

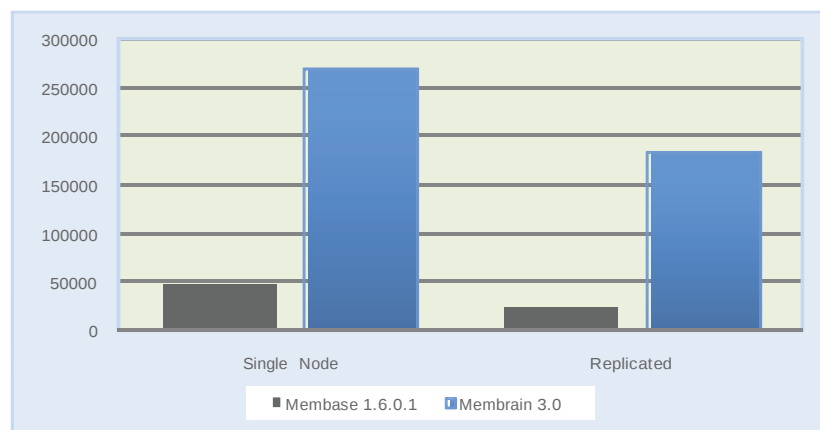
MEMBRAIN: THE SMART NOSQL, BASED ON MEMCACHED

Software that transforms standard x86 servers and flash memory into NoSQL super-servers

Membrain™ is a flash-optimized implementation of the widely-used memcached software cache, designed for optimal scale-up and scale-out. Membrain starts with Schooner's highly-concurrent implementation of memcached, extended to provide true persistence. It includes Schooner libraries that optimize and balance the use of multiple x86 processor cores, flash memory, and DRAM on commodity servers. Membrain includes high-speed synchronous replication and automated failover for enterprise use.

Scaling other caching software or NoSQL data stores usually requires you to keep the data on each server small enough to fit in the available DRAM. As the datacenter needs more cache or data store capacity, the only way to scale is to add servers and shard the data across them. That's expensive and inefficient, since many of these servers are poorly utilized.

Membrain offers a better way, scaling by exploiting cores and flash memory instead of rack after rack of servers, and eliminating the need to keep your data in DRAM to get great performance.



Key-value store queries / second on a 95%:5% load, on 1 TB data set on server with 64 GB of DRAM

Membrain transforms standard servers into memcached and NoSQL super-servers, providing access to up to 512 GB of flash memory on each server at DRAM-like speeds. You can handle way bigger loads with way fewer nodes, with minimal downtime.

Membrain is the best way to offload your database when you need the highest application performance. Membrain's enterprise-class availability also makes it the best high-performance NoSQL data store.

CUSTOMERS SEE THE BENEFIT

Plaxo solved its cache and NoSQL scalability problems by using Membrain on IBM 8-core x86 servers with 512 GB of flash memory. Rather than spreading 640GB of cache capacity across 10 servers each with 64GB of DRAM, Plaxo found that a single Schooner-powered x86 server was able to do the job. This resulted in a 10X reduction in power, cooling, and rack space.

"In the wonderful world of Schooner, failovers go away. Schooner replication means that you're sure that what you have on one node will also be on the other."

— Ethan Erchinger
Director of Operations
Plaxo

Engineered for Maximum Concurrency

Flash memory is 100x faster than hard drives with 1/100th the power consumption of DRAM. Multi-core processors allow parallel execution of multiple threads. But neither memcached nor NoSQL options such as MongoDB, CouchBase, or Cassandra were written to exploit multi-core processors or flash memory. Cores go unused. Flash IOPS go unexploited. You pay.

We wrote Membrain for maximum concurrency, true persistence, and high availability, making it a superb NoSQL data store. Membrain contains Schooner code that sits on top of the OS to balance the use of the server's cores, flash memory, and DRAM. This holistic and tightly-coupled approach allows Membrain to fully exploit the power of modern commodity hardware. You see the result as fast, efficient, available, productive, and green NoSQL and memcached.

100% Compatibility

Membrain is 100% memcapable, including binary protocol. If you use memcached or a NoSQL data store today, you can use Membrain just as easily but with far better economics and performance.

Membrain also supports containers. This allows the total flash memory capacity of each Membrain-powered server to be divided into multiple caches or NoSQL data stores. You can mix-and-match various classes of data and administer each separately.

Membrain

Used as pure memcached or as a persistent NoSQL data store, Membrain delivers:

- The best memcached and NoSQL performance, with hundreds of thousands of accesses per second per node;
- Persistence, including guaranteed completion of writes into flash memory;
- Support for PCIe, SAS and SATA flash memory, at DRAM-like speeds, on any commodity x86 server;
- Minimal downtime through high-speed synchronous replication and immediate automated failover;
- Isolation and policy control for different data sets via configurable containers;
- RAID and hot-swapping across flash memory for SAS / SATA drives;
- Comprehensive facilities for concurrent backup and restore;
- Massive savings in hardware spending and related operating expenses

Why Schooner?

Membrain substantially reduces your need for servers and the associated cost of power, pipe, and people needed to run your servers. Membrain delivers order-of- magnitude improvements in performance, downtime, and ease of scaling. Scale smart, with Schooner.

AVAILABLE ON YOUR PLATFORM

- Runs on Dell, HP, and IBM x86 servers or blades.
- Runs on Red Hat Linux 5.4 / 5.5 or CentOS 5.4 / 5.5
- Works with all SAS, SATA, and PCIe flash drives.

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