

ESG Economic Audit

Analyzing the Economic Benefits of Kaminario Cloud Fabric

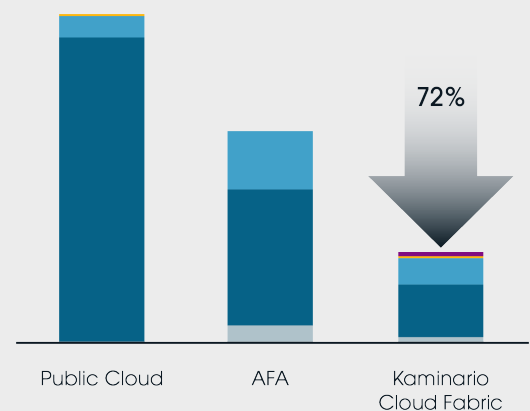
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Executive Summary

Kaminario Cloud Fabric combines the best features of on-premises and public cloud storage: low-cost on-premises all-flash storage hardware with a pay-per-use software consumption model.

ESG completed a total cost of ownership analysis of Kaminario Cloud Fabric across five categories—cost of capital, storage capacity, maintenance and support, power and cooling, and storage administration—for a prototypical organization with a multi-petabyte storage footprint. ESG confirmed that Cloud Fabric can be used to reduce the cost of delivering storage-as-a service by 72% or more.

Kaminario Cloud Fabric Economics (Three-year TCO)

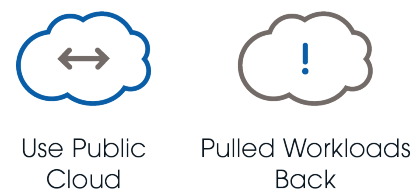


Introduction

This ESG Economic Audit quantifies the savings that can be expected when using Kaminario’s software-defined Cloud Fabric as the cornerstone of building an on-premises storage-as-a-service offering compared with renting block storage from a public cloud provider or purchasing an all-flash array from a traditional storage vendor.

Background

According to ESG research, 85% of surveyed organizations are currently using public cloud computing services and only 3% of organizations have no plans to use the public cloud. The public cloud is certainly an attractive option. The public cloud eliminates the need for physical administration and the ownership of physical resources. It's quick and easy to deploy and ideally suited for temporary and unpredictable workloads. The initial entry costs are attractive—no large upfront investment is required. However, entry cost is only part of the story.



According to ESG research, 41% of organizations currently using IaaS have moved at least one application/workload from a public cloud infrastructure service back to on-premises resources.¹ This emerging trend of workloads being repatriated back from the public cloud to on-premises storage is driven by concerns about the potential risks and costs associated with public cloud storage.

Organizations and service providers with a multi-petabyte storage footprint are acutely aware of the potential risks and costs associated with the public cloud. IaaS offerings cannot deliver the economics at scale that cloud-scale organizations and application providers expect. In addition, security and regulatory concerns make it difficult for IT organizations to move all of their workloads to a hyperscale public cloud provider.

This report explores how Kaminario Cloud Fabric provides a new choice that combines the best of both worlds: low-cost on-premises all-flash storage hardware with a pay-per-use software consumption model.

Kaminario Cloud Fabric

Kaminario Cloud Fabric provides a software-only consumption model for the Kaminario composable data platform. Cloud Fabric customers deploy the VisionOS software-defined storage platform and the Clarity analytics suite with a simple, enterprise-wide “pay as you go” software license. The software is preinstalled on a certified industry-standard hardware stack that is provided by global technology integrator, Tech Data (Nasdaq: TECD). The storage infrastructure can be scaled up, out, in, and off based on the demands of the business.

Kaminario Cloud Fabric implements a pay-per-use consumption model. Cloud service providers can instantly license, provision, and pay for only the amount of storage software that’s being used. Licenses are not tied to a specific hardware asset and can float between pools of capacity in one or more all-flash arrays and multiple data centers. Additional cost savings are provided through discounts based on one-year or three-year terms and capacity-based tiering. Additional incentives are in place to encourage enterprise-wide adoption.

