

## A bridge to hybrid cloud

*Transparent cloud tiering in IBM Spectrum Scale accelerates deployment of scalable hybrid cloud storage solutions*



## Highlights

- Eliminate the challenges of data growth while reducing storage costs
- Combine IBM® Spectrum Scale™, IBM Cloud Object Storage System™, and IBM SoftLayer® to create powerful business solutions
- Seamlessly add flash, disk, tape and cloud storage tiers to optimize efficiency
- Achieve a comprehensive, unified storage infrastructure for the full lifecycle of enterprise data

According to the latest IBM research, three-quarters of enterprises have already adopted cloud capabilities to some degree.<sup>1</sup> But that doesn't mean they're jettisoning all their traditional IT systems. In fact, a global study of 500 IT decision makers reveals that organizations are increasingly integrating cloud resources with traditional IT to accommodate dynamic needs and specific business priorities.<sup>1</sup> This is hybrid cloud.

Today, 64 percent of cloud adopters are using some form of hybrid cloud,<sup>2</sup> and more than 80 percent of enterprise IT organizations are expected to commit to hybrid cloud architectures by 2017.<sup>1</sup> IBM research indicates that improving productivity is the number one motivation for moving to hybrid cloud—organizations hope to offload some of their IT resources and management complexity to the cloud. A close second is improved security and risk reduction—using the flexibility of a hybrid platform to judiciously choose which workloads and data to move to the cloud and which to maintain in-house. Rounding out the top four motivations for hybrid cloud adoption are cost reduction—shifting costs from fixed IT to as-needed cloud services—and scalability to handle dynamic workloads.

IBM is a leader in helping enterprises of all types and sizes take advantage of the capabilities and benefits of hybrid cloud infrastructure. On the data storage front, IBM offers IBM Spectrum Storage™, a family of software-defined storage solutions. One of the most widely deployed members of the IBM Spectrum Storage family is IBM Spectrum Scale, a high-performance data- and file-management solution used extensively across multiple industries worldwide. The innovative new transparent cloud tiering feature of IBM Spectrum Scale enables nondisruptive, intelligent data migration between flash, disk, tape and even cloud storage tiers. Leveraging the capabilities of IBM Spectrum Scale transparent cloud tiering, enterprises can more easily bridge storage silos on-premises while adding the benefits of cloud storage to their overall storage solutions.

## The fabric of high-performance hybrid cloud

Enterprise storage is a complex mix of legacy and contemporary workload data with varied size and access performance requirements. Homogeneous storage solutions, however, cannot adequately satisfy these needs—they typically must store data in blocks and files for latency-sensitive applications. But many contemporary video and image applications, for example, require frequent metadata access and near-infinite scalability, especially in object-based storage environments. Thus, most 21<sup>st</sup> century enterprises have developed and deployed a heterogeneous mix of block-, file- and object-based storage solutions.

Also, as more and more enterprises adopt cloud computing, they are finding themselves challenged by the new mix of cloud and in-house storage. Hybrid cloud storage requirements together with enterprise fears of locking in to a cloud storage provider are also driving another important storage characteristic—data mobility—across various kinds of storage. These storage environments include both on-premises and cloud, meeting contemporary use cases such as big data, social or mobile applications, and regulatory compliance.

Consider the alternatives available for enabling hybrid cloud storage: manually managing it with scripts, or deploying a dedicated appliance on-premises that provides connectivity and integration with the cloud environment. However, neither of these alternatives adequately supports contemporary business applications or a simple user experience with cloud. What enterprises need today is seamless, scalable hybrid storage solutions that offer data center agility. The IBM response is a suite of IBM Spectrum Scale transparent cloud tiering capabilities, which work with IBM Cloud Object Storage System offerings to provide:

- Seamless movement and management of data in and out of the cloud
- Simplified data management through native integration of IBM on-premises storage and cloud storage
- The combination of reduced cost with enterprise-level security, compliance and data protection made possible by leveraging cloud storage
- Extension to public cloud providers including Amazon Web Services

Most importantly, the capabilities provided by IBM software-defined storage tools enable enterprises to construct comprehensive data management and storage solutions that involve the full data lifecycle across all data types, both on-premises and in the cloud.



Figure 1. IBM Spectrum Scale provides the foundation for a unified storage infrastructure.

### IBM Spectrum Scale

IBM Spectrum Scale is a proven, highly scalable, high-performance data and file management solution that provides simplified data management and integrated information lifecycle tools capable of managing exabytes of data and billions of files. IBM Spectrum Scale started out as a file system for high-performance computing but has evolved into much more. Today it's a full-featured set of file data management tools, including advanced storage virtualization, integrated high availability, automated tiered storage management and high-performance configurations to effectively manage very large quantities of file data. IBM Spectrum Scale is designed to support a wide range of application workloads using a variety of access protocols and has been proven extremely effective in very large, demanding environments.

The transparent cloud tiering feature in IBM Spectrum Scale connects IBM on-premises storage directly to cloud or object storage. This feature enables you to leverage the benefits of cloud storage (including economics, collaboration and scale) with the simplicity of legacy data access protocols—even as it gives you a common view of data to advance your digital transformation.

