covers all projects.

Basic Tempest Architecture contains one test server which is tempest node and through HTTP Request and HTTP response it talks to Controller Node and controller node talks to compute node and tempest tests executed from controller node. Procedure to run tempest is configure OpenStack/DevStack then run Tempest and at last analyze test results.

We used DevStack from git and configure tempest after that we ran tempest integration test suite and then we ran various tests like tox test, smoke and unit test combination on DevStack environment. Verify results based on log analysis. We tested this on multiple open source operating systems and different hardware architectures.

We used Intel processor with 10 GB Ram and 1 TB Hard Disk. Different Operating Systems are Centos, Fedora and Ubuntu. From OpenStack we used Kilo and Liberty DevStack. DevStack is downloadable from [1] after cloning DevStack from git go in DevStack directory and after make changes in localrc we ran stack script. For tempest there is a script file file called as run_tempest.sh in /opt/stack/tempest directory.

First we performed tox test which come by default in DevStack. This test is important because it checks whether our package installed correctly or not. Tox contains various existing job configurations e.g. tox -e full or tox -e smoke.

4. RESULTS

We performed various tests on Liberty and Kilo version of OpenStack against Centos and Ubuntu and generate some graphs on passed, failed, skipped and total as shown in figure.

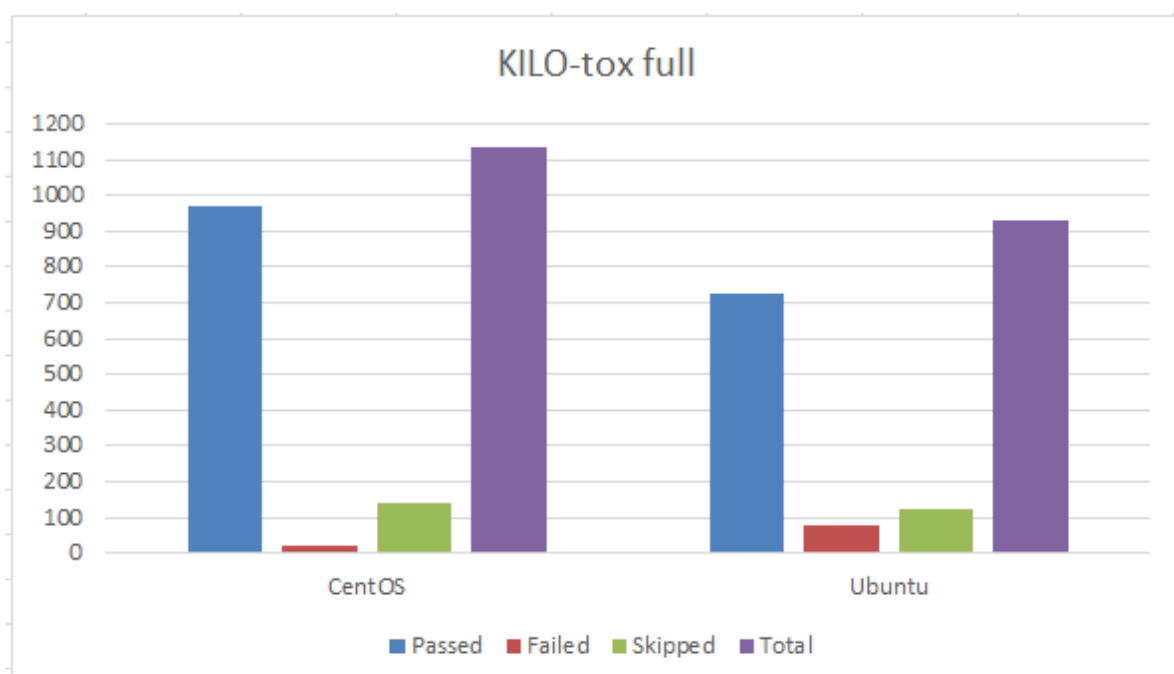


Fig. 1

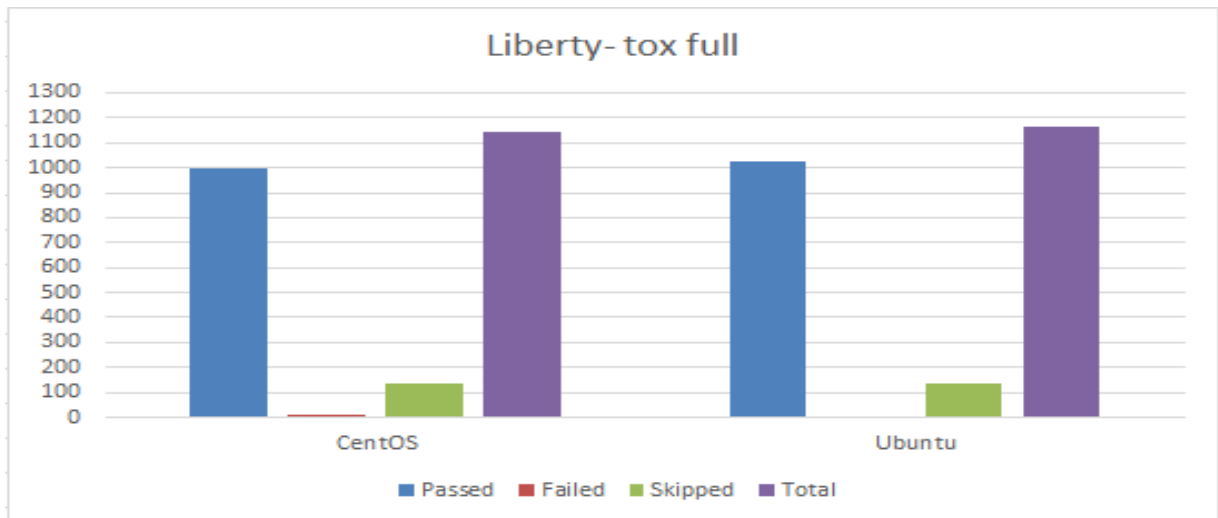


Fig. 2

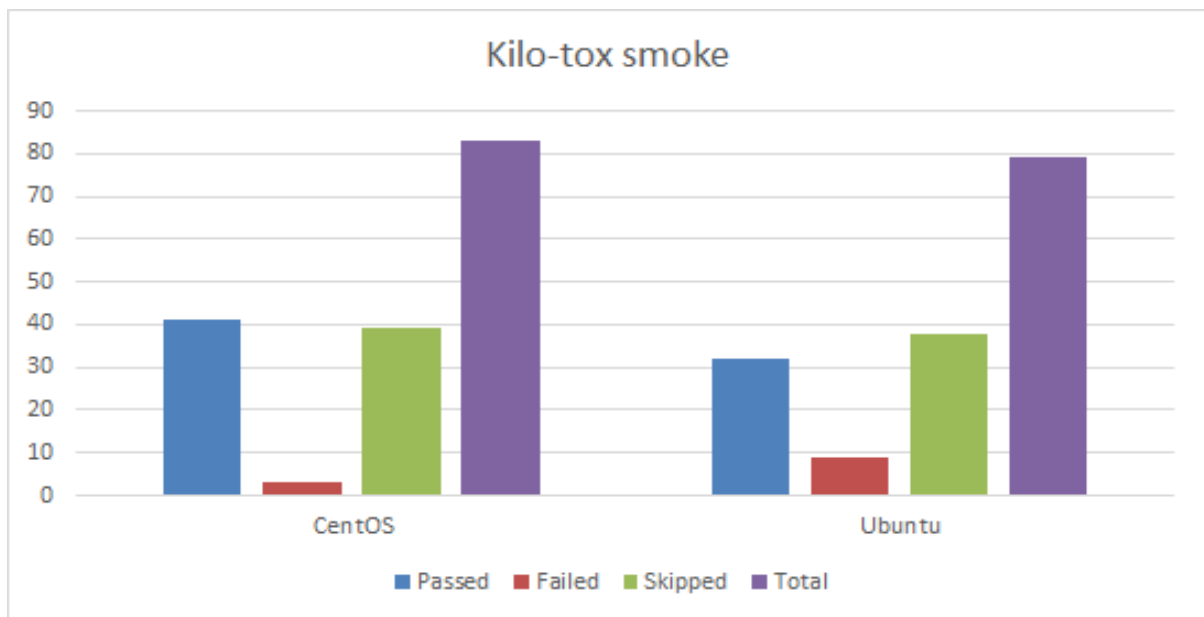


Fig. 3

