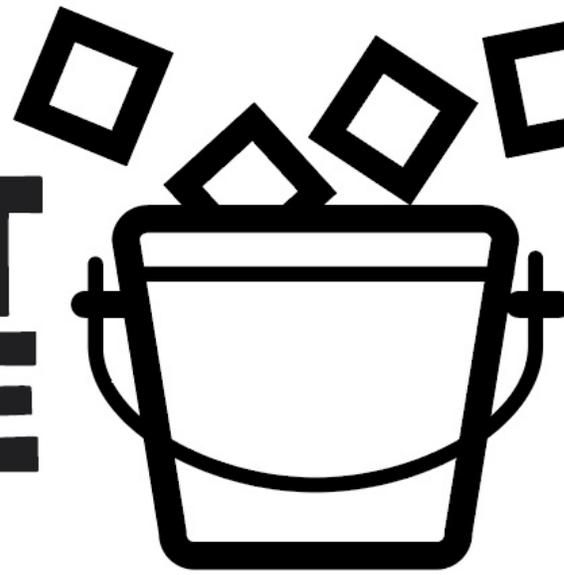


e-Guide

OBJECT STORAGE VS.



FILE STORAGE

6 Reasons You Can Now
Have the Best of Both





Object storage is the modern alternative to traditional block and file storage. Instead of storing data in sectors or tracks (block storage) or in a block-based file system hierarchy (file storage), both of which are limited by physical hardware constraints, object storage stores data in a flat address space, using a unique identifier and an unlimited amount of customizable metadata (tags) that can be attached to each piece of data to make it easy to find and retrieve.



This approach makes object storage infinitely scalable. It can grow to any size just by adding more hardware. It is also much less expensive than traditional SAN and NAS because it doesn't need costly processors to execute database or file lookups. Massive scale at low cost is why object storage is now the foundation for private and public cloud storage platforms like Azure Blob Storage, Amazon S3, IBM Cloud Object Storage (COS), Dell EMC Elastic Cloud Storage (ECS), Hitachi Content Platform (HCP), Cloudian, Scalality, and others.

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Despite its scale and cost advantages, object storage hasn't grown as fast as first predicted, largely due to 6 main challenges that have limited it to a small number of "cheap and deep" use cases.

What's been missing? A file system. In the same way device-based file systems such as NetApp WAFL and Isilon OneFS unlocked the potential of traditional disk storage, an object storage-based file system is now needed to unlock the massive potential of the "new disk" – private and public cloud object storage.

Here are 6 reasons an advanced, object storage-based file system combines the benefits of traditional file storage and modern object storage in one "best of both worlds" solution, supported by 6 real-world examples of enterprises benefiting from this combination today.



1

Low Cloud Egress Costs

Public cloud object storage has been widely viewed as only usable for archive or backup data, which is rarely accessed. That's because the egress charges incurred each time data must be retrieved make public cloud object storage too expensive to store active data sets, such as frequently used files typically stored on NAS devices and file servers.

A file system designed for object storage solves this problem, enabling public cloud storage to be cost-effectively used for NAS and file server use cases. An object storage-based file system minimizes egress charges by caching just the active pieces of itself – files and metadata – anywhere file access is needed, typically on-premises in main, remote, and branch offices. By using physical or virtual edge appliances that support the same CIFS and NFS file sharing protocols as traditional NAS, and intelligent caching algorithms that ensure a high cache hit rate, this modern file system minimizes the need to request files from public cloud storage, reducing egress charges in the process.

A modern file system designed for object storage also compresses and de-duplicates file data before sending it from the edge to the cloud. This can reduce the amount of object storage needed to store enterprise files by an average of 40%, saving on both cloud storage subscription costs and the egress charges to retrieve the file data from the cloud.



Case Study – Austin Radiological Association

Austin Radiological Association (ARA) is an outpatient imaging services provider operating 17 centers throughout central Texas. It provides professional radiologist services to 20 area hospitals, and its imaging centers offer everything from mammography to MRI, with specialty centers for Women's Imaging and Children's Imaging (pediatric radiology).

