

WHITEPAPER

Increase Your Storage Utilization and Improve Your Bottom Line

In today's economic climate, businesses are being forced to reevaluate their budgets and reduce overall IT spending. At the same time, companies have adopted sustainability initiatives finding ways to reduce their carbon footprint by minimizing power, cooling and space. With all this reduction, the one thing that continues to grow is the amount of data.

With this exponential data growth and shrinking IT budgets, it is becoming mandatory to utilize storage more efficiently. Just imagine filling up your car's tank with gas but then being able to use only 20-40% leaving 60-80% of the gas unused! It may sound ridiculous, but this is usually what happens when you buy a storage system.

A lot of focus in the past several years has been on server virtualization for cost, power and space savings but the storage system has largely been ignored. The industry accepted an underutilized storage system and rather than tackling the issue head on, storage vendors have continued to add more drives to the system to get the performance needed to meet Service Level Agreements (SLAs).

So how can you better manage unconstrained data growth with the conflicting demands on IT budgets? This is where Pillar steps in. The Pillar Axiom storage solution allows you to stop wasting storage, power, space and perhaps most importantly – money.

What Led to Storage Being Wasted?

Low storage utilization has a lot to do with using antiquated, outdated storage architectures. With these traditional storage systems, you are forced to separate workloads to guarantee performance. This approach leads to a large amount of drives being allocated to a small amount of data. The only way to increase performance is to purchase additional drives in order to meet the appropriate performance needs. Worse yet, you may need to invest in a more expensive alternative by replacing the current system altogether and upgrading to a more powerful system – all the while using just a small portion of the available storage capacity.

These alternatives become expensive in terms of hardware acquisition costs; software license upgrade costs; system downtime to add or replace the hardware and reconfigure the applications; additional power and cooling costs; and waste precious floor space. These additional costs increase the total cost of ownership over the lifespan of a storage system making the cost much higher than was calculated at the time of purchase.

Pillar Data Systems viewed low utilization rates as an extremely important issue and architected the Pillar Axiom from the ground up. You may find other companies that have written software in an attempt to mask the issue, but with the Pillar Axiom hardware, combined with our unique Quality of Service (QoS) software and distributed RAID technologies, Pillar has driven utilization rates up to 80%, and we guarantee it in writing.

The Pillar Axiom Guarantee – High Utilization with Linear Performance

Pillar's guarantee goes beyond just looking at storage utilization and adds the performance factor to the equation. Other vendors may claim they are able to store more data on the drive, however, the performance impact is not taken into consideration. Pillar will guarantee, in writing, 80% utilization of total usable capacity while maintaining an agreed upon performance level. This is not a blanket one-size-fits-all guarantee, we take it one step further and customize the guarantee to make it meaningful for your unique environment.

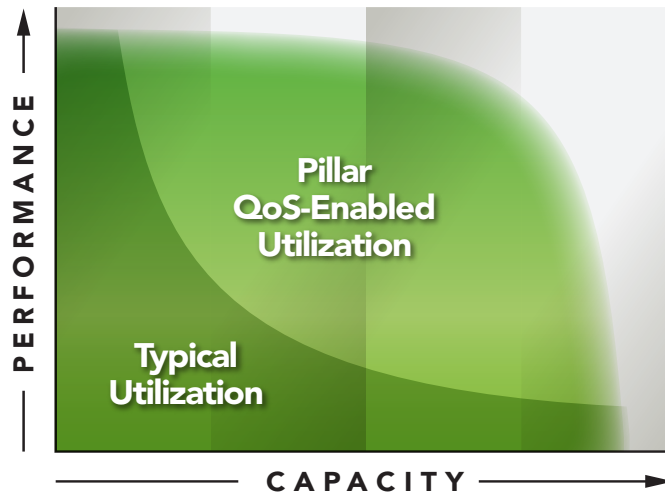


Figure 1: Pillar is able to improve utilization with fewer drives than the industry norm and with no performance degradation.

So How Do We Do It?

