



## Vendor Profile

# FalconStor Leverages Rich Enterprise Storage Heritage to Address the Requirements of Hybrid Cloud Environments

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### IDC OPINION

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Today's datacenters are tasked with supporting a wide range of heterogeneous storage platforms that include physical, virtual, and cloud-based products. Legacy storage management models are built around silos of storage that are managed independently, leading to significant complexity and cost as the diversity in modern Information Technology (IT) infrastructure increases. Software-defined storage (SDS) brings the heterogeneous support and agility required by IT organizations that must support both old and new applications, a variety of different storage media (flash, disk, and tape), and the need to nondisruptively evolve the underlying storage infrastructure as business needs change over time. These considerations are driving high growth in the SDS market, and by 2019 SDS should represent nearly 20% of the overall enterprise storage market (which comprises external, internal, and other primarily original device manufacturer [ODM] revenues). IDC has noted several key trends in SDS over the last year:

- As SDS offerings mature, more and more enterprises are deploying them for mission-critical workloads.
- The features of SDS most highly prized by enterprises and service providers alike are webscale economics, agility (including heterogeneous support), and ease of use.
- SDS deployments are highly positively correlated with an organization's commitment to and use of a hybrid cloud architecture.

The need to efficiently move data between heterogeneous targets to meet a variety of enterprise workflow requirements in the areas of backup, recovery, continuity, and technology refresh is posing challenges for IT organizations that cannot operate outside of the siloed storage model. With its flexibility and ability to run on a variety of different types of platforms, SDS holds the promise of allowing administrators to manage all data mobility-based workflows from a single, centralized management GUI. SDS vendors like FalconStor have stepped up to meet this requirement with a proven, enterprise-class storage virtualization solution. FalconStor's FreeStor is tailor-made for the heterogeneous hybrid cloud environments toward which most datacenters are ultimately moving. This IDC Vendor Profile summarizes the state of the SDS market and then takes a close look at FalconStor, a vendor with a compelling value proposition when it comes to meeting performance, availability, and manageability requirements in heterogeneous block-based environments that span both on- and off-premise (cloud) environments.

### IN THIS VENDOR PROFILE

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This IDC Vendor Profile examines FalconStor Software, a software-defined storage (SDS) vendor offering consolidated, enterprise-class storage management for the heterogeneous, hybrid cloud-

based enterprise. FalconStor Software's offerings include FreeStor, a storage virtualization platform that spans physical, virtual, and cloud environments and is targeted at four pervasive enterprise use cases: data mobility, continuity, application recovery, and optimization. This IDC Vendor Profile provides a high-level discussion of the evolving SDS market as well as FalconStor's FreeStor enterprise storage platform, business and technical value propositions, target markets and customers, and go-to-market strategies.

## SITUATION OVERVIEW

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Most enterprises today are facing a period of transformative change. IT administrators must maintain an infrastructure that supports both legacy applications, many of which have provided the mission-critical foundation for business over the last several decades, and a new generation of cloud-based workloads that are the future. Legacy storage architectures, while well suited for many of the traditional workloads, are severely challenged to cost-effectively meet the performance, scalability, and agility requirements of "next generation applications" (NGAs). These NGAs are built around mobile computing, social media, and big data/analytics, run best on webscale infrastructures, and leverage new technologies like flash, SDS, and cloud. One of the key datacenter challenges over the last several years (and for the foreseeable future) is crafting and maintaining an IT infrastructure that can cost-effectively and efficiently handle both types of workloads in this new era that IDC refers to as "3rd Platform Computing."

Infrastructure agility is key to meeting the evolving dynamic demands of business. The hardware-defined storage architectures of the past have demanded sophisticated storage expertise, limited IT's expandability and technology refresh options, and have ultimately led to significant complexity and high cost in datacenters built around numerous storage silos. In an era of limited budgets where storage management tasks are increasingly migrating from storage specialists to IT generalists, ease of use has become a key purchase criterion for service providers and enterprises alike. The rise of SDS is in direct response to customer concerns about meeting performance, availability, and cost requirements in an infrastructure which must support easy scalability and the agility to respond rapidly to changing market conditions and business needs.

