



# Harnessing Wire Speed Performance for Software Defined Storage

## HyperDrive, a Ceph Enterprise Appliance, Outperforms Traditional Xeon Hardware

It takes more than generic hardware to get outstanding performance for storage. It's a common industry misconception that commodity hardware is adequate for the unique demands of storage. However, a recent head-to-head performance test pitting a cluster of dual socket Xeon processors against our entry level HyperDrive, a Ceph enterprise storage appliance optimized for storage, couldn't match HyperDrive's read/write performance.

### Head-to-Head Performance Testing

StackHPC, an independent third party, performed extensive performance tests using HyperDrive configured as a Ceph storage cluster in a conventional enterprise configuration. HyperDrive's performance was compared to a reference system configuration that is commonly deployed as a storage solution and utilizes commodity hardware (Xeon servers). The HyperDrive appliance, by contrast, utilizes hardware and software that were engineered and built by SoftIron to specifically optimize storage processes. (For both the HyperDrive and reference platform's hardware specifications, please refer to the Appendix.)

### Read/Write Testing Results

#### 26% Faster Sequential Non-Cached Access

For sustained write performance, StackHPC found that the SoftIron server achieved a peak write bandwidth of approximately 817MB per second, exceeding the reference platform's sustained peak write bandwidth of 650MB per second. The SoftIron cluster outperformed the reference platform for most object sizes up to 2MB. This equates to HyperDrive outpacing the reference system by approximately 26% at peak write bandwidth.



### What is HyperDrive?

HyperDrive is an enterprise storage appliance that utilizes Ceph, the leading open-source distributed scale-out software platform.

HyperDrive scales out using distributed storage to give you the best possible performance. In independent customer tests, HyperDrive delivered wire speed throughput for each node and performance scaled up linearly with each additional node.

Learn more at [softiron.com](http://softiron.com)

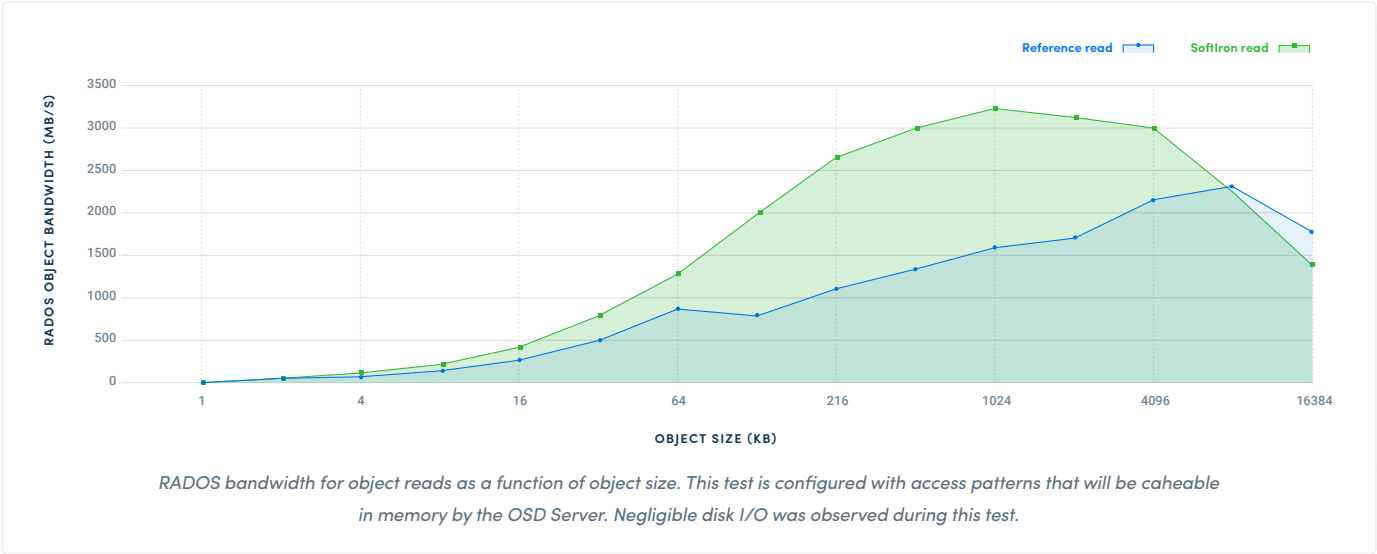




### 44% Faster Random Cached Access

For cached access, the SoftIron system again demonstrated write performance that was particularly strong for smaller objects. In this pattern of access, the SoftIron cluster had a peak write bandwidth of 606 MB per second and the reference platform had a peak write bandwidth of 740 MB per second.

