

# Storperf

## Project: StorPerf - Storage Performance Benchmarking for NFVI

### Description

The purpose of StorPerf is to provide a tool to measure block and object storage performance in an NFVI. When complemented with a characterization of typical VF storage performance requirements, it can provide pass/fail thresholds for test, staging, and production NFVI environments.

A key challenge to measuring disk performance is to know when the disk (or, for OpenStack, the virtual disk or volume) is performing at a consistent and repeatable level of performance. Initial writes to a volume can perform poorly due to block allocation, and reads can appear instantaneous when reading empty blocks. How do we know when the data reported is valid? The Storage Network Industry Association (SNIA) has developed methods which enable manufacturers to set, and customers to compare, the performance specifications of Solid State Storage devices ([Ref](#)). StorPerf applies this methodology to OpenStack Cinder and Glance services to provide a high level of confidence in the performance metrics in the shortest reasonable time.

See the Blog Post on [Storage Performance Guidelines](#) for more information.

### Slides and Demos

#### StorPerf - Using OpenStack to Measure OpenStack Cinder Performance (OpenStack Days Canada)



#### StorPerf Not Quite Live Demo (OpenStack Days Canada)



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## Storage Performance Indicators - Powered by StorPerf and QTIP

This video gives a little background on how StorPerf provides reliable metrics for QTIP.

### StorPerf Overview - OPNFV Summit, 2017



StorPerf- Using ...Performance.pptx

### StorPerf Metrics Deep Dive



Graphite Deep Dive.pptx

### StorPerf Demo - Danube Pre-Release

Project References

Meetings

## Storperf Team Weekly Meeting

Every Thursday at 1500 UTC during the winter  
(16:00 CET, 10:00 EST, 07:00 PST)

Every Thursday at 1400 UTC during NA DST  
Chaired by mbeierl (Mark Beierl)

Zoom: <https://zoom.us/j/5014627785>  
IRC Channel #opnfv-meeting on Freenode




## Links

- Primary contacts: Mark Beierl [mark.beierl@emc.com](mailto:mark.beierl@emc.com) and Edgar StPierre [edgar.stpierre@emc.com](mailto:edgar.stpierre@emc.com)
- Meetings & Minutes: [StorPerf Team Weekly Meeting](#)
- Original etherpad proposal: <https://etherpad.opnfv.org/p/StorageBenchmarkProposal>
- Updated proposal presentation: [storagebenchmarkproposal.pptx](#)
- Jira: <https://jira.opnfv.org/secure/RapidBoard.jspa?rapidView=3&view=planning&epics=visible>
- Gerrit: <https://gerrit.opnfv.org/gerrit/#/q/storperf>
- Git: <https://git.opnfv.org/cgit/storperf/>
- Jenkins: <https://build.opnfv.org/ci/view/storperf/>
- Jenkins code coverage: <https://build.opnfv.org/ci/job/storperf-verify-master/ws/cover/index.html>
- Docker images: <https://hub.docker.com/r/opnfv/storperf/tags>
- IRC: Server:freenode.net Channel:#opnfv-storperf

## Build Status

[Build Status](#)

## Open Bug List

Key	Summary	Created	Updated	Assignee	P	Status	Resolution	Fix Version (s)
<a href="#">STORPERF-249</a>	<a href="#">Graphite docker does not always bind to port 2003</a>	Jul 08, 2018	Oct 05, 2018	Unassigned		RESOLVED	Cannot Reproduce	
<a href="#">STORPERF-248</a>	<a href="#">storperf - delete stack after job complete</a>	Jul 05, 2018	Aug 01, 2018	Ameed Ashour		RESOLVED	Won't Fix	
<a href="#">STORPERF-251</a>	<a href="#">Can't run test074 twice</a>	Jul 10, 2018	Jul 11, 2018	Ameed Ashour		RESOLVED	Fixed	

[3 issues](#)

## Backlog

Key Summary Assignee Status

[No issues found](#)

## Key Project Facts

**Not found**

Could not find the given branch master

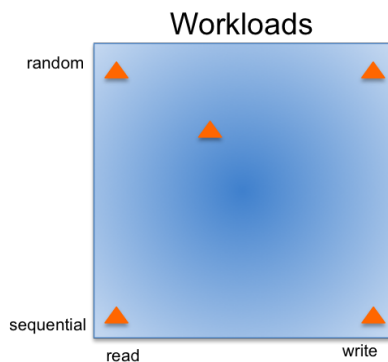
## Test Cases

This is an outline of test cases. A specification will be written capturing actual tests and steps. And of course, the input to the test process will be determined by community participation.