Given its mammography storage growth rates, ARA would have had to purchase new, full-sized storage arrays, requiring a \$1.3 million up-front investment. The unlimited capacity of Azure object storage combined with an object-storage based file system from Nasuni has eliminated the need for this expenditure. The unique ability of Nasuni UniFS® to allow both files and metadata to scale in the cloud and not on local devices gives ARA capacity on-demand, in a "pay-as-you-grow" subscription model.

Says ARA CIO Todd Thomas, "When it comes to retrieval, we are able to ensure our clinicians have rapid access to images without cloud egress charges using Nasuni edge appliances, which intelligently cache files locally. We are also able to pre-load large, historical file sets if they are needed for a patient visit the next day into the Nasuni edge appliances to ensure fast access."

[Read the full ARA case study >>](#)

2

High Performance File Access

Latency has been another impediment to using object storage for day-to-day file sharing. Having to connect to public cloud object storage every time a file is needed would frustrate users, since the network bandwidth from each office to the public cloud is rarely sufficient to provide the LAN-speed access they're used to. And the cost to fix the latency issue in all locations would be astronomical.

Private cloud deployments in which object storage is hosted on-site also have latency issues. While users in the main office will enjoy fast, LAN-speed access to the object storage in the data center, users in remote and branch offices will have the same performance challenges they have with traditional NAS. VPN or other remote access approaches will be required, resulting in slow access over the WAN. Or, object storage will have to be replicated from the data center to the remote sites at significant cost.

A file system designed for object storage overcomes the file latency challenge in the same way it solves the egress charge challenge. Edge appliances can be deployed in any location to cache actively used files from public or private cloud object storage. The appliances look like regular file servers or NAS devices, presenting shares via standard protocols (e.g. CIFS, NFS) for high speed file access. Yet they require, on average, only 20% of the hardware resources because they are only caching the active files. Enterprises can choose from flash-optimized physical appliances or use existing hyperconverged infrastructure or flash arrays as virtual edge appliances.

All appliances are automatically synchronized with the latest version of every actively used file, so users are always connecting to their local edge appliances at fast, local LAN speed. Intelligent caching algorithms yield cache hit rates of nearly 99%, so there is rarely any need to request files across a slower public internet or WAN connection.

Case Study – APi Group

Founded in 1920, Minnesota-based APi Group has diversified and grown through acquisition. Today, APi Group consists of 40 different companies operating within four major business sectors, including life safety products, specialty construction, infrastructure, and gas and oil pipelines. The IT group serves more than 5,000 employees distributed across 200 offices throughout the US, Canada, and UK.

With remote office / branch office (ROBO) file storage becoming a bigger issue for IT and its business units, APi Group implemented Nasuni Enterprise File Services™ with Azure object storage. The Nasuni UniFS® global file system now stores all APi Group files and metadata in Azure. Small Nasuni edge appliances deployed on-premises at each APi Group location provide cached, high performance access to frequently used files, even at ROBO locations and temporary job sites with slow external network connections.

“With Nasuni edge appliances acting as the file servers on site and only having to be just big enough to store the active files, our designers are getting their files at local LAN speed,” says Calvin Olson, IT Manager at APi Group. “It’s like stuffing 100 pounds of potatoes into a 20-pound bag. We’ve been able to apply the cost savings of not having large NAS arrays in remote offices to the purchase of other needed IT resources.”