The SoftIron read performance was very strong, peaking at 3300 MB per second, far exceeding the reference platform's peak read bandwidth of 2294 MB per second, an astounding 44% faster than the reference system.



### Testing Conclusions

The SoftIron Ceph platform delivered very strong performance in a number of areas. It was particularly strong at servicing object reads that have good cache locality. In this scenario, the SoftIron Ceph platform was approaching approximately wire

speed, simultaneously, from every OSD server. The SoftIron Ceph platform's write performance was mostly at or above the level of the well-specified reference platform.

# What Makes HyperDrive so Fast?

After reviewing these results, your next question might be: What makes HyperDrive so fast? There are a few unique factors that set HyperDrive apart from other storage solutions.



## Optimized Storage Hardware

Most storage vendors buy their components from other vendors and assemble them to create a generic, non-integrated solution that's actually optimized for compute, not storage. In the end, this type of generic hardware delivers poorer performance as we saw in the test results.

SoftIron takes a different approach: both HyperDrive's software and hardware are engineered and built by SoftIron from the ground up to do one thing extremely well: storage. The result is wire speed performance that beats the industry's hardware standard for a storage appliance.



## Built for Storage, Not Compute

Most storage manufacturers build their appliances around a motherboard, processor, and then add software. SoftIron started with the software first and then engineered all of HyperDrive's hardware components to work with it. HyperDrive utilizes Ceph, the best open source storage platform, and all HyperDrive components integrate with and exploit Ceph's outstanding functionality. The result is a solution that's optimized – from the ground up – for fast storage performance.



## Scalable Performance

HyperDrive scales out using distributed storage on commodity hardware. By distributing the load, you'll get the best possible performance from low cost hardware. As more HyperDrive boxes are added, read/write performance and scalability increase exponentially.

## TestDrive a HyperDrive

Try a Ceph-Powered Scale-out Storage Cluster for 90 Days.  
No Commitment. Cancel anytime.

[softiron.com/testdrive](https://softiron.com/testdrive)



## APPENDIX:

# Hardware Architectures



## HyperDrive

- › 8-core AMD Opteron A1100 ARM64 CPU. There is uniform access to all memory from all CPU cores.
- › CPU has a 4MB L2 cache and an 8MB L3 cache. A number of I/O components are integrated in its System-on-Chip (SoC) architecture, including fourteen SATA-3 ports and two 10GBase-T Ethernet ports.
- › SoftIron's server architecture uses all fourteen SATA-3 ports. Each server has ten 6Tb 7200 RPM HDDs, each operating as a Ceph Object Storage Device (OSD). Additionally, a 256GB SSD acts as write journal for the OSDs. Finally, there is a root filesystem for the server, located on a separate device.

## Reference system

The reference Ceph cluster deployment consists of three OSD servers. Each industry-standard x86 server has the following specifications:

- › Dual-processor 8-core Xeon E5-2630v3 CPUs, giving 32 hyperthreaded cores at 2.40GHz and 20MB L3 cache
- › 32GB RAM
- › 12x 1.8TB 7200RPM SAS drives
- › 4x 372GB SSDs (each SSD has 10G journals for 3x HDDs)
- › Two Intel 82559ES 10G Ethernet NICs. One NIC is dedicated to RADOS API and the other is dedicated to storage replication traffic.
- › Running Red Hat Enterprise Linux 7.2; automatically deployed as part of the OpenStack deployment. The reference cluster runs the Hammer release (0.94.5).



SoftIron® makes the world's finest solutions for the data center. The company's HyperDrive™ software defined storage portfolio is built on Ceph and runs at wire speed, while Hypercast™ delivers the best density and value for real-time video streaming. SoftIron unlocks greater business value for enterprises by delivering great products without software and hardware lock-in.