¹ Source: ESG Master Survey Results, [2018 IT Spending Intentions Survey](#), December 2017.

ESG Economic Audit

ESG's Economic Audit process is a proven method for understanding, validating, and quantifying the economic value of an IT industry solution. The process leverages ESG's core competencies in market and industry analysis, forward-looking research, and technical/economic validation.

Approximately two years before this report was published, ESG quantified the economic benefits of the Kaminario K2 on-premises all-flash storage array compared with traditional on-premises all-flash storage arrays.² The compelling economic advantages of the K2 architecture, VisionOS, and Clarity were validated via a combination of interviews with Kaminario experts and customers and quantified in an extensive model. Kaminario's Cloud Fabric offering amplifies the economic benefits of the K2 architecture with additional economic benefits that are ideally suited for multi-petabyte scale enterprises and cloud service providers.

ESG expanded the economic analysis in 2018 with a goal of auditing the cost of the new Kaminario Cloud Fabric offering compared with the publicly available cost of all-flash arrays and block storage-as-a-service offerings from market-leading vendors. The total cost of ownership over three years was modelled for a prototypical organization with a multi-petabyte block storage footprint. The total cost was normalized to cost per GB of storage per month for comparison.

Economic Value Overview

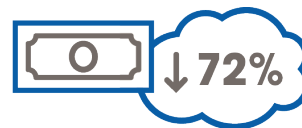
Kaminario Cloud Fabric is more affordable than array-based storage solutions due to a variety of factors that can be classified into two major categories: procurement economics and utilization economics. The combination of these economic savings creates a storage infrastructure strategy for cloud service providers that enables direct competition with public cloud.



Cloud Fabric Procurement Economics

Organizations can deploy Kaminario Cloud Fabric on a Kaminario-certified, industry-standard hardware stack purchased from Tech Data, an international end-to-end technology distributor and integrator. Leveraging Tech Data's volume purchasing power and operational efficiency enables Kaminario to ensure that customers can acquire the certified hardware stack at the lowest possible cost.

The Tech Data partnership simplifies and speeds the purchase cycle. Tech Data takes responsibility for acquiring and assembling the certified hardware stack, integrating the Kaminario software, and installing the complete solution into the customer's infrastructure. A fixed pricing model for the hardware stack eliminates the need for long negotiation and purchasing processes.



Cloud Fabric Storage costs
\$0.0387/GB/Month—
72% less than public cloud storage.

A unique benefit of Kaminario's offering is the ability to independently scale capacity and compute resources. This enables cost optimization for both performance and capacity requirements. Another key differentiator is Kaminario's commitment to using industry-standard hardware while fully disaggregating the SW. Kaminario's hardware partners include well-known technology brands like Broadcom, Mellanox, Qualcomm, Samsung, and SuperMicro.

² <http://kaminario.com/company/blog/understanding-true-economic-value-flash-storage/>



Cloud Fabric Utilization Economics

Kaminario Cloud Fabric is preinstalled and available for immediate use—to meet both planned and unplanned capacity requirements. The base amount of storage provided on day one can be augmented with additional capacity to handle spikes and future growth. Kaminario Cloud Fabric eliminates the long acquisition cycles and complexities of scaling traditional on-premises storage arrays by streamlining the purchase of incremental storage—customers get the storage they need when they need it, removing the need for price negotiations, contracts, or extended procurement processes.

Traditionally, due to long purchasing and acquisition cycles for on-premises storage, storage admins order additional capacity when about 70% of storage is consumed—meaning there is typically a 30% buffer of unused storage capacity. This limit can vary between organizations, but 70% is a good rule of thumb. For service providers, buffer capacity represents capital investments that are not being monetized. This over-investment creates a tax on the overall profitability of the cloud service.