The Pillar Axiom delivers on its utilization promise through our innovative modular design, Quality of Service software and application profiles.

The Anatomy of the Pillar Axiom

The Pillar Axiom architecture consists of three main building blocks: Pilot policy controller, Slammer storage controller, and Brick storage enclosures.

Axiom Pilot Policy Controller

The Axiom Pilot is the management interface for Axiom systems. We designed a separate, highly-available management enclosure so that day-to-day management tasks do not steal valuable processing power from applications using the Axiom. Each Pilot uses redundant hardware and the Axiom Storage Manager software to ensure reliability, availability, security through an easy to use Web-based GUI. The Pilot is tightly integrated with Pillar's AxiomONE™ software suite, enabling intuitive storage management, configuration, and monitoring.

Axiom Slammer Storage Controller

The Axiom Slammer is the storage processor for the Axiom system. Pillar broke the “two controllers do it all” model by moving the RAID controllers out of the storage processing unit and placed them into the Brick storage enclosure. The Slammer is completely redundant and consists of dual, active/active control units, redundant fans, power, and mirrored cache – everything you'd expect in a system architected for an enterprise environment that is dependant on high availability. A single Pillar Axiom 600 storage system can have up to four Slammers (8 control units). Supporting multiple Slammers in the same Axiom system means you can add storage processing power without having to purchase another system or replace it with a larger one. The Pillar Axiom grows as your storage needs grow without introducing additional management points, extra software licenses, or costly downtime.

Axiom Brick Storage Enclosure

Pillar took the same innovative approach when we designed the Axiom Brick storage enclosure by offering a range of drive types to support your business needs. Bricks are available with Solid State Drives (SSD), Fibre Channel (FC), SATA, or an intermix of drive, supporting up to 12 drives per Brick for FC and 13 drives per Brick for SSD or SATA. Each Axiom Brick contains two RAID controllers, so for every Brick you add to the Axiom, you are adding two RAID controllers improving overall efficiency while maintaining optimal performance.

The Best of Both Worlds: High Performance and High Utilization with Pillar's Application-Aware Profiles

The Pillar Axiom is the first and only true Application-aware storage platform on the market. With the Axiom's user-definable application profiles, administrators provision LUNs or filesystems (FSs) by application much like virtualized servers are provisioned. This enables the Axiom to differentiate services based on application workload as defined by best practices and SLAs, without the complexity experienced when configuring traditional storage systems. No longer do you need to worry about which LUN or FS resides on what drive type. With application profiles the Axiom manages the details in the background and dynamically provisions cache, capacity and CPU based on the applications' needs.

Most companies have various types of data that have changing priorities based upon business needs. With the Axiom, we take the guess work out of how to assign storage resources and ensure that as your application needs change it receives the appropriate level of Axiom system resources, including cache, capacity and CPU. QoS software prioritizes I/Os based on the needs of the application and business, with the high priority I/Os getting more system resources than lower priority I/Os. This allows you to meet established SLAs and guarantees performance. You also have the flexibility to set up a policy to automatically increase or decrease the priority of specific applications temporarily as it is needed.

In addition, we have characterized the I/O profiles of today's popular applications, including Oracle, SQL, Microsoft Exchange, VTL, and VMware. These configuration parameters have been saved as open source Axiom Profiles and are available to you in a simple drop-down menu in your Axiom's Storage Management Tool. All you do is choose a profile from the menu and the Axiom will literally tune itself. By using Pillar's profiles to tune and provision your storage system, you benefit from having a faster deployment which in turn, can save you money on professional consulting costs.

QoS exploits the multiple capacity-performance choices for storage by selecting the price-performance points that best meet the requirements of your applications.

