BLACKPEARL OBJECT MANAGER USER GUIDE

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Table Of Contents

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INTRODUCTION

This guide describes the installation, configuration, and use, of the BlackPearl Object Manager. The guide helps you to optimize the software for best performance and data security.

This guide is intended for data center administrators and operators who maintain and operate object storage systems. This guide assumes a familiarity with large-scale data storage architecture, with installing, configuring, and use of data storage software, as well as with various data storage mediums, including cloud, disk, and tape.

RELATED PUBLICATIONS

BlackPearl Object Manager Help

This user guide is also available in web form, and can be accessed by clicking the question mark (**?**) icon in the Object Manager user interface, or by entering the below URL into a web browser.

https://support.spectralogic.com/vail/vailonlinehelp.htm

BlackPearl Object Manager Release Notes

The BlackPearl Object Manager Software Releases Notes on the *Support Portal website* provide the most up-to-date information about the Object Manager, including information about the latest software releases.

Spectra Logic BlackPearl Storage Manager Systems

The following documents related to the BlackPearl Storage Manager are available on the *Support Portal website* at: support.spectralogic.com.

The *Spectra BlackPearl Storage Manager User Guide* provides detailed information about configuring, using, and maintaining your BlackPearl Storage Manager.

The *Spectra BlackPearl DS3 API Reference* provides information on understanding and using the Spectra DS3 API.

Spectra Logic Tape Libraries

User Guides for Spectra Logic tape libraries are posted on the *Support Portal website*.

What's New

The Object Manager application is updated to Object Manager 3.6.1, which brings with it the following new features and changes:

Product Rebranding

The software running the Object Manager application has been updated to the BlackPearl Object Gateway solution, which consists of two renamed software components:

- **BlackPearl Object Manager** - formerly known as the Spectra Vail application.
- **BlackPearl Storage Manager** - formerly known as the BlackPearl Nearline appliance.

Additionally, the hardware platform for both software products is now called the Spectra Storage Server.

Bucket-Level Encryption

You are now able to enable encryption on a per-bucket basis.

SigV4a Presigned URL Support

The Object Manager application now supports presigned SigV4a URLs.

Firmware Update Job Cleanup

When updating the BlackPearl Object Manager, the application cancels outstanding GET jobs, and triggers the completion of all PUT jobs, before updating the application firmware.

Destination Full/Insufficient Space Job Handling

The application now detects if destination storage is full and releases any BlackPearl Storage Manager jobs that were restoring data from tape. This prevents a deadlock where the BlackPearl cache is full of data it cannot transfer to the final destination. Additionally, if an object is too large to be restored to the destination storage, the job fails. However, if the destination storage is large enough but does not currently have sufficient space, the restore job remains in a pending state until adequate space on the destination is available for the object.

Automatic Pack List Restoration

In the event the pack list is corrupted or deleted, the Object Manager application now automatically restores the pack list using information contained in data packs.

User Interface Improvements

The Object Manager user interface is updated with the following:

- The dashboard screen of the Object Manager user interface has been optimized to display information critical to maintaining a healthy Object Manager sphere, such as information about storage, cache, and database space.
- The Object Manager user interface now displays the capacity of tapes that have not been assigned to a data policy. Additionally the user interface also displays information about the BlackPearl Storage Manger database and cache pools.
- The BlackPearl Storage Manager dashboard now displays in the Object Manager user interface by default and does not require a login to display.
- Charts for throughput and operations now display separately for each IAM account. The throughput chart now displays the number of active socket connections. The operations chart now displays dropped connections.
- Performance charts now support increased durations, as well as the ability to download the performance chart as a CSV file.
- You are now able to enable or disable a single storage, or all storage on an endpoint. When storage is disabled, all in-progress PUT jobs are completed. All GET jobs are canceled, unless the GET job is necessary for an in-place restore.
- When creating disk storage, you are now able to specify a record size. The application automatically configures the disk volume on the BlackPearl Storage Manager with the specified volume record size.
- The application now displays the name of the lifecycle assigned to a bucket or IAM account when the "default" option was specified when creating the bucket or IAM account.