[Read the full APi Group case study >>](#)

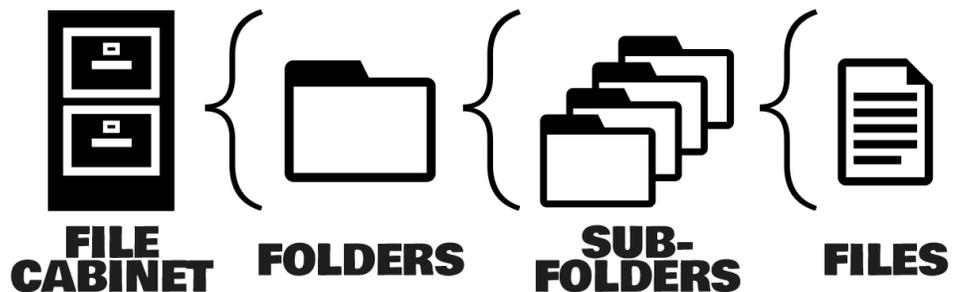


3

Familiar Hierarchical Folder Structure

The flat address space used by object storage is one reason it is so scalable. It's also another reason it has not been suitable for traditional NAS and file server use cases.

The human mind likes to organize information in a hierarchy. This is why the filing cabinet, with its drawers, folders, and subfolders, has been used as the metaphor for computer file systems since the dawn of the computer era. Users want their group shares, project directories, and home drives organized in a hierarchy that is familiar and easy to navigate.



An object storage-based file system delivers this familiar file and folder structure on top of the flat address space of object storage. Enterprise IT organizations benefit from unlimited scalability, while keeping users happy and ensuring fast acceptance and adoption.



IDL Worldwide

Case Study – IDL Worldwide

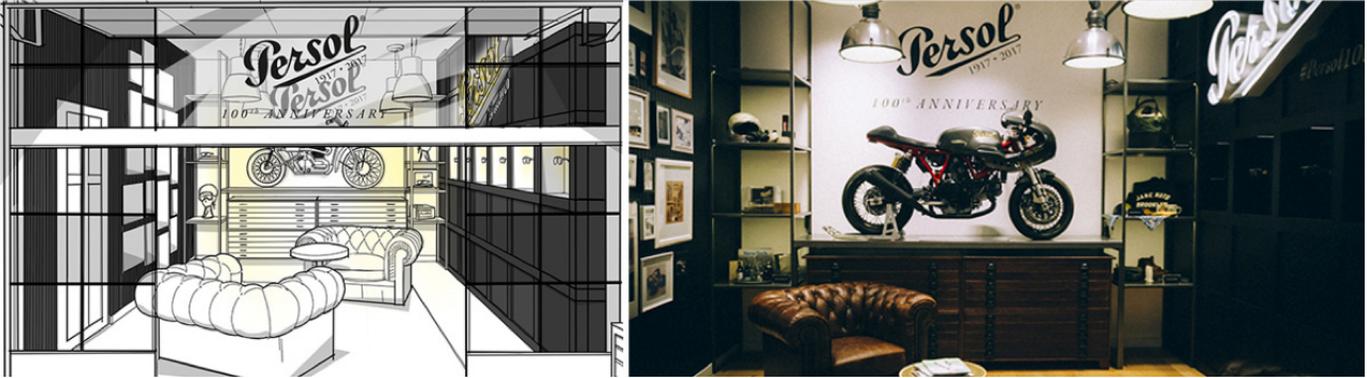
Retail branding firm IDL Worldwide designs unique customer experiences for an impressive client list, including Coca-Cola, Nickelodeon, Chick-fil-A, and The North Face.

As the agency grew and added new office locations, traditional file storage could no longer meet its needs. Users were storing Adobe Creative Cloud application files, video, audio, and CAD/CAM project files on laptops, file servers in multiple offices, and other hard-to-track locations. To collaborate, its teams were using a complex mix of file transfer solutions, including Aspera, Mass Transit, and FTP, along with local file servers, Dropbox, and private network bandwidth. In some cases, IDL would store 20+ copies of a single 1 GB file.

The answer was a strategy called "Skybox" that includes an overhauled file infrastructure, plus company-wide training and system documentation. After extensive evaluations, IDL built its Skybox implementation around Nasuni enterprise file services, powered by the Nasuni UniFS® global file system. They selected Amazon S3 for the underlying object storage.

