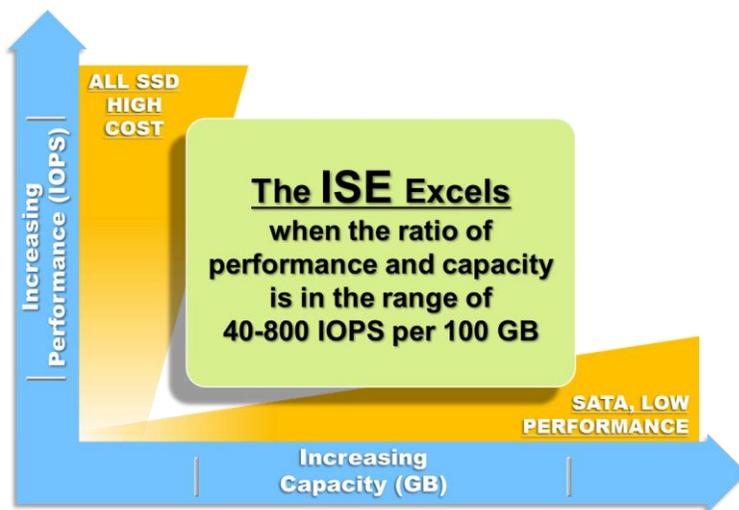


Storage Building Blocks for Performance Applications

X-IO was founded in 2002 as the Seagate Advanced Storage Architecture division. The division was charged with developing a storage unit unlike anything ever created; a storage building block that grouped high-end drives in a synergistic way to deliver meaningful, customer-valued advantages. The resulting product was the first **Intelligent Storage Element** and the beginnings of the **ISE product line**. The ISE excels when the application needs both performance and capacity.

Real-world applications are neither performance-insensitive, nor capacity-insensitive. To operate properly and reliably, they require particular, calculable configurations of IOPS per GB of capacity, which larger data center operators usually express as a performance/capacity metric: “The number of IOPS required per 100 GB of storage provisioned.”

Application demand on storage varies widely from application to application. A properly sized (in IOPS and GB) storage system is the first step to an efficient, effective use of storage related capital.



Application Environment	Typical IOPS required per 100 GB of capacity
Desktop Virtualization	40-80
Server Virtualization	75-250
Transaction Processing	200-300
Data Warehousing/BI	300-400

The Price Advantage

The ISE product models, with a wide variety of hard drives and SSD in the base 40-drive 3U unit, are designed for applications requiring between 40 and 800 IOPS for each 100 GB of storage provisioned.

In that 40-to-800 IOPS per 100 GB range, the **ISE is the lowest priced storage option available, on a price-per-GB basis**. In other words, once you calculate and fix your IOPS-per-100-GB-of-capacity requirement, no other enterprise storage vendor can provide that capacity (and those IOPS) at a lower price than X-IO. **We guarantee it.**

X-IO leads the storage industry on this real-world price-performance metric because our storage arrays are engineered, from the ground up, to drive more – usually 2x – performance from each drive, which means in turn that, when you’re using X-IO ISE storage arrays to power your applications, you never have to over-provision capacity in order to reach required IOPS thresholds. Or, vice versa, you never have to pay for more IOPS than you need to meet your application and capacity requirements.

The Warranty Advantage

ISEs are self-healing. The drives are top of the line enterprise drives, not the inexpensive, low duty-cycle SATA models used by others. Drive failures are handled and repaired, inside the ISE, by our patented software, without disrupting or reducing either the capacity available to applications, or the rated IOPS available to those applications. This allows ISEs to remain in service, with little administrative intervention for five or more years, compared to the industry’s norm of three years. We back this claim with a **five-year, no-cost warranty**, in a market where our competitors charge astronomical fees for their fourth and fifth year hardware warranties. Those charges are hidden and include significant acquisition costs that X-IO customers avoid, completely. **Storage so good, a five-year warranty.**

The Energy Advantage

Unlike most storage arrays, where value-added engineering is confined to the storage controller, the ISE is carefully designed, at every level, to be extremely parsimonious in its use of energy. We engineer every aspect of our system – from the enclosure’s cooling envelope to the ball bearings in our custom-designed fans – to reduce direct and indirect energy consumption. The result is straightforward, and significant: up to 48 TB or 60,000 IOPS delivered by only 700 watts or less of direct energy consumption, and a front-to-back temperature differential of less than 10 degrees centigrade. In a typical installation, **the ISE consumes 32-38% less direct energy (and an equivalent amount of indirect energy, in the form of heat load and ambient noise reduction) than competitive systems.**

The Predictable Capacity and Performance Advantage

Unlike traditional storage arrays, with X-IO ISEs:

- **Capacity never degrades.** The rated capacity of any ISE on day one, and its available capacity on the final day of the fifth year of its warranted lifecycle are identical.
- **Performance whether empty or full.** The rated IOPS of any ISE are always the minimum available to applications, no matter how full the array becomes.

The Frame-Free Scalability Advantage

ISEs do not depend on a legacy storage controller to power performance-hungry software stacks and applications. Instead, the **ISE is designed, explicitly, to be managed by the element in the software environment chosen by the customer as the suitable locus of control:** the operating system, the hypervisor, the database management system, or the application itself. This frame-free model for enterprise storage is, increasingly, the dominant model for large-scale storage architecture, as evidenced by the investments made by VMware, Oracle, Microsoft and other enterprise software companies, and by the dominance of the idea of “software-defined storage” in today’s architectural thinking. With the ISE, no separate controllers are required to build multi-petabyte storage pools under software management, and there are never any hidden forklift upgrades required to scale capacity and performance. **A customer’s oldest ISE will cooperate, in a single storage pool, with the customer’s newest ISE, seamlessly and at rated capacity and performance, for its warranted five-year life, and beyond.**

For large-scale data center operators deploying public or private cloud environments, where software-based configuration and change management (CCM) for storage is one of the keys to rapid self-provisioning, operating cost reduction and SLA management, **the ISE’s complete and industry-unique RESTful APIs** – the basis of our frame-free scalability – **allow for autonomous storage management:** complete, software-based control over every aspect of the storage pool’s operation from either open-source cloud platforms (e.g. OpenStack) or custom-coded applications as are commonly found in PaaS and SaaS environments.

The Availability and Reliability Advantage

Large-scale data center operations are, ultimately, focused on the predictability and stability of the portfolio of applications and services under management. In too many cases, brittle data centers lack this predictability and stability because the underlying storage architecture – purchased on the basis of performance-indifferent cost-per-GB – lack both the availability and reliability to keep mission-critical applications up and running effectively. Storage architectures based on the ISE:

- Exhibit up to **seven-nines availability (99.99999%)**, leveraging individual ISEs’ in-situ repair and remanufacturing capability, as well as ISE data continuity and availability features like X-IO’s Active-Active Mirroring, which pairs ISEs in high-availability configurations.
- Require **little or no ongoing human intervention** to operate at rated performance or capacity.

Pay Less and Get So Much More!

As the procurement penchant for performance-indifferent storage purchases based on capacity alone becomes a thing of the past, and as organizations discover that solid-state disk is best deployed in tandem with traditional hard drive storage in hybrid configurations, more and more organizations are fixing their storage performance requirements, and making purchase decisions based on IOPS-per-GB calculations. For those organizations, **X-IO represents the lowest-cost supplier of enterprise-grade performance storage.**



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