Success in Algorithmic trading is predicated by developing sound strategies and executing exhaustive backtesting using the widest range of financial market data and data from real-time sources including social media, news, and beyond. Over the last decade, algorithmic trading has transformed the landscape in financial services. Financial Services firms that have the ideal combination of algorithms, fast access to market data and infrastructure usually win big. Not surprisingly, most of the firms involved in algorithmic trading are adopting High Performance Computing (HPC) technologies to deliver a competitive edge in scale, performance, and ROI.

DDN is at the forefront of the proprietary trading infrastructure race, partnering with firms to deliver 5x the backtesting workflows in the same time it would take to execute a single workload on traditional architectures. A pioneering proprietary trading firm has deployed more than 140PB of DDN storage and nearly 2TB/s of storage bandwidth over the last 5 years to power their data-intensive backtesting and strategy workflows – that’s close to what the largest supercomputers in the United States National Labs have. In this case study, we provide details on the main workflows driving proprietary trading, data-intensive architectures and how the firm developed a solution that drives their core trading strategies.

Proprietary Trading Pioneer’s Strategy

One of the largest proprietary trading firms (to be called PropAlgo, henceforth) that is at the cutting edge of algorithmic trading, views their use of DDN and HPC-centric technologies as a competitive advantage over other firms. PropAlgo’s business is entirely dependent on timely analysis of financial market data. Most of PropAlgo’s analysis drives development of trading strategies, using exhaustive market data to backtest and improve them. The key to delivering accurate and timely strategies is the ability to efficiently execute backtesting while utilizing exhaustive market data and data from real-time feeds such as social media and news sources. For PropAlgo this meant that more market data they could get into their compute cluster memory, the more research they could do, and the more research they could do directly impacted the accuracy of their trading strategies.
ANALYZING PROPRIETARY TRADING ARCHITECTURES

When PropAlgo infrastructure architects, some of whom were ex-national laboratory scientists, first joined the company and started developing algorithmic trading solutions, they realized that the existing algorithmic trading infrastructure had several fundamental weaknesses that were bottlenecking performance improvements. The primary bottleneck identified was the firm’s Enterprise NAS data storage infrastructure.

DYNAMICS OF ADOPTING INNOVATIVE TRADING TECHNOLOGIES

Objectively analyzing application performance, identifying architectural weaknesses and breaking bad infrastructure habits of the past requires performance-expertise and strong organizational support. Six years ago when PropAlgo set out to deliver the data-centric architecture, it was a bit of a tough sell. Bringing in a new vendor that nobody had heard of to compete with traditional big name Enterprise storage vendors was an uphill battle. However, PropAlgo needed scalability and unhindered throughput. Until that point, none of the storage vendors that PropAlgo had worked with could provide the reliable, simple, cost-effective high performance infrastructure they needed. PropAlgo introduced one unit of DDN SFA® Storage, then purchased two units a couple of months later, and then 10 more units 6 months after that. PropAlgo hasn’t stopped buying DDN SFA Storage. To keep up with internal demand, driven by increased backtesting and strategy development, PropAlgo doubles their storage bandwidth every 6-9 months.
WHY DDN STORAGE FUSION ARCHITECTURE FOR PROPRIETARY TRADING

When architecting a data-centric architecture to drive current and emerging proprietary trading workflows, PropAlgo required a data management solution that was scalable and delivered high throughput for IO-intensive backtesting and strategy development workloads. The DDN SFA family of products has consistently delivered unmatched throughput, enabled unprecedented application scalability and consistent reliability. Independently audited results from STAC identify DDN SFA technologies as the definitive leader in scalable market data analytics (#1 Kanaga benchmark performance ever since the inception of the benchmark). In fact, STAC benchmark results covering market data analytics across storage vendors conclusively demonstrates that DDN SFA storage architecture delivers 3X-6X faster throughput than even the more expensive traditional storage, SSD Direct Attached Storage or all-flash arrays. PropAlgo chose DDN SFA7700, SFA12K® and SFA14K™ products as the core foundational layer for their data centric architecture because:

- DDN SFA technology exposed performance and high throughput access down to the drive level, enabling high throughput rates for backtesting applications.
- The DDN GRIDScaler® solution aggregated performance across the storage ecosystem and delivered unhindered access to storage targets, which allowed applications to scale and execute faster.
- The high-bandwidth, low-latency networks at the core of DDN Solutions eliminated IO bottlenecks across the systems stack, resulting in extreme performance for backtesting.
- PropAlgo like other financial services companies is looking to leverage high performance storage solutions for Risk Management, where DDN has delivered 452% faster SAS Grid and 450% faster Informatica risk analytics.
- PropAlgo can also leverage the unique DDN architecture to utilize the SSD tier – not just for faster metadata performance, but also for pinning parts of the applications on to SSDs, resulting in extremely responsive trading workflows.