ESG estimates that Cloud Fabric customers can decrease the cost of buffer capacity by more than 75% through a combination of increasing SW license utilization to 100% and lowering the cost of the hardware:

- **Usage-based licensing:** Cloud Fabric software licensing is purely usage-based; there is no software cost associated with overprovisioned infrastructure.
- **Roaming license:** Capacity-based software licenses are not tied to a specific hardware asset. The licenses are free to roam within and between different pools of storage in one or more all-flash arrays and data centers.
- **Faster hardware refresh:** Tech Data's regional distribution centers and extensive inventories enable the rapid delivery and deployment of the Kaminario hardware stack. This enables storage admins to delay the acquisition of additional hardware capacity, increase capacity in smaller steps, and consume less capital per acquisition cycle.

The combination of increased utilization and a usage-based software model dramatically lowers the cost of overprovisioned infrastructure compared with traditional storage array paradigms.

Public Cloud Storage Economics

Renting storage from a public cloud provider eliminates the time and expense associated with buying your own storage infrastructure. This agility benefit of public cloud storage is great for transient and unpredictable workloads but is cost-prohibitive over time for predictable workloads at scale—especially when application workloads trigger surcharges for high levels of storage performance or WAN egress traffic.

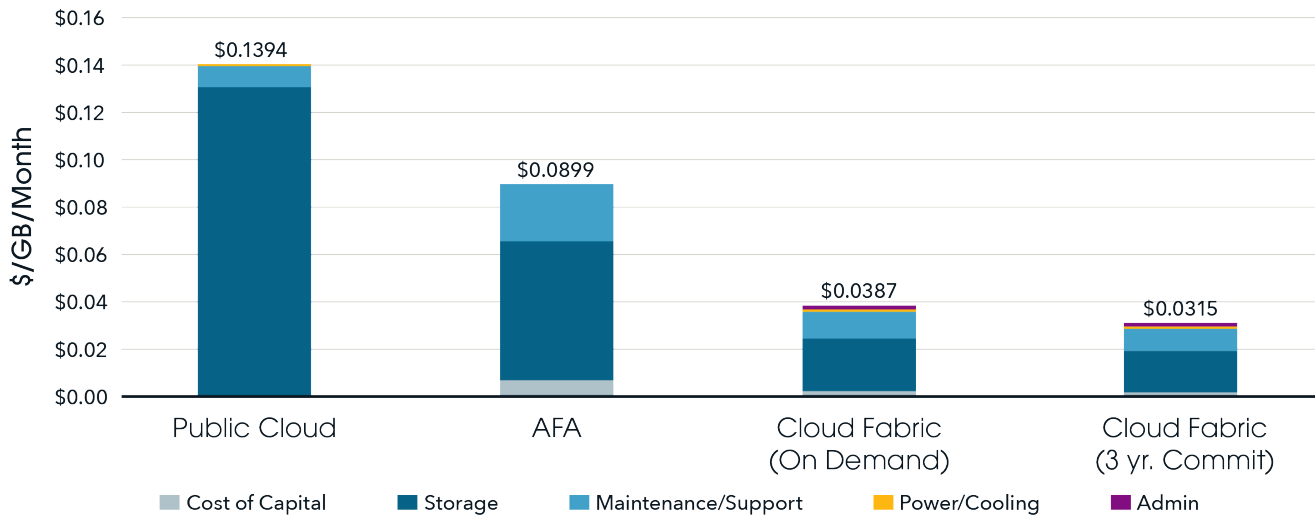
ESG Economic Analysis

ESG created a three-year TCO model and applied pricing associated with each component—cost of capital, storage capacity, maintenance and support, power and cooling, and storage administration—for a prototypical large service provider that's shopping for 20 PB of usable capacity. Pricing was based on publicly available data and industry knowledge, and all costs were based on street pricing, which factor in expected discounts.

