

ESG Economic Value Audit

Analyzing the Economic Benefits of Kaminario Cloud Fabric

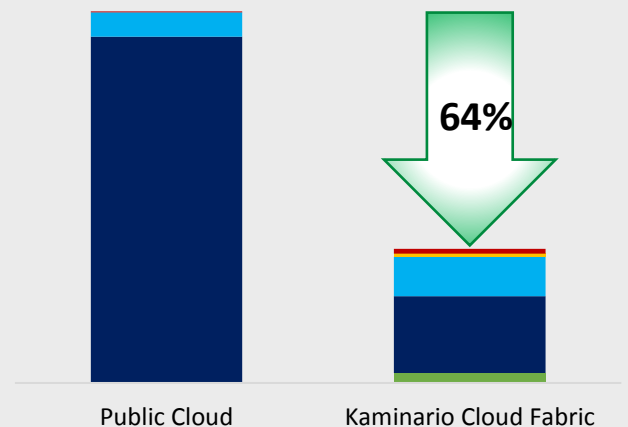
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February 2018

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 storage capacity, maintenance and support, power and cooling, and storage administration—for a prototypical service provider. ESG confirmed that Cloud Fabric can be used to reduce the cost of delivering storage-as-a service by 64%, or more, compared to the public cloud.

Kaminario Cloud Fabric Economics (3-Year TCO)



Introduction

This ESG Economic Value Audit quantifies the savings that can be expected when using Kaminario Cloud Fabric as the cornerstone of an on-premises storage-as-a-service offering compared to renting block storage from a leading public cloud provider.

Background

According to ESG research, the transition to the cloud is almost complete: 85% of surveyed organizations are currently using public cloud computing services, up from 57% in 2013, and only 3% of organizations have no plans to use the public cloud. Infrastructure-as-a-service (IaaS) is becoming increasingly important, with 51% indicating they currently use IaaS, and 24% planning to use IaaS in the future. The second most-cited business initiative driving ESG research respondents' IT spending is cost reduction.¹ In other words, IT managers want to increase the agility and responsiveness of the business with a cloud-first strategy that won't blow the budget.



Use Public Cloud



IT Spending Initiative is Cost Reduction

Service providers are faced with the decision to either build service offerings on top of public cloud services or build their own data center infrastructure that can compete with hyperscale public IaaS offerings. A key challenge for service providers building their own infrastructure is the ability to compete with the software-defined data center frameworks that hyperscale IaaS have implemented. In particular, traditional data storage arrays are capital-intensive and largely inflexible compared to the software-defined, scale-out storage used by hyperscale public cloud providers.

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 a 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 1-year or 3-year terms and capacity-based tiering. Additional incentives are in place to encourage enterprise-wide adoption.

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 one and a half years before this report was published, ESG quantified the economic benefits of the Kaminario K2 on-premises all-flash storage array compared to traditional on-premises all-flash storage arrays.² The

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

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

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 the multi-petabyte scale cloud service provider.

ESG expanded the economic analysis in 2018 with a goal of auditing the cost of the new Kaminario Cloud Fabric offering compared to the publicly available cost of block storage-as-a-service from a leading public cloud vendor. The total cost of ownership over three years was modelled for a prototypical large service provider 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

Service providers 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 service providers 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 completed solution into the service provider's infrastructure. A fixed pricing model for the hardware stack eliminates the need for long negotiation and purchasing processes. The result is significantly reduced costs and elapsed time from submitting a purchase order to storing data.



**Cloud Fabric Storage costs
\$0.0387/GB/Month, 64% 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.



Cloud Fabric Utilization Economics

Kaminario Cloud Fabric storage 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—service providers 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 a 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 to 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.