### IBM SoftLayer

IBM SoftLayer is an infrastructure-as-a-service (IaaS) cloud offering delivered by SoftLayer, which operates data centers that power global enterprise cloud infrastructures across North America, Europe and Asia. SoftLayer provides the flexibility of having both virtual and bare metal servers in one solution that can be deployed on demand. Without sacrificing control and security, SoftLayer offers high performance and makes enterprise data available when and where it is needed. SoftLayer provides an open application programming interface for system-to-system access, supports several standard interfaces, and fully integrates with third-party or custom applications.

### IBM Cloud Object Storage System

Built on technology from Cleversafe, an IBM Company,<sup>3</sup> IBM Cloud Object Storage System offers object-based storage software and appliances for on-premises and cloud-based dedicated services as well as for off-premises public storage services, all designed to enable you to store and manage massive amounts of data more efficiently—and designed to help you meet the demands of data-intensive workloads delivered on in-house IT, through IBM Cloud or a combination of the two. IBM Cloud Object Storage System technology uses an innovative approach

for cost-effectively storing large volumes of unstructured data while ensuring security, availability and reliability. IBM Cloud Object Storage System Information Dispersal Algorithms separate data into unrecognizable “slices” that are distributed via network connections to storage nodes locally or across the world. With IBM Cloud Object Storage System technology, transmission and storage of data are inherently secure. No complete copy of the data resides in any single storage node, and only a subset of nodes needs to be available in order to fully retrieve the data.

### Transparent cloud tiering

To address today’s need for seamlessly integrating mission-critical, high-performance enterprise storage with the cloud, IBM offers *transparent cloud tiering*, essentially a software-defined enterprise cloud bridge that enables existing IBM Spectrum Scale storage products to natively support public and private cloud storage. Transparent cloud tiering provides intelligent data mobility between storage tiers, including off-premises cloud resources, while addressing enterprise concerns regarding security, resilience and vendor lock-in. Such capabilities are critical for effectively realizing hybrid cloud strategies.

Current IBM Spectrum Scale customers, cloud service providers and large enterprises with private cloud infrastructures can all benefit from transparent cloud tiering. Enterprises looking to reduce storage costs and improve storage utilization, business agility and application performance can leverage the power of transparent cloud tiering within IBM Spectrum Scale to enable reliable, secure and transparent hybrid cloud storage solutions. The following table lists some of the key transparent cloud tiering features and their benefits:

IBM Spectrum Scale transparent cloud tiering	
Features	Benefits
IBM Cloud Object Storage System as an on-premises storage target	<ul style="list-style-type: none"> <li>• Lower total cost of ownership, especially at petabyte scale and beyond</li> <li>• Gain the full range of object-storage capabilities including data security, reliability and durability for regulatory compliance</li> </ul>
IBM Cloud Object Storage System and Amazon Simple Storage Service (S3) public cloud storage	<ul style="list-style-type: none"> <li>• Eliminate capital expenditures with pay-as-you-grow cloud storage</li> <li>• Drive down storage costs using on-demand cloud storage when you need it</li> <li>• Seamlessly move data in or out of the cloud using automated policies</li> </ul>
Innovative dashboard	<ul style="list-style-type: none"> <li>• Monitor and manage storage across file/object data types, on-premises and in the cloud</li> <li>• Easily achieve hybrid cloud storage with data security, durability and reliability</li> <li>• Optimize storage performance and cost; maximize storage utilization</li> <li>• Implement a unified storage infrastructure with local and/or distributed data access (private/public/hybrid cloud)</li> <li>• Track storage characteristics such as data transfers, performance, alerts, audit logs and policy changes</li> </ul>

## The unified storage infrastructure

IBM Cloud Object Storage System and IBM Spectrum Scale with transparent cloud tiering can be combined with SoftLayer offerings to provide virtually unlimited options for implementing comprehensive, unified storage infrastructures for innovative business solutions. Transparent cloud tiering within IBM Spectrum Scale along with the IBM Cloud Object Storage System and SoftLayer offerings can help enterprises utilize cloud storage as an additional storage tier while addressing policy-based information security, durability and availability needs. These hybrid cloud-based solutions offer greater choice of geography, performance, cost optimization and flexibility in data storage.

Figure 1 illustrates the concept of implementing IBM Spectrum Scale as the foundation for a comprehensive, unified storage infrastructure across the full data lifecycle. This implementation leverages the advantages of both on-premises and cloud-based resources and can seamlessly incorporate flash, disk, tape and cloud storage tiers. IBM Spectrum Scale includes robust and granular data lifecycle management functionality that can automate and optimize the movement of data between storage tiers based on a wide range of user-controlled policies and priorities. For example, most file systems monitor fewer than a dozen data attributes—IBM Spectrum Scale monitors more than 50.

Policy or event-based automated data movement can be based on optimizing performance, cost, geographic location or many other data attributes and combinations. IBM Spectrum Scale seamlessly integrates with flash, disk and even tape storage media. On-premises or cloud-based cloud object storage implementations are easily added to provide rich object storage functionality. Thanks to the commitment and support IBM has provided to the OpenStack community and its many initiatives, open-source solutions such as OpenStack Swift can also be integrated to provide object storage functionality.