IDC defines SDS as a storage solution (hardware plus software) that delivers a full suite of storage services via an autonomous software stack that runs on (but is not tied to) industry-standard (rather than proprietary or custom) hardware platforms (known as server-based storage) built using commodity off-the-shelf (COTS) components. SDS solutions can support block, file, object, and/or hyperconverged storage, depending on vendor implementation. For a detailed discussion of the definition of SDS, see *IDC's Worldwide Software-Defined Storage Taxonomy, 2016* (IDC #US40951716, February 2016).

SDS solutions got their start with hyperscaler vendors like Amazon, Facebook, and Google over a decade ago. Faced with the task of building easily scalable infrastructures that could support dynamic and growing multipetabyte environments, these organizations chose to move away from the expensive, monolithic storage architectures of the past to what they viewed as a much more cost-effective model. Having significant development expertise, these organizations built their own layer of software-based services designed to run on Intel x86-based servers with internal storage. These were the first webscale infrastructures. The growth of the SDS market over the last decade has been driven in large part by commercial vendors attempting to provide the scalability, agility, and cost economics of these webscale infrastructures with more turnkey offerings that would be much easier for organizations

without the significant software development expertise of an Amazon to deploy. In 2016, IDC expects the SDS market to generate \$5.76 billion in revenue and to grow at a 20.8% compound annual growth rate (CAGR) to crest \$9.09 billion in 2019.

As SDS vendor offerings mature, they are evolving to include many of the features that datacenters have come to expect from their established enterprise storage platforms. These include caching and tiering options, data reduction features, data protection capabilities such as RAID, self-healing and other availability management services, snapshots, encryption, replication, and quality of service (QoS) controls. When these turnkey SDS solutions began to be available several years ago, most customers chose to deploy them with non-mission-critical workloads, but more recently many customers are using these solutions for bet-the-business applications that require extremely high levels of availability. While these systems are deployed both by service providers and by enterprises, the penetration is greater with service providers – primarily because they are more comfortable with newer webscale architectures, work with a higher percentage of NGA workloads, and are more dependent on the cost-effectiveness of operations to deliver profits in a business that is known for its razor-thin margins.

Customers appreciate the cost savings, flexible agility, and ease of management that SDS brings to the table. Legacy hardware-defined storage solutions tended to bundle expensive hardware with software that could only run on that proprietary platform and were able to charge a premium for these offerings. SDS products can potentially run on any commodity hardware, giving customers the flexibility to use a number of different platforms – either ones they already own and are re-purposing or by providing the ability to choose their hardware supplier of choice (e.g., Cisco, Dell, HDS, HPE, IBM, or any of a number of original device manufacturers like Quanta and SuperMicro). The newer SDS platforms have also been built with changing storage management paradigms in mind. Many routine storage tasks like data protection, provisioning, system expansion, and backup have become much simpler and more automated, making it easier for IT generalists to effectively and reliably manage the storage infrastructure. While some vendors basically provide a comprehensive set of intelligent data management services that apply only to the hardware products that they officially sell, others have extended the metaphor much further, offering the ability to leverage a common set of enterprise-class data services from a centralized management point across a large number of heterogeneous storage platforms that have been virtualized.

This latter capability is particularly interesting in light of the heterogeneous nature of most datacenters. Most IT administrators are managing a mix of physical and virtual platforms, some of which are on-premise and some of which are off-premise in the cloud. Most organizations have a mix of flash, spinning disk, tape, and cloud-based storage. According to recent IDC research, well over 50% of IT organizations are running at least two hypervisors, and 72% of IT organizations already have a hybrid cloud environment in place. Hybrid cloud is the future of IT as organizations look to place workloads and data on the most cost-effective platform to meet both usability and cost considerations. In these environments, the ability to easily and securely move data to the cloud as well as between clouds of different types becomes more important, and a predictive analytics capability with a comprehensive view of the entire hybrid cloud environment provides the data necessary to maintain performance, access, and cost optimization as things evolve.

