

Breakthrough MySQL Database Acceleration

The performance advantages of the Pliops Extreme Data Processor

BACKGROUND

MySQL is a critical part of the application infrastructure for the most popular SaaS offerings, from the largest service providers to the most modern private cloud solutions. MySQL's ease of use and linear scalability enable high-traffic websites to handle massive data traffic volumes effectively. But these ever-increasing data and application workloads demand high-performance, low latency response coupled with robust data protection and scalable storage to meet the infrastructure demands resulting from growing end-user expectations.

Today's infrastructure runs up against two inherent bottlenecks:

- CPU limitations due to higher computational loads
- Storage I/O as a result of high data amplification

Despite advances in NVMe solid-state drives, computing performance has not kept pace, which exposes infrastructure inefficiencies that directly impact MySQL database performance and scalability. High computational loads and data amplification create storage I/O bottlenecks and consume vital compute and storage resources. Until now, the only option was to throw more money at the problem—adding servers, SSDs, and datacenter footprint—which doesn't provide a sustainable solution. The Pliops Extreme Data Processor (XDP) changes this by radically simplifying how data is processed and flash storage is managed to increase the effectiveness of your existing infrastructure investments for optimal MySQL database operations.

Key Highlights

Pliops XDP delivers exceptional MySQL performance and efficiency gains at significant cost savings:

- Up to 2.5x more queries per second to enable faster data processing
- Up to 8x lower latency enables fast and frequent updates
- Up to 6x more usable MySQL database capacity
- Reduce infrastructure footprint and lower CapEx by more than 50%
- Consistent performance even with massive volumes of write traffic
- Drive fail protection with zero trade off in performance keeps data safe
- Simple and fast to deploy with standard MySQL in any server with any SSD

Delivering Increased Performance

A primary challenge for effective database management is optimizing database performance and lowering latencies. Organizations adopt NVMe drives as a way to increase database performance. However, inherent inefficiencies in existing storage and server architectures make it virtually impossible to fully benefit from NVMe SSD performance. Pliops XDP enables organizations to unleash the full potential of NVMe SSDs by eliminating these inefficiencies. **Figure 1** shows Pliops XDP delivering 2.5x higher queries per second and an 8x reduction in four nines latency versus software RAID 0 with MySQL 6.1 database.

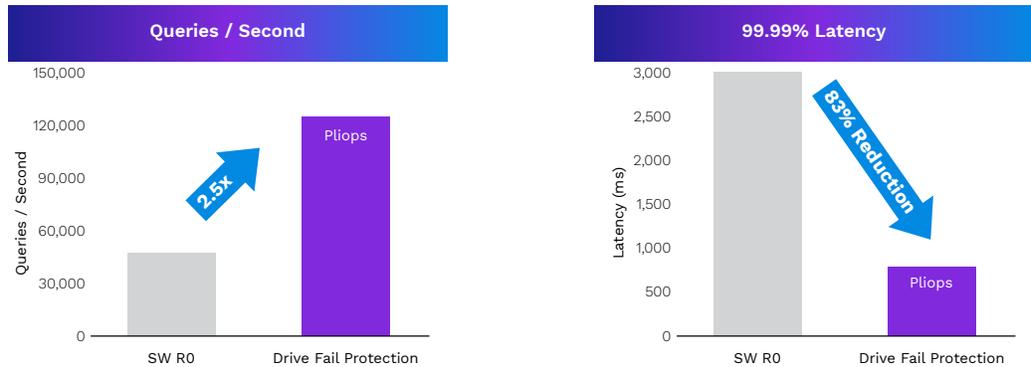


Figure 1: Significant improvement in queries/second and four nines latency

Database Protection and Resiliency

MySQL data protection can also directly impact performance. Today, storage architects and database administrators have to make a tradeoff. They can either optimize for performance with no data protection using RAID 0 and address the fault tolerance with a costly secondary environment. Or, they can prioritize fault tolerance with RAID 10/1 but accept reduced performance.