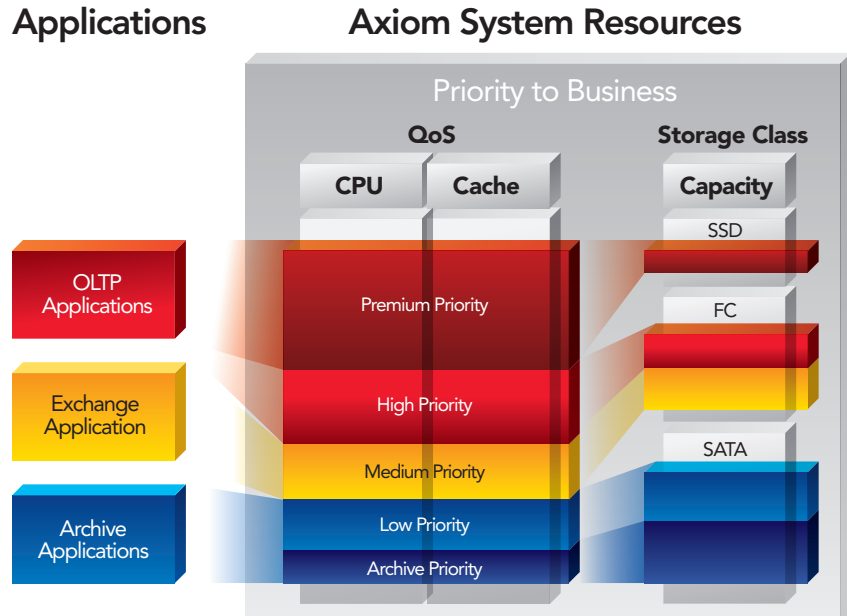


Figure 2: The Axiom differentiates total storage system resources – CPU, Cache and Capacity – based upon application priority.

Thin Provisioning for High Utilization and Predictable Performance

Preparation for future storage needs shouldn't mean buying more capacity than you need today. Being able to allocate storage based on future need without "claiming" that space and making it unavailable and unused is a key benefit of the Axiom. This allows you to maximize the amount of storage needed to support a given application.

Thin provisioning is recognized in the industry as a critical approach to simplifying storage management while drastically improving storage capacity utilization. In fact, Pillar's Axiom One Thin Provisioning along with QoS, large amounts of cache and distributed RAID, Pillar delivers industry-leading utilization rates and will drive utilization even higher for thinly provisioned LUNs and FSs while maintaining consistent performance. No other thin provisioning vendor can consolidate multiple applications in a single system with a dynamic quality of service assigned to each virtual volume.

Pillar's unique storage allocation architecture ensures that performance does not degrade when additional Brick storage enclosures are added to meet capacity requirements, even under fault conditions.

Pillar's Unique Approach to Distributed RAID

Pillar has taken a different approach to RAID within the Axiom system allowing us to deliver twice the average industry utilization rates. Unlike other storage vendors where two controllers do it all, we put two RAID controllers in each Brick storage enclosure and have a 6:1 drive to controller ratio, independent of the number of total drives. As a result, I/O processing for RAID is done in the Brick and not in the front-end control units giving more I/O processing capability for applications.

The diagram below illustrates our RAID implementation versus a typical approach. The Pillar Axiom on the left consists of a single Slammer that contains at least 24GB of cache, four SATA Bricks (the four on the top) and four FC Bricks (the four on the bottom). It clearly shows 16 RAID controllers and how each one controls a maximum of 6 drives. A typical storage array is displayed on the right where you see just two controllers with maybe 8GB of cache managing all 90 drives. It would be very difficult to use those drives efficiently and maintain anything near optimal performance based upon this type of legacy system architecture.