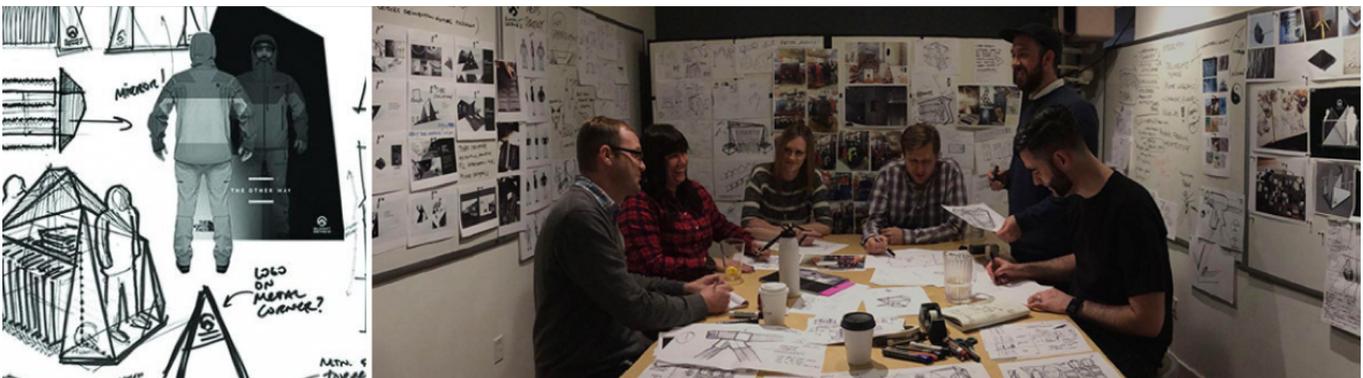
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Says David Cottman, IDL's Manager of Graphics Solutions, "We asked ourselves some key questions. How do we have designers in Pittsburgh and Portland work on the same project and have access to the exact same files? How can we eliminate the redundancies of multiple files all over the place? How can we make it easy for new employees to use this system? And how do we make it easy and cost-effective for IT to implement and manage?"

Once IDL's line of business and IT architects designed the Nasuni-based Skybox solution, the agency established a plan to ensure its success and standardization across the company, then brought in key players from each department to ensure buy-in.



"We decided how we were going to set up our file system so everyone was working out of the same folder structure," explains Cottman. "We set up strict permissions and rules around this, so an account manager will have access to the project management folder with read-write access, but manufacturing might have read-only access. Project management, IT, and security all collaborated to make sure this was set up properly, so we have a true global file server that gives every worker the resources they needed."

[Read the full IDL Worldwide case study >>](#)

4

Broad Application Compatibility

Almost all applications used by enterprises today are compatible with the CIFS/SMB and NFS file sharing protocols. As a result, applications can read from and write to any file server or NAS device that supports these standards. This is not the case with object storage.

Amazon's S3 API has become the de-facto standard for reading from, writing to, and managing object storage. Applications must be completely rewritten to support this new standard.

The alternative is to leverage the same approach as traditional file storage – use a file system as the middleman. For decades, file systems have provided a “middleware” layer that enables users and IT to store, organize, secure, protect, and manage files from any application. A file system designed for object storage that supports CIFS/SMB and NFS protocols can provide this same level of broad application compatibility.

Enterprises can use the file system to dip their toes in the object storage waters, with a simpler, lower-cost way to archive inactive file data from all applications without requiring any application rewrites. Or, they can leverage the file system for more advanced NAS consolidation, remote office file server, and multi-site file collaboration use cases.

Case Study – Perkins + Will

Perkins+Will is the #1 architecture and design firm in the US. Known for projects such as the new Sports Therapy and Research Center for The Dallas Cowboys, the company has grown steadily over the past two decades and now has 24 offices around the world.

With the firm's architects needing to store and share business-critical BIM files as large as 300 GB, traditional file storage could no longer keep pace. Cloud object storage was the ideal solution, but the complexity of design and management applications such as Revit, Navisworks and Newforma and creative apps such as Adobe Photoshop and Illustrator, required a solution that could maximize both storage performance and application compatibility.

