

Faster insights for developing new medicines

Introduction

Eikon Therapeutics is building on Nobel Prize-winning super-resolution fluorescence microscopy tools (developed by Eikon co-founder Eric Betzig). Their Single Molecule Tracking (SMT) systems enable exquisitely precise measurement of the dynamic behavior of individual protein molecules in living cells, on a massive scale. Multiple individual proteins are fluorescently labeled within a cell, and hundreds of cells can be imaged in a single sample. By quantifying the movement of each individual protein molecule over time, they are building a profile of that protein's population dynamics, both in its native state and in the presence of drug candidates, hormones or other stimuli. They can capture hundreds of thousands of protein trajectories in less than a second. Eikon Therapeutics typically analyzes millions of experimental conditions each week.

Eikon Therapeutics employs the Starfish software application to store and manage drug discovery protein molecular files and objects. SMT systems store billions of files distributed across millions of directories and application has to traverse & analyze these billions of files at massive scale. The Starfish software utilizes the PostgreSQL database to store all the metadata information for these files and objects. Each server is equipped with twelve 1.92TB solid storage disks and high performance network interface cards from Mellanox.

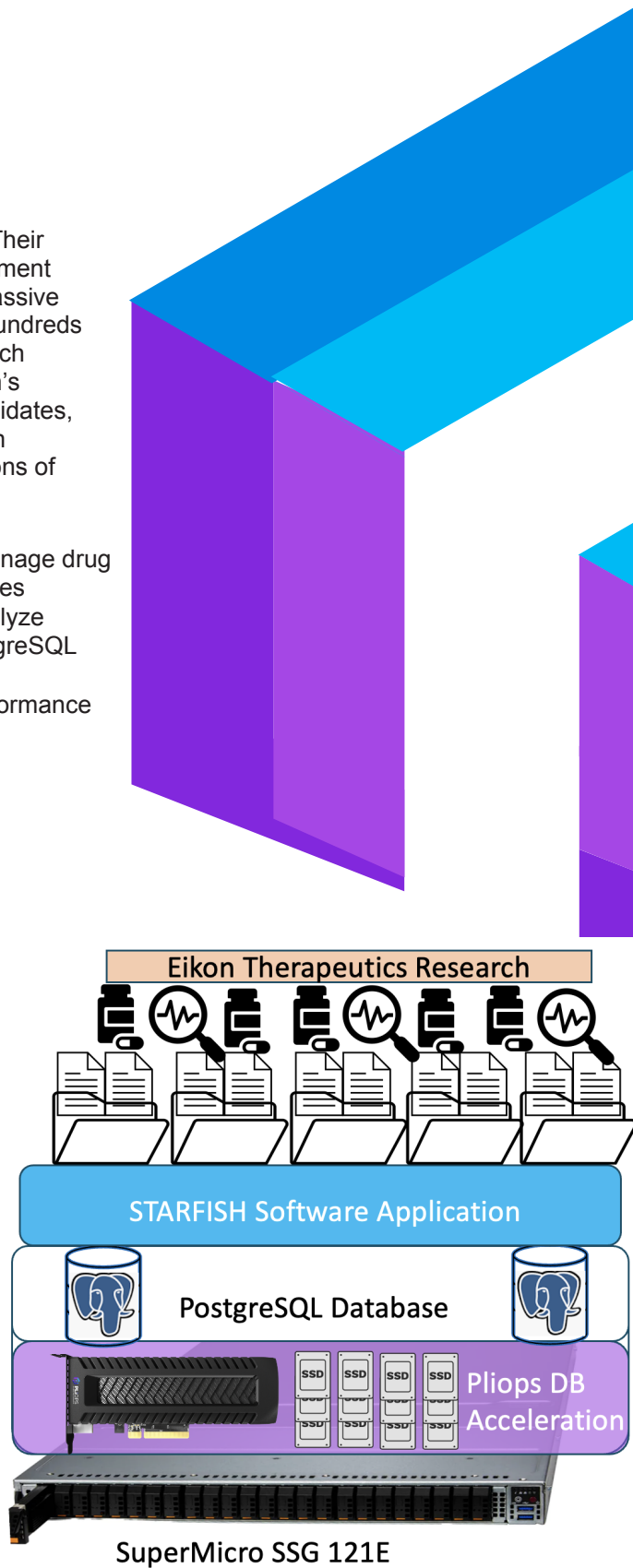
Operational Improvements

Eikon Therapeutics needed to improve overall operation aspects with a focus on performance, reliability and expanding into high availability and disaster recovery. They also sought to address data growth as part of their operational improvements.

First Eikon focused on performance : The current setup impacted PostgreSQL database performance due to traditional hardware raid limitation. To traverse the 2.5 billion unique files and its metadata look up around 10 days with native storage cluster based approaches.

The second focus was storage availability. Eikon was facing occasional drive resulting in extended recovery time. In addition, there was severe performan degradation during the drive rebuild process.

Based on these challenges, Eikon Therapeutics realized they needed a storage solution that could deliver higher performance with better reliability and recovery times.



SuperMicro SSG 121E

Solution

Eikon Therapeutics tested Pliops XDP-AccelDB with 12 Gen 4 NVMe SSDs which not only met their requirements, but also exceeded their expectations. The configuration details are described in the table below.

Accelerator Card	Pliops XDP-RAIDplus PCIe x8 form factor Low Profile HHHL (6.6" x 2.536")
Storage	12 Gen 4 NVMe SSD 1.92 TB x 12 drives
Server	2U Supermicro SYS-120U-TNR
CPU	Dual Intel® Xeon® Gold 6434 CPU @ 3.7 Ghz
Memory	1TB DDR4 2667 MT/s
OS	Rocky linux 8.7
Kernel	5.8.0.53

Results

10x throughput improvement compared to the older configuration setup. Concurrent sessions reached up to 200K objects/second in total, whereas most complex directories hit 80K objects/second every day.

The storage density per node also increased by 1.5x to 2X even with RAID 5 protection due to built in data compression.

Drive rebuild efficiency improved by 7x with a 2x faster recovery time. This enabled Eikon to meet or exceed RPO and RTO goals. The Pliops team will continue to further refine RPO and RTO metrics.

Disk Endurance has been enhanced due to all data being written sequentially. Eikon Therapeutics has faced no drive failure in the past six months.

Eliminated the need to stripe data and log to prevent spindle contention on writes to the data base.

The Eikon Therapeutics team has already implemented in their production system and now expanding with additional servers for DR and HA

In summary the Pliops solution impressed the Eikon storage team by significantly reducing their operational overhead.

To schedule your own XDP-RAIDplus evaluation, please reach out to demo@pliops.com
Learn more about XDP-RAIDplus at pliops.com/AccelDB

About Pliops

Pliops overcomes storage inefficiencies to massively accelerate performance and dramatically reduce overall infrastructure costs for data-hungry applications. Founded in 2017, Pliops is a winner of the 'Flash Storage Solution of the Year' Award in the Data Breakthrough Awards program and has been named a few times one of the 10 hottest semiconductor startups. Pliops global investors include KDT, State of Mind Ventures Momentum, Intel Capital, Viola Ventures, SoftBank Ventures Asia, Expon Capital, NVIDIA, AMD, Western Digital, SK hynix and Alicorn. Learn more at www.pliops.com.

Key Solution Benefits

- Up to 10x throughput improvement
- Up to 2x higher database storage density
- RAID 5 like protection with no capacity penalties
- SSD Write Amplification Factor reduced to 1
- Cost per TB reduced by 55%
- No dedicated hot spare required with Virtual Hot Capacity (VHC) feature
- Protection against 2 sequential drive failures with VHC