Finally, pricing models have not kept pace with changing preferences in how customers want to consume products. In the traditional "storage silos" model, software capabilities like snapshots and replication must be licensed separately for each storage silo, forcing customers to effectively pay multiple times for the same software-based feature. Although new software-defined features make it

extremely fast and easy to provision storage and migrate data, traditional pricing models lack the granularity to accurately reflect what **should** happen to license costs as storage is allocated and/or de-allocated (i.e., they should be adjusted up or down). The more efficient "pay as you go" model is one of the benefits of many cloud storage offerings, but few on-premise infrastructure solutions offer this flexibility. A move to a more granular pricing model is a natural fit with software-defined platforms that do heterogeneous storage virtualization and would offer significant value to customers, but licensing models have yet to catch up with the customer evolution toward hybrid cloud.

## Company Overview

FalconStor was originally founded in 2000, and for the first phase of its life established itself as a premiere provider of enterprise-class virtual tape library solutions to the commercial market. They developed a particular reputation for making data movement (and the workflows based on it like backup, restore and disaster recovery) very easy and efficient in heterogeneous environments. FalconStor's products were OEMed by major enterprise storage providers and in wide use among Fortune 2000 companies. As data protection needs evolved, FalconStor added complementary products and features, including storage virtualization, deduplication, continuous data protection, and enterprise-class data services like snapshots and replication. Even before the appearance of the software-defined storage market, FalconStor was selling software-based solutions that ran on COTS hardware and differentiated itself from competitors by its heterogeneous support and cost economics. This background and product portfolio provided a very relevant foundation for FalconStor's current SDS offerings and go-to-market strategies.

## The FreeStor Intelligent Data Management Solution

Today, FalconStor's flagship product is FreeStor, an intelligent data management solution that leverages a horizontal, heterogeneous SDS platform to move and optimize data, eliminate silos, and enable existing storage infrastructure to be easily and nondisruptively evolved. FreeStor is an enterprise-class, general-purpose storage platform that effectively front ends and virtualizes any block-based storage, allowing management for all of them to be performed from the FreeStor GUI. This allows storage of all types – physical, virtual, cloud and flash, disk and tape – to be pooled and supports nondisruptive data movement between any managed targets. As organizations struggle with maintaining traditional on-premise storage infrastructure while adding newer storage architectures such as server-based storage and cloud, the availability of a centralized management point that provides a common set of enterprise-class capabilities and a comprehensive predictive analytics capability lowers complexity and significantly reduces management costs. It also makes it much easier to continue to nondisruptively service workload requirements even as the underlying infrastructure evolves as necessary to keep up with the needs of a dynamic business environment.

The enhanced analytics capability is particularly interesting. Although FreeStor uses an out-of-band management model, it has visibility on all I/O passing through its abstraction layer. This enables a number of interesting benefits, including client to physical resource mapping, end-to-end (host to physical storage) troubleshooting, and intelligent analytics covering performance, service levels, rules and alerts, capacity consumption and planning, usage tracking, reports and monitoring, and audit logs. FreeStor provides a single pane of glass that can be used to perform intelligent analytics against any managed targets, easing management and enabling correlations not possible with siloed storage monitoring tools.

FreeStor can be deployed on either physical or virtual appliances. FreeStor Storage Servers (FSSs) are deployed in pairs for high availability on x86-based hardware and any back-end virtualized storage

is mapped to these appliances. (FreeStor supports over 15 different enterprise storage platforms as well as Microsoft Azure, Oracle Cloud, Amazon Web Services, Google, Aliyun, and Huawei clouds.) Scaling to support larger configurations requiring higher levels of throughput is as simple as adding more FSS pairs. FreeStor configurations support redundant paths to all virtualized hardware on the back end with transparent, automatic recovery from failed network links, storage devices, controllers, and/or FSS nodes. The FreeStor Management Server (FMS) is an out-of-band administrative console, and each FMS can manage up to 128 FSS nodes. As a block storage virtualization solution, supported network protocols include Fibre Channel (FC), iSCSI, and FC over Ethernet (FCoE) for client connections; 10GbE for FSS node storage cluster interlink; and FC and IP for connections between FSS and FMS nodes.

