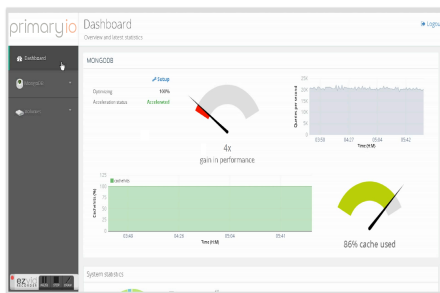


PrimaryIO APA™ for Online Analytic Processing (OLAP)

Highlights

- Improve OLAP database performance (OPS) 426% over traditional approaches
- Deliver faster analytics and decision making to meet challenging SLAs
- Create no adverse effect on database semantics or transaction reliability
- Respond to changing business requirements with no business disruption
- Does not require a change or upgrade to existing server and storage infrastructure
- Simple installation and management for application administrators and DBAs
- Support bare-metal, hypervisor or cloud deployment modes



"IT teams are increasingly concerned about the speed and cost of delivering services to their end users. The PrimaryIO APA software offers an innovative and cost-effective way for admins to accelerate performance of OLAP databases by leveraging existing server and storage resources to intelligently optimize IO and ultimately accelerate real-time analytics based on the needs of a particular business process or workload."

Mark Peters, Senior Analyst
Enterprise Strategy Group

At PrimaryIO, we are performance optimization specialists. Our sole focus is accelerating the performance of online analytic processing (OLAP) database applications such as MongoDB in the most cost effective and least disruptive way imaginable in order to maximize business results.

Application Performance Challenges

Operational databases such as MongoDB are deployed to support real-time analytic workloads that evaluate and help enterprises act on millions of diverse data sources that can change minute by minute or even second by second. Often the shape of the data whether it be semi-structured, unstructured or geospatial changes faster than systems can cope with. Example applications might include financial services companies analyzing ticks, tweets, satellite imagery, and any other type of data to inform trading algorithms in real time, or a retailer may decide to set up a digital geo-fence around their brick-and-mortar locations to push in-store incentives to shoppers in real time.

For these real-time analytic applications, performance and availability requirements are very high. In order to expedite an overall analytics job, application administrators need to accelerate both the data ingestion phase as well as the time required to mine the created data. Database applications such as MongoDB can incorporate any kind of data and are built to scale on commodity hardware deployed on-premise or in the cloud. But most IT admins attempt to resolve OLAP performance challenges by simply throwing more hardware resources as the problem which is often disruptive and highly expensive and may in the end not results in improved performance.

A New Approach - PrimaryIO APA™

Traditional storage I/O acceleration solutions available today have many drawbacks. Since they are not application aware, they write more data than is necessary to accelerate performance resulting in inefficient flash utilization and jittery performance. Application Performance Acceleration (APA) technology from PrimaryIO solves these limitations by intelligently and dynamically writing only the most relevant business analytics data to maximize application performance and minimize expensive flash usage.

The PrimaryIO APA technology is an application tier plug-in that integrates tightly with MongoDB. It identifies component I/O blocks such as collections, databases, indexes, etc., in the primary I/O stream that are important to tuning the performance of a MongoDB data store. The APA intelligently caches only the latest incremental information that will result in higher performance. Whether your datacenter is already pure flash or has a mix of hard disks and flash, PrimaryIO's software technology can help you redefine your approach to application performance acceleration.

Industry's First Application Aware Solution

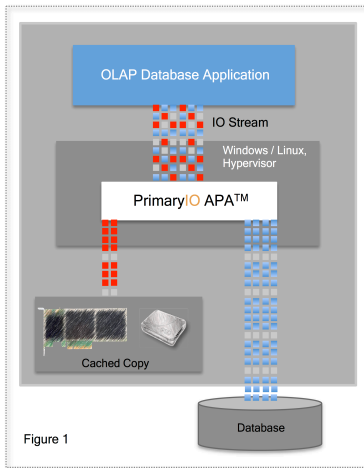


Figure 1

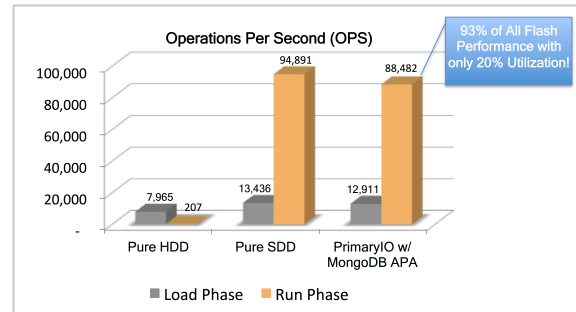
As illustrated in Figure 1, PrimaryIO APA™ is a software-only, hardware agnostic application acceleration solution for OLAP database applications. Regardless of whether the database is deployed on a Windows or Linux bare-metal server or hypervisor the PrimaryIO APA software is designed to improve performance to the highest level.

The PrimaryIO APA solution is simple to install and the GUI is intuitive and tailored for both system or application administrators. The Application Performance Acceleration (APA) application tier plug-in intelligently intercepts and caches a copy of the critical components of the incremental data set based on their ability to accelerate performance, such as frequently accessed collections or indexes that speed up queries. Application admins in particular benefit from easier management since they do not have to become system experts. Rather, they can optimize performance based on familiar database application components without the risk of adversely impacting existing server and storage infrastructure. The PrimaryIO solution requires no changes to the underlying system infrastructure and supports multiple cache modes including write-through to ensure transaction reliability.

Maximize Performance and Minimize TCO

Figure 2 below depicts an OLAP lab experiment of MongoDB used to run analytics on a web server log repository to get answers for various business intelligence questions. The data load phase includes importing the data into the MongoDB database while the run phase includes running analytics on the job on the latest inserted data set.

In the pure HDD test run, the system delivered 207 operation per second (OPS), but when that same data set was accelerated with the PrimaryIO APA technology for MongoDB the system delivered 88,482



OPS, a 426% improvement. What is most compelling is that PrimaryIO APA was able to achieve 93% of all-SSD performance while only requiring a cached data set that was 20% of the total database size. That's a significant TCO savings over alternative solutions that are less efficient because they cache all I/O indiscriminately or, in the case of an all-flash array, place the entire database in flash. The PrimaryIO APA solution in contrast is much less expensive and ensures there is no disruption to storage operations during the installation.

Product Specifications and System Requirements

Components	PrimaryIO APA Core, Web GUI and APA plug-in for MongoDB
Cache Type	Fully Associative Cache
Cache Mode	Write-through, Write-back, Write-around, Read-around
Cache Size	Maximum 1 TB
Management	GUI, CLI
Operating System	64 bit x86 Linux, Microsoft Windows 2008/2012
Environment	Bare metal, VMWare, KVM, Xen, AWS/EC2
RAM	40MB minimum for optimal performance
Processor	Two dual-cores Processor 2.2 GHz or more
Supported SSDs	SSD supporting PCIe, SAS or SATA interface

About PrimaryIO

Big data, web and database applications are stressing the limits of traditional IT architectures because storage performance has not kept pace with compute capabilities. Eliminating this bottleneck has become a top priority for IT organizations globally. PrimaryIO provides software solutions to dramatically increase application performance by accelerating data I/O throughput. PrimaryIO's first product, APA™, is a caching software solution that non-intrusively increases application performance while avoiding costly server and storage upgrades. For further details on PrimaryIO APA or to download the product, please contact: info@PrimaryIO.com or visit www.PrimaryIO.com.