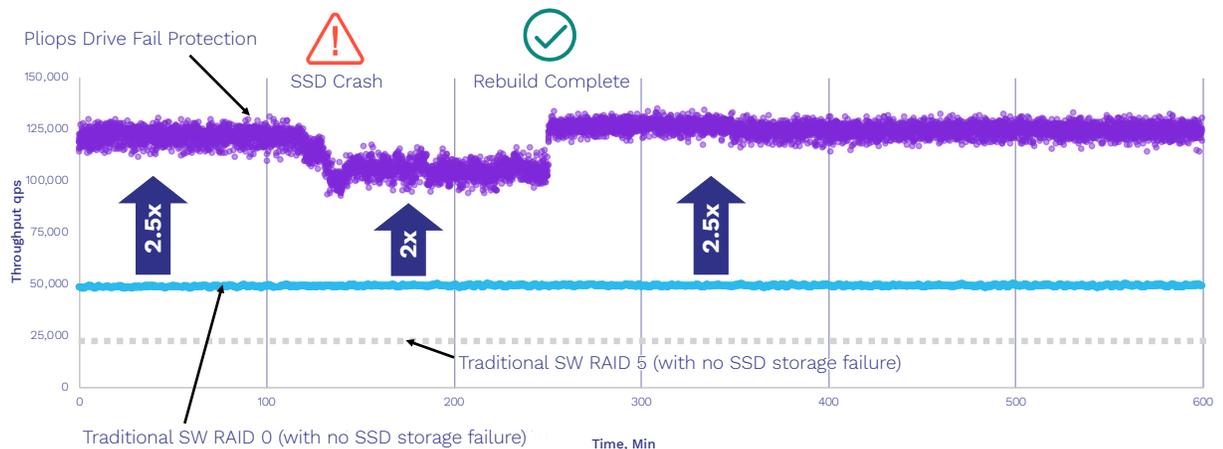


Figure 2: Pliops Drive Fail Protection performance vs software RAID 0 and RAID 5

Pliops XDP eliminates this performance or data protection tradeoff by natively delivering both in the product architecture. **Figure 2** shows Pliops architecture provides drive fail protection (similar to RAID 5) at 2.5x the performance of RAID 0. In the event of a drive failure, the performance benefit drops to 2x during the storage rebuild phase, but recovers to full performance within an hour. **Figure 2** makes it evident that Pliops XDP delivers exceptional performance compared to RAID 0 in normal SSD operations and even during the SSD crash and rebuild phase.

Scalable Capacity and Efficiency

Pliops XDP inline data compression, thin provisioning, and drive fail protection capabilities provide up to 6x more usable MySQL database capacity, all while reducing host CPU loading. With additional storage and compute power, database administrators can consolidate multiple databases without compromising application performance to manage database growth more effectively—resulting in significant savings on infrastructure costs and management overhead.

Traditional database storage engines incur excessive read, write, and space amplification, negatively impacting SSD performance and endurance. For high performance MySQL database applications, this amplification can range from 5x to 100x, consuming valuable system processor cores and network bandwidth resources. Excessive write amplification substantially reduces the performance and longevity of SSDs and increases storage costs. With Pliops XDP, enterprises can improve infrastructure capacity and the efficiency of managing MySQL database applications. This improvement provides flexibility to support scaling users or consolidating databases to reduce infrastructure footprint, lowering CapEx by more than 50%.

Ease of Deployment

Pliops XDP is plug-and-play, delivered on a low-profile PCIe card that works in any server and with any SSD, including TLC, QLC, Optane, and more. Using a standard NVMe block driver, Pliops XDP is up and running in minutes to accelerate MySQL databases and storage-intensive workloads. Flexible deployment models mean Pliops XDP can adapt to any infrastructure by seamlessly integrating with direct-attached SSDs, in a storage server, or in NVMe-oF storage systems.

Conclusion

With Pliops XDP, MySQL databases used for critical infrastructure for popular SaaS and private cloud offerings can experience the best of all worlds – performance, data protection, scalability, and ease of deployment. With the option to increase the efficiencies of existing infrastructure investments, while maximizing the advantages MySQL can deliver, Pliops database acceleration offers a cost-effective approach to solving some of today's greatest operational challenges. Learn more at pliops.com.

About Pliops

Pliops multiplies the effectiveness of organizations' infrastructure investments by exponentially increasing datacenter performance, reliability, capacity, and efficiency. Founded in 2017 and named as one of the 10 hottest semiconductor startups by CRN in 2020 and 2021. Pliops global investors include NVIDIA, Intel Capital, SoftBank, Western Digital, KDT, and Xilinx. **Learn more at www.pliops.com.**