## Company Strategy

As the new 3rd Platform Computing environment took hold, FalconStor noted that it held a number of storage technologies in its portfolio that would be foundational for the new, more agile infrastructure datacenters would need to build. Supporting the mix of legacy and NGA workloads (the latter focusing heavily on mobile computing, social media, and big data/analytics) has resulted in the proliferation of independent storage silos, driving complexity and higher management costs. Storage silos from different vendors result in inconsistent storage features across platforms, paying for licenses for the same software functionality (e.g., snapshots or replication) multiple times, and in many cases force disruptive data migrations during technology refresh. With FreeStor, FalconStor saw the opportunity to combine its proven enterprise storage capabilities into a single, SDS solution that would provide common features managed the same across heterogeneous platforms and support nondisruptive technology refresh and data mobility – all while providing the agility necessary to accommodate 3rd Platform Computing requirements.

These issues exist for both service providers and enterprise datacenters alike, and FalconStor targets both of these organizations. The typical FalconStor customer has a mix of heterogeneous platforms, both on- and off-premise, is frustrated with having to build specialized skill sets to manage each independent storage silo, and is looking for a way to nondisruptively enable underlying infrastructure change to keep up with evolving demand for performance, scalability, and availability. With both a direct and indirect (OEM and channel) sales capability available, potential customers can acquire this agile platform through several different consumption models, including as an appliance (from FalconStor PartnerChoice resellers), as a software-only product, and as a cloud services-based offering (from their numerous service provider customers). FalconStor's basic vision with FreeStor is to provide enterprise-class data services, centrally managed across all types of heterogeneous storage platforms, at public cloud prices.

The ability to easily and nondisruptively move data in heterogeneous environments is core to FreeStor, and FreeStor addresses a set of issues with which every IT organization struggles around data protection, recovery, business continuity, and technology refresh. Purpose-built tools for snapshot, backup, and replication tend to focus on a select set of platforms – a single vendor, a particular hypervisor, virtual machines, or cloud only – forcing customers to purchase and use multiple tools to address the core set of workflows that require data movement in heterogeneous environments. With this in mind, FalconStor targets four key use cases with FreeStor based around its heterogeneous data movement capabilities:

- **Data mobility.** FreeStor virtualizes all back-end storage, and with integrated snapshot and replication capabilities has the ability to nondisruptively migrate data from array to array, between clusters, or site to site. Its WAN-optimized replication makes data movement fast and

efficient, and its support for a variety of different heterogeneous storage systems and protocols allows data to be moved from any managed system to any other managed system regardless of whether those systems are physical, virtual, or reside in the cloud.

- **Continuity.** FreeStor's highly available architecture makes failures transparent, enables automatic recovery, supports on-line expansion and technology refresh, and allows a variety of different local and remote topologies to meet performance, scalability, and availability requirements. Other vendors may provide these same capabilities within their own product line, but FreeStor enables it across heterogeneous storage configurations.
- **Application recovery.** FalconStor's long history as an enterprise data protection specialist endows FreeStor with key features such as snapshot API integration with a variety of different platforms and applications to support application-consistent recovery options, policy-based, auditable, validated recovery, any-to-any recovery that can be managed from a variety of different control points (mobile, tablet, laptop, etc.), support for bootable snapshots (to speed recovery), and space-efficient data capture and movement options with FreeStor's snapshot and replication implementations.
- **Optimization.** With data growing at high rates, storage efficiency technologies like thin provisioning, space-efficient snapshots and clones, WAN-optimized replication, and data reduction help to cost-effectively store and manage large data sets. FreeStor offers all these features today, and the global nature of their deduplication capability supports a broader scope for improved data reduction ratios than silo-based data reduction technologies.