Perkins+Will deployed Nasuni Enterprise File Services with Amazon S3 object storage at all 24 locations around the world. The ability of the Nasuni UniFS global file system to “speak” CIFS/SMB and NFS from its edge appliances when interfacing with applications and users, and S3 when interfacing with Amazon object storage meets both requirements.

Comments Gerald van Benschop, Infrastructure Manager at Perkins+Will, “When we deployed Nasuni in one of our largest offices housing many of our senior executives, no one noticed. That’s the perfect scenario – better storage and no change for the end users.”

[Read the full Perkins+Will case study >>](#)



5

Advanced Data Protection

Traditional file storage is typically protected in two ways:

- Third-party backup software with full and incremental backup schedules periodically protects files and enables them to be recovered to various points in time. Recovery times depend on whether the backups are to tape or disk, and whether the media is on or off-site.
- Snapshot software captures a point in time copy of the file storage, usually on another disk array. Because snapshots are costly, with full copies on disk, snapshots are not typically retained for more than 1 week, and are often overwritten by the next snapshot.

Like traditional file storage, object storage does not offer native data protection. Most object storage platforms offer a geo-replication option to create copies of objects in other locations, but this is intended for disaster recovery, and doesn't address the need for file-level recoveries at multiple recovery points.

An object storage-based file system enables object storage to surpass traditional file storage when it comes to file-level recovery points and recovery times. The most advanced object storage-based file systems offer continuous versioning, which captures snapshots of files as they change, encrypting, de-duplicating, and compressing them and storing the delta differences in object storage.

Each delta change is stored as its own file version using a Write Once Read Many (WORM) approach that prevents erasure. By creating an unlimited, immutable version history of every file in object storage, the need for file backup software, hardware, and media – and the IT overhead to manage it – are eliminated, as are the associated costs.

The most advanced object storage based file systems enable any version of any file to be recovered through self-service or IT-assisted interfaces, significantly improving upon the recovery times (RTOs) and recovery points (RPOs) offered by traditional file storage.

Case Study – Faith Regional Health

Faith Regional Health Services treats more than 150,000 patients across 13 counties in the midwestern US. The fast-growing care provider received the 2018 Distinguished Hospital Award for Clinical Excellence™ from Healthgrades. Like many hospitals, Faith Regional's rapid growth is putting pressure on its file infrastructure, creating challenges for both its IT organization and its clinicians.

One of its biggest challenges was to make its backup and disaster recovery processes faster, more reliable, and more efficient. With Ransomware attacks on the rise, the IT team wanted to be able to restore unstructured data to the point immediately before any attack to minimize data loss – something its traditional file storage and backup solution could not provide.



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The IT team at Faith Regional began researching how it could leverage cloud object storage as a more cost-effective option for capacity. Azure soon emerged as the object storage front-runner, but what was missing was a way to store files using Faith Regional's existing file sharing protocols, and provide clinicians with high performance image access on-premises without incurring cloud latency or egress charges.

Nasuni's global file system was the answer. Nasuni Enterprise File Services is now fully implemented in a hybrid cloud configuration, with all files and file versions stored by Nasuni's global file system in Azure, and the actively used files cached by Nasuni edge appliances in each Faith Regional location.

Nasuni Continuous File Versioning™ takes continuous snapshots of the file system. New or changed data is chunked, de-duplicated, compressed, encrypted and stored in Azure, providing an infinite version history of every file, and eliminating the need for costly, difficult-to-maintain third party backup tools.

Explains Paul Feilmeier, IT Director at Faith Regional, "Nasuni's file system versioning is incredible. My team doesn't have to worry about backup schedules, backup windows, RPOs, and RTOs anymore. It's all automated. Plus, we've been able to eliminate about \$20,000 in annual backup software maintenance, and avoid new file backup licensing costs as we grow."

Continuous File Versioning also mitigates the threat of Ransomware at Faith Regional. If a cyberattack slips through the first line of defense, IT can roll back to a previous version of the entire file system, a directory, or an individual file to a date and time stamp right before the Ransomware attack. The amount of data loss is minimized, downtime is avoided, and business continuity is assured.