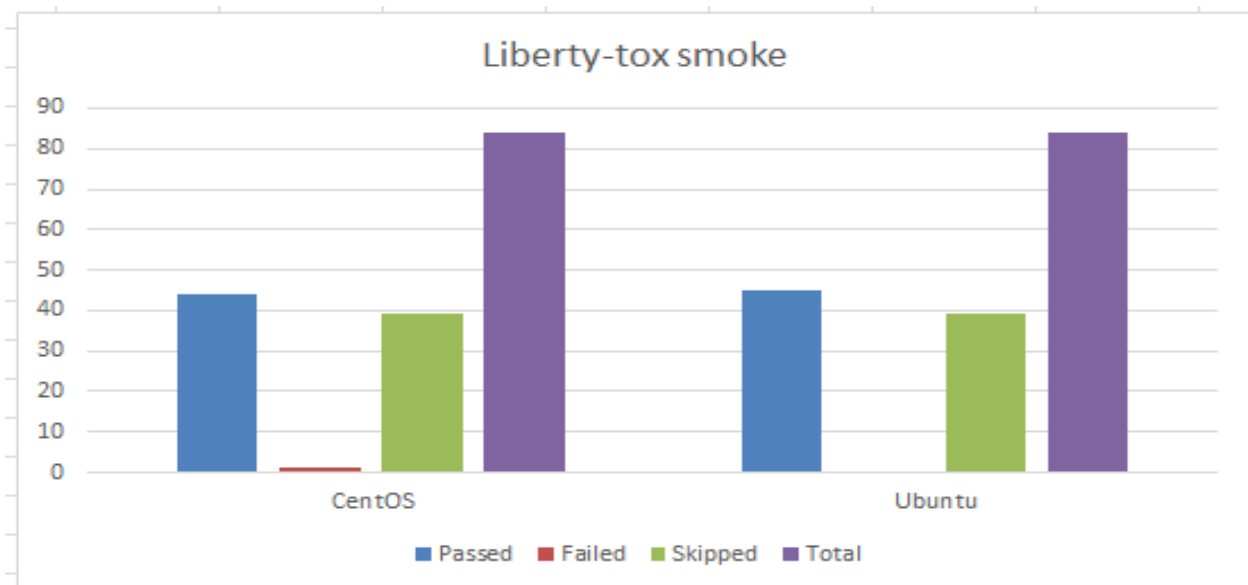


Fig. 4

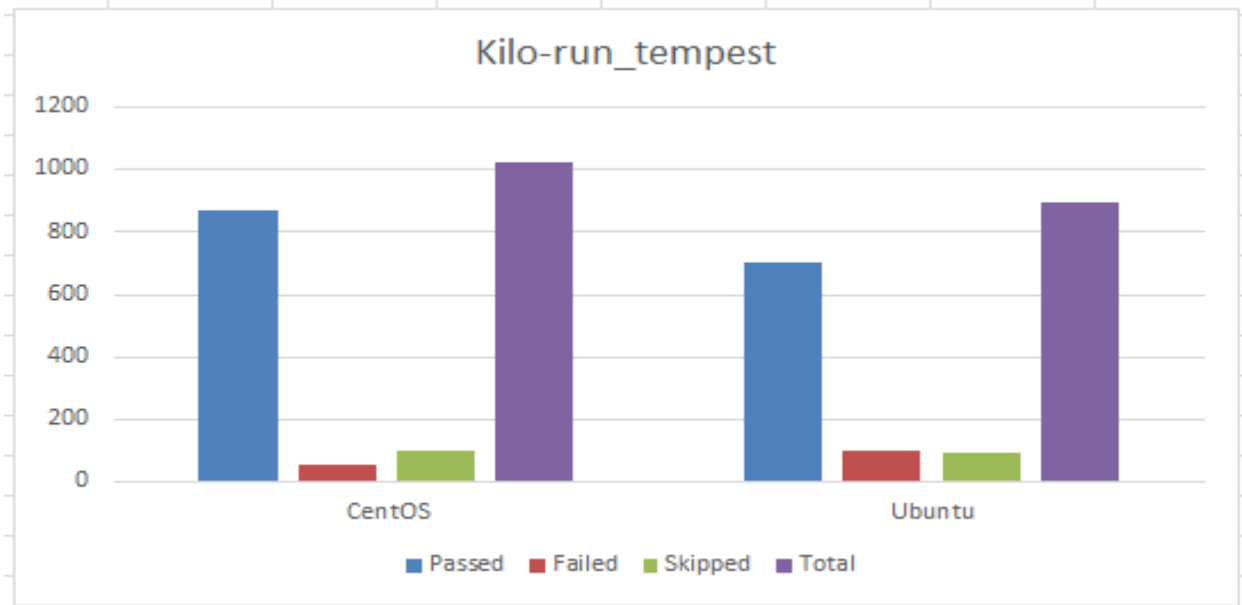


Fig. 5

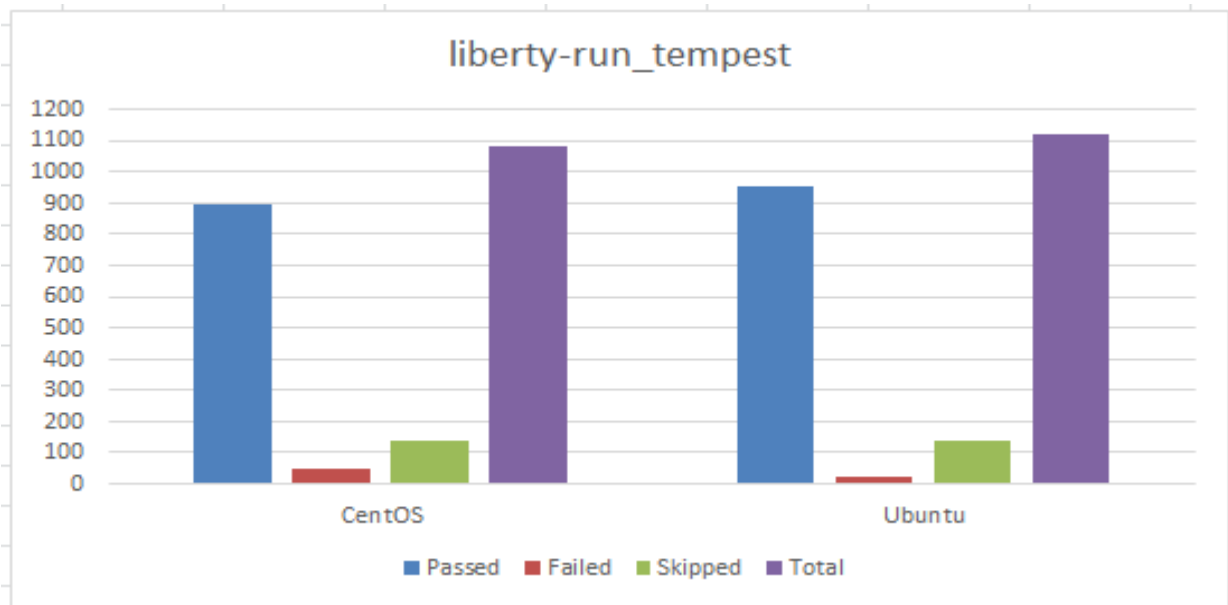


Fig. 6

CONCLUSION

From overall tests we can conclude that Ubuntu is better choice for OpenStack if compare with Centos. In future we will perform test on OpenStack implementation.

REFERENCES

- [1]. <http://docs.openstack.org/>
- [2]. <https://github.com/openstack/>
- [3]. <https://wiki.openstack.org/wiki/devstack>
- [4]. <https://github.com/openstack-dev/devstack>
- [5]. http://docs.openstack.org/developer/tempest/field_guide/