#### **Cloud storage as an additional tier**

Using transparent cloud tiering, you can readily do the evaluation, planning and configuration of IBM Spectrum Scale implementations to utilize cloud storage as an additional storage tier. IBM Spectrum Scale-based cloud storage can be enabled in less than five minutes. Administrators can look at current IBM Spectrum Scale usage patterns to obtain insights into storage costs and potential savings from adding cloud storage such as SoftLayer or even storage from third-party public cloud providers such as Amazon S3, while ensuring that enterprise information is secure and meets business objectives and compliance requirements. You can also evaluate the impact of a proposed cloud storage addition on the enterprise wide area network (WAN) and share information with network teams to make the necessary adjustments to the WAN gateway to enable cloud storage access.

In such an environment, the benefits of implementing hybrid cloud storage environments become magnified. First and foremost, the challenge of keeping up with explosive data growth can be virtually eliminated, as cloud storage capacity is essentially unlimited. In fact, thanks to the scalability of cloud resources, you can meet data-growth challenges without significant capital investments. You no longer periodically deploy additional storage arrays with the accompanying complexity and need for capital expenditure, nor do you buy more disks; you simply add more cloud storage capacity and account for it through your operational budget. This highlights another powerful advantage of cloud storage—cost. Economies of scale and commodity-like market competition have driven cloud storage costs below where most on-premises storage solutions can compete, even into the cost range of tape. Plus, with cloud there are almost no implementation expenses and very little management outlay.

#### **Policy-based seamless data mobility from on-premises to cloud storage**

IBM Spectrum Scale transparent cloud tiering provides other benefits as well. On average, unstructured data is moved 10 times within different storage tiers during its lifetime.<sup>4</sup> The ability to quickly move data where and when it is required is crucial to deriving business value from growing unstructured data sets. The transparent cloud tiering features of IBM Spectrum Scale enable you to determine where file system data should reside and create policies in less than 15 minutes to automatically move the data. This capability allows for informed decisions concerning when and how enterprise data is moved and how to most effectively migrate the data to the appropriate storage tier, keeping costs lower and storage utilization optimal.

Administrators can monitor the security and integrity of data being migrated to and from cloud storage and customize policies based on pre-configured enterprise storage policies. IBM Spectrum Scale also allows administrators to model and share the impact of policies on enterprise storage.

From an operational perspective, the transparent cloud tiering features of IBM Spectrum Scale simplify the process of moving data across storage tiers within an organization and help increase storage utilization. From a strategic perspective, data mobility provides flexibility in the storage infrastructure, which is necessary for organizations to respond to data growth. From a single dashboard view, administrators can monitor and manage the details of current and historical systems' storage characteristics, such as performance, data transfers, system alerts, system audit log, and storage utilization needed to optimize cost and manage storage performance. The dashboard view can be tailored to suit business requirements and priorities.

### Bridge to better business

Using IBM Spectrum Scale with transparent cloud tiering, you can take advantage of cloud data economics with the simplicity of legacy protocols to provide a common view of data to advance your digital transformation. IBM has the vision, resources and willingness to deliver the true hybrid cloud storage solutions that enterprises of all types and sizes demand. The transparent cloud tiering feature in IBM Spectrum Scale enables you to achieve a comprehensive, unified storage infrastructure solution that incorporates all data types and leverages all the advantages offered by the cloud. Transparent cloud tiering functions essentially like a bridge to the cloud, dramatically expanding your storage-solution horizons. More importantly, these capabilities provide a technology bridge to lower costs, greater agility and much more opportunity for your 21<sup>st</sup> century business.

## For more information

To learn more about the IBM Spectrum Scale, please contact your IBM representative or IBM Business Partner, or visit:

[ibm.com/systems/storage/spectrum/scale/](http://ibm.com/systems/storage/spectrum/scale/)

For more information on the full IBM Spectrum Storage portfolio, visit [ibm.com/systems/storage/spectrum/](http://ibm.com/systems/storage/spectrum/)

For more on IBM Cleversafe, visit

<http://www.businesscloudnews.com/2015/10/06/>

[ibm-acquires-storage-vendor-cleversafe-in-hybrid-cloud-play/](http://ibm-acquires-storage-vendor-cleversafe-in-hybrid-cloud-play/) and

<https://www.cleversafe.com>

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<sup>1</sup> “Growing up hybrid: Accelerating digital transformation,” *IBM Center for Applied Insights*, February 2016. <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=GMW14087USEN>

<sup>2</sup> “Don’t Get Left Behind - The Business Benefits of Achieving Greater Cloud Adoption,” *IDC*, August 2015. <http://www.cisco.com/c/dam/en/us/solutions/collateral/trends/cloud/cisco-bca-infobrief.pdf>

<sup>3</sup> Cleversafe, Inc. was acquired by IBM in October 2015.

<sup>4</sup> “Get Control Over Your Data”, *File Pilot Software*. Accessed August 1, 2016. <http://filepilotssoftware.com/index.php/users-data-mobility-use-cases/>



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