## Block Storage

Given the SNIA guidelines, testing of Cinder volumes or Glance ephemeral storage, regardless of back end driver. StorPerf makes no attempt to read the OpenStack configuration to determine what drivers are being used.

1. Preconditioning of defined Logical Block Address range
2. Testing across each combination of: Queue Depths (1, 2, 8) and Block sizes (2KB, 8KB, 16KB)
3. For each of 5 workloads: Four corners (100% Read/Seq, Write/Seq, Read/Random, Write/Random) and mixed (70% Read/Random).



## Object Storage

This is planned for a future release.

Assuming an HTTP-based API, such as Swift for accessing object storage.

1. Determine max concurrency of SUT with smaller data size (GET/PUT) tests by determining performance plateau
2. Determine max TPS of SUT using variable block size payloads (1KB, 10KB, 100KB, 1MB, 10MB, 100MB, 200MB)
3. Use 5 different GET/PUT workloads for each: 100/0, 90/10, 50/50, 10/90, 0/100
4. Perform separate metadata concurrency test for SUT using List and Head operations

Especially looking for workload recommendations for testing in this area.

## Metrics

Initially, metrics will be for reporting only and there will not be any pass/fail criteria. In a future iteration, we may add pass/fail criteria for use cases which are testing viability for known workload requirements.

## Block Storage Metrics

The mainstays for measuring performance in block storage are fairly well established in the storage community, with the minimum being IOPS and Latency. These will be produced in report/tabular format capturing each test combination for:

1. Average IOPS for each workload
2. Throughput bandwidth. Note that throughput data can also be calculated based on IOPS \* block size.
3. Avg Latency for each workload

## Object Storage Metrics

This is planned for a future release.

Object storage delivers different storage characteristics than block storage, and so the metrics used to characterize it vary to some degree:

1. Transactions per second (throughput can also be calculated from TPS \* object size)

2. Error rate
3. Per-test average latency

## Contributors

- [Saksham Agrawal](#)
- [Stephen Gooch](#)
- [Eddy Raineri](#)
- [Taimoor Alam](#), Technische Universität München [taimoor.alam@tum.de](mailto:taimoor.alam@tum.de)
- [YaYa Diallo](#)
- [Taseer Ahmed](#)
- [Ameed Ashour](#)

## Emeritus Contributors

- [Sam Decker](#), Unaffiliated, Algonquin College Student
- [Chanchal Chatterjee](#), EMC [chanchal.chatterjee@emc.com](mailto:chanchal.chatterjee@emc.com)
- [Vishal Murgai](#), Cavium Networks [Vishal.Murgai@caviumnetworks.com](mailto:Vishal.Murgai@caviumnetworks.com)
- [Vikram Dahm](#), Dell [V\\_Dham@Dell.com](mailto:V_Dham@Dell.com)
- [Stephen Blinick](#) [stephen.l.blinick@intel.com](mailto:stephen.l.blinick@intel.com)
- [srinivas tadeipalli](#), Tata Consultancy Services
- [Nataraj Goud](#), Tata Consultancy Services [nataraj.b2@tcs.com](mailto:nataraj.b2@tcs.com)
- [Dennis Qin](#), EMC
- [Daniel Smith](#)
- [Iben Rodriguez](#)
- [Tim RAULT](#)
- [qi liang](#)
- [Shrenik Jain](#)

## Committers

- [Mark Beierl](#)
- [Jose Lausuch](#)
- [Taseer Ahmed](#)

## Emeritus Committers

- [Edgar StPierre](#)
- [Shrenik Jain](#)