The average of the publicly available pricing for three industry-leading public cloud vendors was used to determine the cost of storage for the public cloud option shown in . The cost of storage for the on-premises all-flash option was based on the average street pricing from a pair of industry-leading storage vendors. The cost of a four-hour service level agreement from a public cloud vendor, which is comparable to the Kaminario and Tech Data support and SLAs that were used for

analysis, was included for support. The administrative cost associated with provisioning and managing public cloud storage was included as well.³

Figure 1. Kaminario Cloud Fabric Economics
(TOTAL COST OF STORAGE OWNERSHIP OVER THREE YEARS)



Source: Enterprise Strategy Group

Like public cloud storage, the AFA and Kaminario Cloud Fabric analysis included the costs of storage, maintenance, support, and administration. Since the hardware stack resides on-premises, the costs of power, cooling, and capital were included as well.⁴

The Cloud Fabric business model combined with the cost savings provided by the Tech Data partnership enable Kaminario to drive down the cost of the storage service. Kaminario Cloud Fabric storage costs 72% less than public cloud storage (\$.0387/GB/month versus \$0.1394/GB/month). A three-year capacity commitment magnifies the savings to 77%.

Analyzing the Economic Benefits over Time

With a goal of illustrating the economic forces behind the results summarized in , ESG compared the total cost of storage over time for traditional on-premises all-flash storage, public cloud storage, and Kaminario Cloud Fabric. The results are shown in .

The expenditure profile for traditional on-premises storage arrays follows a stair step pattern, where there is a large capital expense to acquire the hardware, followed by ongoing operating expenses. As consumed storage reaches approximately 70%, capacity is expanded, resulting in additional capital outlays.

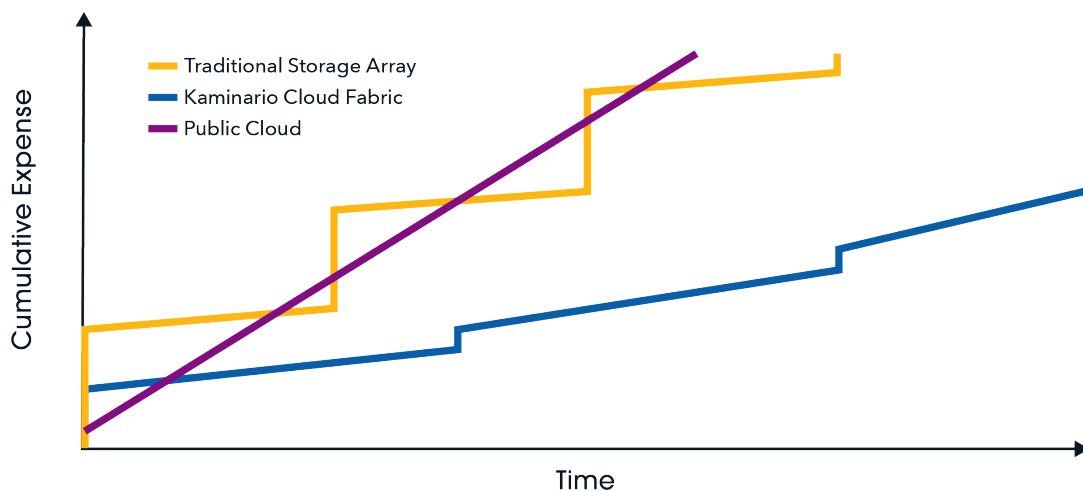
³ Business-class support (24x7 electronic access to cloud support engineers and one- to 24-hour telephone response time guarantees, depending on severity), and the analysis assumed that a fully burdened full-time engineer (FTE) with an annual cost of \$80,000 can manage five times more public storage capacity per year than on-premises Cloud Fabric (25,000 TB versus 5,000 TB).

⁴ The average US cost of electricity as of August 2017 (\$0.1053 per kWh) and a typical co-location fee for data center floor space (\$9/month/40U) were used to calculate the cost of power, cooling, and space. An annual percentage rate (APR) of 8% was used to calculate the cost of capital.

The profile for traditional public cloud storage solutions is roughly linear, with expenses growing proportionally to the growth of storage consumption. Public cloud storage requires the least amount of initial investment but eclipses the cost of on-premises storage over time.

Figure 2. Kaminario Cloud Fabric Economics

(TOTAL COST OF STORAGE OWNERSHIP OVER TIME)



The profile for Kaminario Cloud Fabric is similar to traditional on-premises storage arrays. However, due to Kaminario's economic advantages, both the initial investment and subsequent capacity expansion investments are lower. Utilization economic advantages, particularly the ability to move licenses between hardware stacks and rapid delivery and deployment of the hardware stack without long and complex purchasing cycles, enable storage providers to delay capacity expansion from the traditional 70% consumption point to 80-90% consumption, freeing capital and manpower for other investments.