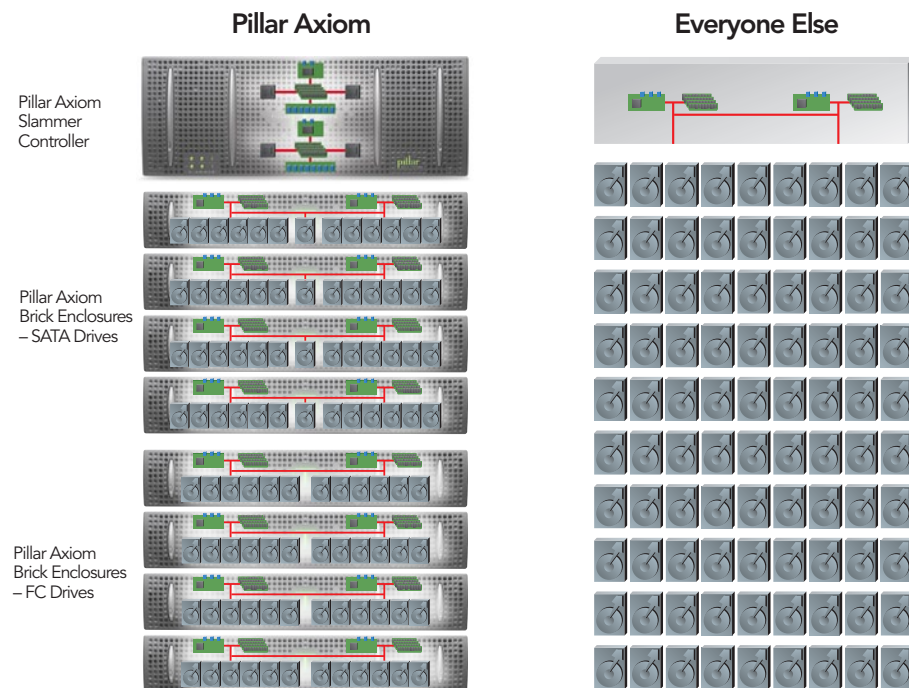


Figure 3: The Axiom deploys 16 controllers (two per Brick) to manage 100 drives – in contrast to the approach most vendors take with two controllers for 90 drives.

The benefits of this architecture to you include, among other things, increased write performance, the fastest rebuild times in the industry (even under fault conditions) and improved data protection.

With our distributed RAID architecture you can easily grow a single Axiom 600 up to 1.6PB of raw capacity while maintaining multi-tenancy capability, with the added capacity automatically integrated into the storage pool.

With traditional storage you are only assured of increasing capacity when drives are added. With Pillar's distributed RAID it is easy to see that dedicating two RAID controllers per Brick allows the Axiom to predictably scale in performance with the addition of each Brick. Pillar has taken out the guess-work involved when purchasing storage giving you better utilization, higher performance, and lower costs.

Hear what our customers are saying

Earth Rangers: Improving Your Storage, Improving Your Bottom Line

Earth Rangers, a Canadian non-profit organization, came to Pillar Data looking for a storage alternative that would support their growth plans and green initiatives. They had identified several Important considerations prior to looking for the ideal storage solution that included expandability, scalability, smooth integration with their VMware environment, and energy efficiency. After extensive research and evaluation of other storage vendors, the IT team at Earth Rangers concluded the Pillar Axiom was the best solution to meet their requirements. They found they could consolidate multiple tiers of applications and data onto a single Axiom platform, reduce energy consumption and costs in half, double their storage capacity, all while achieving the industry's highest utilization rates.

Summary: Gone Are The Days of Throwing More Drives at Storage Problems

Recognizing the challenges associated with maximizing storage utilization while maintaining appropriate performance levels was a fundamental issue of traditional storage systems, Pillar Data designed a solution unlike anything else on the market today. The Axiom's unique scalable design allows you to meet your capacity and performance needs delivering utilization rates double the industry average and reducing total cost of ownership by up to 50%.

With the highest utilization rates in the industry – up to 80% guaranteed – the Pillar Axiom is right choice for the modern data center.

Pillar Data Systems takes a sensible, customer-centric approach to networked storage. We started with a simple, yet powerful idea: Build a successful storage company by creating value that others had promised, but never produced. At Pillar, we're on a mission to deliver the most cost-effective, highly available networked storage solutions on the market. We build reliable, flexible solutions that, for the first time, seamlessly unite SAN with NAS and enable multiple tiers of storage on a single platform. In the end, we created an entirely new class of storage.

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