[Read the full Faith Regional Health case study >>](#)

6

Multi-Site File Synchronization

Digital transformation requires businesses to become thoughtful and flexible in the way they invent and adapt. They must innovate in an agile way. They must tap the intellectual horsepower of their employees – wherever they may be – to design products and services that are differentiated from the competition. This level of collaboration cannot be accomplished without a fast, efficient way to store and synchronize files across multiple locations.

Traditional file storage has been unable to satisfy this requirement without massive investments in data center NAS, remote office file servers for storing replicated file data, MPLS bandwidth for replicating the file data, WAN acceleration for boosting remote access performance, and backup and DR infrastructure distributed in each location. When this still doesn't satisfy the lines of business, "shadow IT" investments are made in FTP sites, file transfer software, and consumer-grade file sync and share solutions.

Object storage with a global file system offers a simple, high performance, and cost-effective solution to storing and synchronizing files across multiple sites at scale. The global file system stores all files and metadata in private or public cloud object storage. High-speed internet bandwidth is used to securely propagate just the changes to active files across edge appliances. With every appliance kept constantly in sync, users across all locations will think they're working on one big, fast local file server.

Changes made to files in different locations are automatically aligned based on their date and time stamps and stored in object storage as independent versions if the file system offers global volume management capabilities. By storing just the tiny fragments of each file that have changed and leveraging the low cost of object storage, the file system provides an infinite version history of every file without impacting IT budgets.

File locking is another powerful capability a file system brings to object storage. Except an object-storage based file system goes well beyond the capabilities of traditional device-based file systems by applying the lock globally. Global file locking ensures only one user anywhere in the world can make file changes at a time. If architected as a scalable cloud service with redundant lock servers and lock server failover built-in, global file locking minimizes the data loss – and productivity loss – caused by version conflict.

Case Study – M+W Group

M+W Group is a global leader in specialized engineering and construction services headquartered in Stuttgart, Germany. Faced with multi-site file storage challenges, they chose IBM Cloud Object Storage and Nasuni to unite all global locations under a single file system to help their 6,000 employees collaborate on international projects in 30 countries around the world.

The on-premises, private cloud solution based on IBM COS and Nasuni provides M+W scalable file storage capacity, high performance file access, and high speed file synchronization, improving collaboration on complex CAD and BIM files across multiple sites.

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Nasuni's continuously versioning file system also provides M+W Group's 45 active sites with advanced data protection that meets the company's aggressive recovery point and recovery time objectives.

Comments Herman Muliady, Head of ICT, Global for M+W Group, "One of the strengths of our business is the number of engineering specialists we can call upon to support our clients. We need to be able to form dynamic cross-functional teams made up of these specialists no matter where they are located. This cannot be accomplished without a fast, efficient way to store and share files. We're now a year into our deployment, and we're pleased with how much easier this solution is for our IT team to manage."

Summary

This e-Guide has covered 6 reasons why "File Storage vs. Object Storage" is no longer an either-or proposition. As this e-Guide explains and the customer case studies prove, a global file system unlocks the potential of object storage for all file storage use cases – archiving, primary data center NAS, ROBO file servers, and multi-site file collaboration. Start a proof of concept with Nasuni to validate how you can accelerate the benefits of object storage for your enterprise, while preserving all the benefits of traditional file storage.

About Nasuni

Nasuni enables enterprises to store, synchronize, protect, and manage files across all locations at scale. Powered by the Nasuni UniFS® global file system, Nasuni file services stores unstructured data in object storage from providers such as Amazon, Dell EMC, IBM, and Microsoft, while caching actively used data wherever it is needed – on-premises or in the cloud – for high performance access. By using Nasuni to collaborate on files across multiple sites, consolidate Network Attached Storage (NAS) and remote office file servers, and archive data for long-term retention and compliance, customers maximize workforce productivity while radically reducing IT cost and complexity.

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