Other Considerations

A variety of factors that influence the choice between Kaminario Cloud Fabric and public cloud storage were not modelled but should be considered.

- **Public cloud storage surcharges:** Public cloud storage solutions typically include network egress fees (fees for network bandwidth to transfer data from the public cloud) and IOPS fees (fees based on performance: running faster or supporting more transactions per second costs more). These fees can vary wildly depending on application workloads and usage patterns but would only magnify the Cloud Fabric cost advantage.
- **Scaling:** Cloud Fabric utilization economics improve as the scale of the deployment grows—especially when licenses roam between pools of storage on different hardware platforms.
- **Virtual pooling:** Cloud Fabric virtual pooling enables different levels of service, which can be used to optimize for different levels of performance, availability, and cost.

- **Clarity System Manager:** Kaminario management tools and APIs can be used to reduce staffing requirements and operating costs—especially when compared with traditional on-premises storage arrays or a roll-your-own software-defined storage solution running on commodity hardware.
- **Ability to leverage new hardware innovation:** The Kaminario Cloud Fabric solution roadmap includes optimization for the latest storage technologies, including next-generation NVMe flash storage devices and an NVMe fabric back-end.
- **Hardware cost reductions:** The Kaminario alliance with Tech Data provides customers with access to a certified hardware reference stack based on industry-standard hardware. As hardware prices erode (e.g., the NAND flash cost reductions anticipated for 2019), savings pass directly to Cloud Fabric environments.
- **Enterprise license economics:** For large customers, Kaminario offers multi-site, enterprise license agreements that deliver substantial savings for volume commitments.

The level of savings that your organization will achieve depends on a variety of factors, including the specific public cloud provider you're considering, your capacity requirements, the cost of capital for your organization, etc. That said, if your organization plans on delivering services that need a petabyte or more of block storage, then ESG is confident that the economic benefits of Cloud Fabric will hold true.

The Bigger Truth

Service providers are faced with either reselling public cloud storage or deploying on-premises storage to support the ever-growing demand for enterprise-class cloud infrastructures. Kaminario Cloud Fabric provides a new choice that combines the best of both alternatives—low-cost on-premises all-flash storage hardware with a pay-per-use software consumption model. ESG completed a three-year total cost of ownership analysis for a typical large service provider deployment. We found that Kaminario Cloud Fabric can yield a total savings of up to 65% compared with traditional on-premises all-flash storage and 77% compared with the public cloud.

For Enterprise Clouds

Enterprise IT organizations deploying private or hybrid cloud strategies can leverage Cloud Fabric to build on-prem or collocated cloud infrastructure with consumption based acquisition model that mirrors public cloud. The superior economics of Cloud Fabric can be a valuable tool for managing IT infrastructure costs and supporting broader cloud strategies.

For SaaS and Consumer Internet Applications

Kaminario's highly scalable storage technology is a natural fit for modern SaaS and Consumer Internet applications including Fintech, Healthtech, and ecommerce. Cloud Fabric provides a consumption based procurement vehicle that aligns infrastructure costs with business growth.

For Cloud Service Providers

As CSPs build datacenter infrastructure to support private or multi-tenant IaaS offerings, Cloud Fabric offers a storage acquisition model that perfectly aligns costs to revenue streams.

For Managed Service Providers

Kaminario Cloud Fabric lets MSPs build out infrastructure – in the customer datacenter or at a colo – while keeping costs aligned to their own services-oriented approach. Managed storage infrastructure can complement a broad array of other managed services including database and application management, managed disaster recovery, and broader bare metal infrastructure as a service offerings.

If your organization is looking for a storage solution that can provide the foundation for an enterprise-class storage-as-a-service offering, then ESG believes that you should seriously consider the economic advantages of Kaminario Cloud Fabric.

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