A key part of FalconStor's go-to-market approach is its pricing strategy. FalconStor's unique "Pay Once" pricing model differentiates from traditional licensing approaches in several key ways that offer significant value to customers. First, there is a single-tier license fee that includes all storage management features. FalconStor's list of data services includes I/O path optimizations for performance (patented SafeCache and HotZone performance acceleration), mirroring, tiering so that customers can mix and match solid state disks (including NVMe-based drives) and hard disk drives to meet performance and/or capacity requirements, thin provisioning, global data deduplication, space-efficient snapshots and clones, AES 256-bit encryption, WAN-optimized replication, and predictive analytics. Other key features include support for application-aware snapshots (using host agents), RecoverTrac disaster recovery that allows for flexible restore options (P2P, P2V, V2V, or V2P), automated storage appliance failover, support for stretched clusters (i.e., NetApp MetroCluster certification), the FalconStor HyperTrac Backup Accelerator, and an ability to easily integrate into existing security management schemas through its support for Microsoft Active Directory and the Lightweight Directory Access Protocol. FreeStor includes an OpenStack Cinder block driver enabling integration into OpenStack environments and supports SAP HANA (SAP ICC certification) as well as a number of APIs, including VMware VAAI, Microsoft Windows VSS, a REST API, and SNMP – all of which make it easier to integrate FreeStor into preexisting heterogeneous environments. VMware vCenter integration is also supported. Data services are selectable at the volume level for maximum flexibility when managing numerous application workloads, and support data movement and placement across heterogeneous hardware.

Second, FreeStor is licensed by capacity, regardless of the underlying hardware. If 100TB is licensed, then that license includes all that is necessary to manage that capacity of data, regardless of whether it resides on Dell, Hitachi, EMC, HPE, IBM, Oracle, Fujitsu, NetApp, Violin Memory, or any of the other supported storage platforms. If customers retire an older storage array and move its capacity to a newer platform, as long as the capacity under management does not increase, there is no additional software licensing charge. Customers are billed on an annual basis for capacity being managed by FreeStor, with the FreeStor integrated analytics tracking storage usage. Regardless of what happens

with storage usage over the course of the year – whether it goes up or down – customers will be billed accurately at the end of the year based on their **actual** usage. This is truly a revolutionary change for on-premise licensed software in the industry.

And third, customers only need license for primary storage capacity. Secondary copies, whether they are created through snapshots or replication, are effectively free. FreeStor's intelligent analytics define and track the primary storage capacity based on copy creation workflows. For many workloads, enterprises routinely create as many as seven to ten copies to feed various test, development, and production workflows. This aspect alone of the FreeStor pricing model is enough to drive a very rapid return on investment for a FreeStor purchase.

A cloud service provider – Egenera – provides the prototypical use case for FreeStor. Based near Boston, Massachusetts, Egenera delivers wholesale managed services designed specifically for the channel – their customers use Egenera cloud infrastructure as the basis for relabeled managed services delivered to their own customers (end-user organizations). With this business model, Egenera is required to provide data mobility, continuity, recovery, and storage management across a wide range of physical and virtual servers, hypervisors, media types (flash, disk, tape), and other cloud providers. Given this level of heterogeneity, the use of siloed, vendor-specific management tools is out of the question – it is too complex and costly. A single set of integrated data protection technologies, including mirrors, snapshots, replication, and on-line backup APIs, that works across virtually every type of software, hardware, or cloud-based storage platform Egenera might encounter is what makes this herculean task viable and affordable. FreeStor enables this type of any-to-any data movement not only efficiently but with the different levels of granularity necessary to meet the variety of different service-level agreements that Egenera must support with its tiered storage offerings.

## FUTURE OUTLOOK

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As 3rd Platform Computing matures, it is clear that IT organizations are slowly moving toward hybrid cloud infrastructures. Hybrid cloud demands an agility that is well met by SDS architectures, and IDC expects that over time the software-defined datacenter will become the mainstream deployment model for enterprises and service providers alike. FalconStor has bet on the future, and the closer that future gets, the better it should do in the market.