PropAlgo has used DDN exclusively for their Storage environment driving the data centric proprietary trading architecture for the last 5 years. In aggregate, PropAlgo has deployed more than 120PB of DDN storage and nearly 1.7TB/s of storage bandwidth.

ARE YOUR VENDORS A GOOD CULTURAL FIT FOR PROPRIETARY TRADING?

Proprietary trading is arguably one of the most aggressive, demanding and results-oriented ecosystem. PropAlgo, like other proprietary trading firms, is a very technology-forward organization who always considers it imperative that they have access to product engineers, product managers and developers. What also set DDN apart is its openness to consultative engagements with end users.

- **Organizational Efficiency:** In trading environments when challenges or problems arise, they need to be resolved expeditiously. PropAlgo and more than 40% of the largest financial services firms buy DDN solutions because DDN works with end-users and deploys industry experts to help resolve problems and architect solutions with an exceptional customer orientation throughout the relationship.
- **Seamless Execution:** Proprietary trading firms are execution-driven, and POs for necessities like Storage are usually executed the same day when the need arises. Vendors need to be able to match the aggressive timelines and reliability metrics involved. When PropAlgo runs out of storage or IO bandwidth, they can immediately work with DDN and deploy two to three racks and get on with their trading analytics.
- **Strategic Partnership:** As with any technologically forward-thinking proprietary trading firms, PropAlgo needs to be able to ensure their needs are met in emerging product roadmaps. PropAlgo and other prop trading customers have a comprehensive understanding of the DDN manufacturing process, periodically engaging in consultative discussions with the CTO office for exploratory projects, as well as executive teams, product management, and product engineers.
BUSINESS VALUE IMPACT

By adopting data-centric backtesting and proprietary trading analytics powered by DDN, PropAlgo has been able to demonstrate unprecedented business value impact. Using DDN, PropAlgo has been able to lead the industry in revenue and profitability primarily driven by ability to run and backtest 5X as many strategies using DDN in the same time they could in their previous environment. Additionally, PropAlgo has managed to consolidate data centers and minimize CAPEX, while enabling higher performance and capability for business analytics on top of their core statistical research. It is no surprise that DDN powers more than 40% of the world's largest financial services firms.

DDN PRODUCTS FOR FINANCIAL SERVICES

POWERING 40% OF LEADING GLOBAL INVESTMENT BANKS

SFA14K

By integrating the latest high-performance technologies from silicon, to interconnect, memory and storage, the revolutionary DDN SFA14K™ Hybrid and Hyper-Converged Solution is the industry's fastest platform, delivering 6 to 660 GB/s of performance or 6 to 66 Million IOPs per rack. With massively parallel IO capabilities and a zero interrupt RAID engine, SFA systems deliver unprecedented performance with highly efficient capacity management, and latency lower than many flash devices.

SFA7700X

SFA7700X is a hybrid flash storage appliance, purpose-built for Big Data requirements. Leveraging the capabilities of SFA12XX, SFA7700X configurations start at less than 100TB and scale to Petabytes. SFA7700X is the first system to offer SFX® technology, designed to extract maximum performance and value from hybrid (spinning disk and flash) media. SFX integrates application-centric intelligence with the power of flash media to marry the performance of flash with the economy of hard disk drives.

GRIDScaler

DDN GRIDScaler parallel file system-based, Scale-Out NAS appliances integrate into mixed workloads, delivering bottom line results faster and more efficiently. DDN GRIDScaler appliances scale up or out, leveraging SSD-accelerated, hyper-converged, parallel architectures to deliver industry-leading performance for the most intensive applications and demanding environments. DDN GRIDScaler parallel file system appliances combine the accessibility of network data protocols with the industry's fastest and densest embedded storage solutions for 10-30x higher performance and 2-6x higher capacity per data center rack U.

WOS

WOS is a turnkey object storage appliance used for secure collaboration, cost effective local or remote archives and disaster recovery. With no POSIX file system layer, WOS offers extremely high utilization rates. Easy to set policies ensure data is retained at user-defined locations and redundancy levels, automatically. WOS integrates seamlessly with DDN Parallel file system appliances so manufacturing customers can share simulation and mission critical data globally for collaboration, active archive and disaster recovery.

ABOUT DDN®

DataDirect Networks (DDN) is the world's leading big data storage supplier to data-intensive, global organizations. For more than 15 years, DDN has designed, developed, deployed and optimized systems, software and solutions that enable enterprises, service providers, universities and government agencies to generate more value and to accelerate time to insight from their data and information, on premise and in the cloud. Organizations leverage the power of DDN technology and the deep technical expertise of its team to capture, store, process, analyze, collaborate and distribute data, information and content at largest scale in the most efficient, reliable and cost effective manner. DDN customers include many of the world's leading financial services firms and banks, healthcare and life science organizations, manufacturing and energy companies, government and research facilities, and web and cloud service providers. For more information, visit our website www.ddn.com or call 1-800-837-2298.