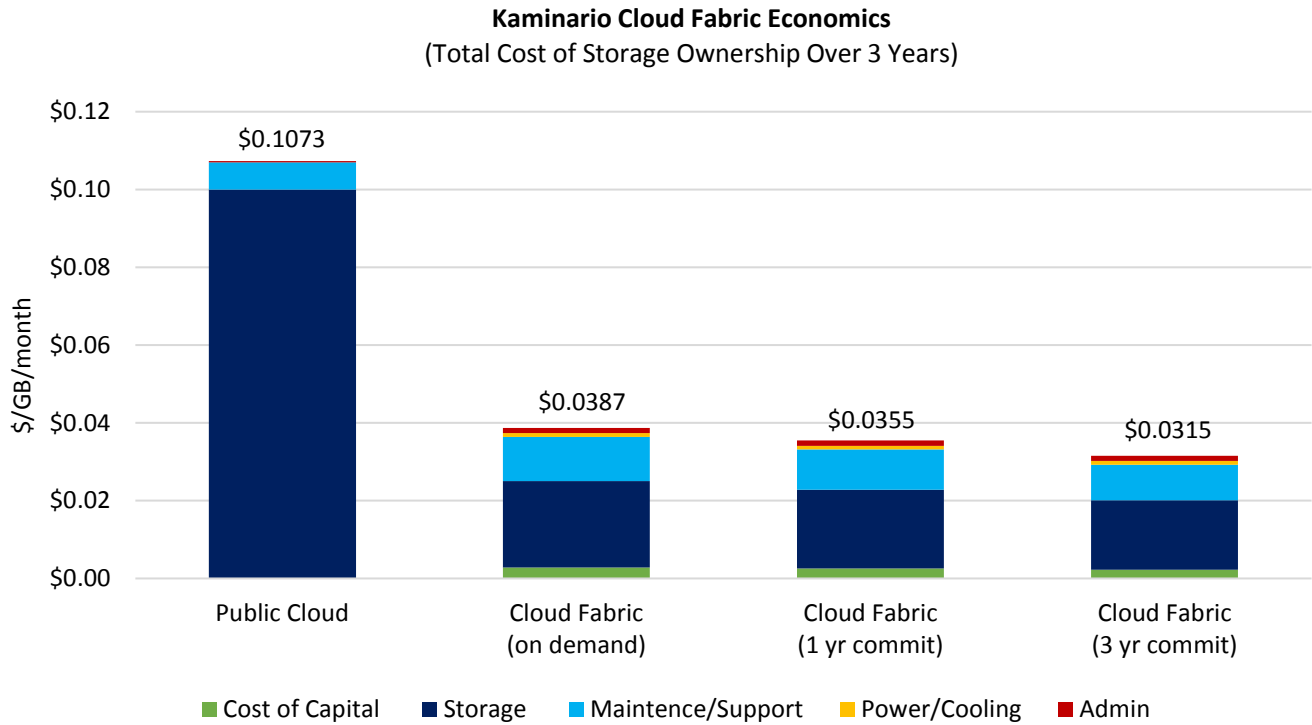
ESG Economic Analysis

ESG created a 3-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.

Publicly available pricing for block storage from an industry-leading public cloud vendor was used to determine the cost of storage for the public cloud option shown in Figure 1. The cost of a 4-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

³ General purpose SSD (gp2); business-class support (24x7 electronic access to cloud support engineers and 1- 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 vs. 5,000 TB).

Figure 1. Kaminario Cloud Fabric Economics: 3-Year TCO



Source: Enterprise Strategy Group

Like public cloud storage, the Kaminario Cloud Fabric model included the cost of storage, maintenance and support, and administration. Since the hardware stack resides on-premises, the model included the cost of power and cooling. In addition, service providers must expend capital to acquire the hardware stack. Thus, the model included the cost of capital.⁴

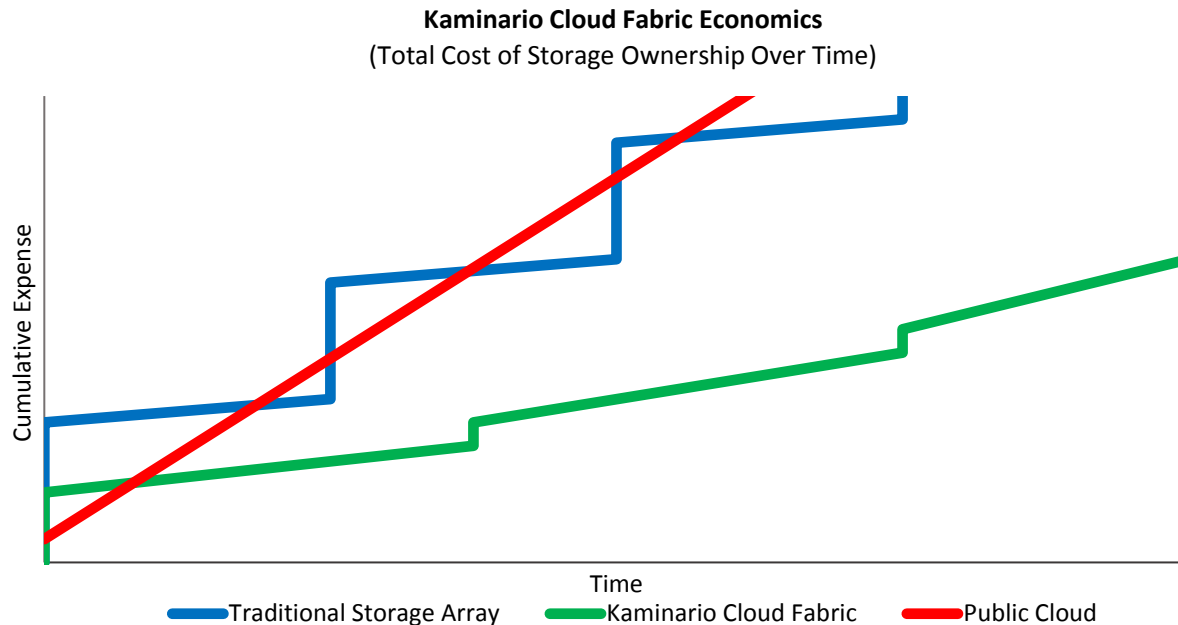
The architecture of the Cloud Fabric software combined with the cost savings provided by the Tech Data partnership enable Kaminario to drive down the cost of the storage service. Kaminario Cloud Fabric storage costs 64% less than public cloud storage (\$.0315/GB/month vs. \$0.1073/GB/month). A 3-year capacity commitment can be used to magnify the savings up to 71%.

With a goal of illustrating the economic forces behind the results summarized in Figure 1, 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 Figure 2.

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.

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.

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.

Figure 2. Kaminario Cloud Fabric Economics: TCO Over Time

Source: Enterprise Strategy Group

The profile for Kaminario Cloud Fabric is similar to traditional on-premises storage arrays. However, due to Kaminario's procurement 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 enables 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 improves 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 (i.e. the NAND flash cost reductions anticipated for 2018), 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 71% compared to traditional public cloud storage, and even more compared to a traditional on-premises all-flash storage array.

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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