## Challenges and Opportunities

As a relatively small vendor that is betting on the future, FalconStor does have some challenges ahead of it. Those IT organizations that already understand and have committed to an SDS strategy over time are good sales targets for them, but for those datacenters that have not yet bought into "software-defined," the value FreeStor brings is lost. Over time, there will be more and more organizations that will see the value to software-defined products like FreeStor, but today FalconStor must compete with other software-defined vendors with better name recognition like VMware and Nutanix and the software-defined businesses of well-established enterprise storage providers like Dell/EMC, HPE, and IBM. Awareness is always a challenge for small vendors, and FalconStor is no different.

The opportunity for FalconStor – and the key differentiator it brings relative to the software-defined offerings from these other vendors – is its ability to support a wider range of heterogeneity. None of these other vendors support physical, virtual, and cloud offerings across the same number of enterprise storage platforms with the flexibility to support all media types (flash, disk, tape), all managed through a single pane of glass. Given the number of datacenter workflows that revolve

around data movement, FalconStor is smart to position FreeStor for use cases that require it. They have an arguably better value proposition for IT organizations dealing with heterogeneity than the major enterprise storage vendors, and they have assembled the needed mirroring, snapshot, replication, and API support technologies into a well-integrated solution. Although FreeStor can clearly be the general-purpose storage platform for any customer, it is interesting to note that even for those organizations that only use FreeStor for its any-to-any data movement capabilities to address backup, recovery, continuity, and/or technology refresh challenges (and not to directly manage various storage silos), it brings significant value, acting as a complementary solution to virtually any deployed storage platforms. Given FalconStor's very efficient software licensing model, this may be a marketing message that FalconStor can use to its advantage.

## ESSENTIAL GUIDANCE

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### Advice for FalconStor

- To optimize sales operations, FalconStor should prequalify prospects based on their views around and commitment to an SDS strategy and the number of different storage platforms they are currently managing.
- Given that its heterogeneous support is the strongest differentiator FreeStor brings to the table relative to other major enterprise storage providers with SDS offerings, FalconStor should ensure that it prioritizes its storage and application platform certification work by market share and/or business opportunity.
- FalconStor should maximize market awareness for FalconStor's value proposition by continuing to broadly publicize wins that showcase FreeStor's appeal to IT organizations moving toward hybrid cloud.

### Advice for Buyers

- Determine your organization's strategic stance on the software-defined datacenter to help inform future storage technology purchases.
- Understand the value that a platform like FreeStor can offer in your shop for two use case scenarios: one where FreeStor is used as the centralized storage management interface for a portfolio of heterogeneous physical, virtual, and cloud platforms, and the other where it is only used to manage data movement operations to simplify backup, recovery, continuity, and technology refresh but not necessarily to directly manage storage provisioning and other routine storage management tasks across the virtualized back-end storage.

## LEARN MORE

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### Related Research

- *Market Analysis Perspective: Worldwide Storage Systems, 2016 – Growing Demand for Software-Defined, Flash-Accelerated Persistence* (IDC #US40357815, September 2016)
- *Software-Defined Storage Appearing in Production Deployments Across Organizations of All Types and Sizes* (IDC #US41655116, September 2016)
- *Worldwide Storage for Virtual x86 Environments Forecast, 2016-2020* (IDC #US41696016, September 2016)
- *Market Analysis Perspective: Worldwide Storage Software, 2016 – The Future of Storage Is Software Defined, Server Based, and Cloud Connected* (IDC #US41666416, August 2016)



- *Worldwide Storage Software Market Shares, 2015: Wide-Ranging Impacts of Cloud, SDS, and Open Source* (IDC #US41508916, June 2016)
- *IDC's Worldwide Server-Based Storage Taxonomy, 2016* (IDC #US40995216, February 2016)
- *IDC's Worldwide Software-Defined Storage Taxonomy, 2016* (IDC #US40951716, February 2016)
- *Worldwide Software-Defined Storage, 2014-2019: Forecast Report* (IDC #US40903816, January 2016)

## About IDC

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