Performance Improvements

Multiple changes to the BlackPearl Object Manager improve performance.

Alert Improvements

- An alert is generated when an object is too big for cloud storage.
- An alert is generated if cloud storage cannot be created because a newer version is already present.
- A general failure alert is logged for any unrecognized error, and the error is included in the body of the alert.

API Improvements

- The Object Manager application now uses the same REST API documentation for both cloud and local control spheres.
- You can now retrieve the total object count for a specified account using API commands.
- The API calls to list or get volume items have been deprecated.

Chapter 1 - Understanding Object Manager

This chapter describes the concepts behind the Object Manager application and how it works with various storage technologies and mediums.

OBJECT MANAGER APPLICATION FEATURES

The Spectra Logic Object Manager is an advanced data management system providing a comprehensive solution for managing, protecting, and accessing data across hybrid cloud and on-premises environments. Object Manager integrates various data storage technologies to streamline data workflows and ensure efficient data management and protection.

The major Object Manager features include:

- Global access to a single name space, which allows for seamless data management across various locations and storage types.
- Command, control, and monitoring using a single management point, which simplifies the management process.
- An Amazon® S3 compatible interface for easy integration with applications and services using the Spectra Object Manager API.
- Data stored on-premises using flash, disk, tape, or third party storage.
- Data stored to and synchronized from cloud storage, allowing for flexible data management options. The Object Manager supports cloud storage providers such as Amazon Web Services®, Microsoft® Azure®, Google Cloud Storage®, and others.
- Once an object is uploaded anywhere in the Object Manager sphere, it is immediately available to anyone who is connected to the sphere, promoting collaboration and efficient data access.
- Rich policy engine provides time-based data placement for each storage type and geographic location, allowing for efficient data management and compliance with data governance policies.
- Unlimited number of data storage sites, offering scalability to meet growing data storage and security needs. Migrating data to multiple geographic locations around the world allows for increased data protection in the event of natural disasters or virus attacks, which normally would impact where and how a company accesses its data.
- Local or cloud-based control. Local control uses a standalone BlackPearl Storage Manager without the need for cloud services, and includes support for multi-factor authentication. Cloud control allows organizations to log in from anywhere in the world to control and monitor data movement, enhancing accessibility and operational flexibility.

Other features of the Object Manager application include:

- A high-speed cache on the BlackPearl Storage Manager which enhances performance for frequently accessed data.
- System monitoring and tools to view capacity information and performance metrics, ensuring optimal data management.

- Supports Cross-Origin Resource Sharing (CORS) for S3 commands, enhancing web integration capabilities.
- The Object Manager application can use a HotPair BlackPearl system running BlackPearl OS 5.8.x or later, enhancing data protection and availability.
- An improved bucket object display includes information about the total number of objects, object size, and total size of all objects in the bucket, all within the Object Manager user interface.
- Supports S3 bucket notifications for various bucket events and S3 tagging of objects, allowing IAM policies to use tags instead of prefixes.
- Includes the BlackPearl Embedded Dashboard for controlling common features of the BlackPearl system without accessing its user interface.

General Use Cases include:

- **Backup and Archive:** Serves as a target for backup applications and long-term data archiving.
- **Data Replication:** Enables replication of data from other storage environments, increasing data availability and redundancy.
- **Disaster Recovery:** Supports robust backup and disaster recovery solutions. Data can be migrated to multiple geographic locations to protect against natural disasters or cyber-attacks.
- **Data Archiving:** Provides cost-effective long-term archiving solutions.
- **Multi-Tenancy:** Suitable for environments requiring isolated data management within a shared infrastructure.

UNDERSTANDING BLACKPEARL STORAGE

The Object Manager application uses a BlackPearl Storage Manager as endpoint storage, which provides scalable, efficient, and flexible storage across multiple mediums, including disk, tape, and cloud. Data transfer operations on a BlackPearl system use the standard S3 interface, appearing to applications as AWS S3 storage.

The BlackPearl Storage Manager uses a system cache to enhance performance for frequently accessed data and uses the Advanced Bucket Management policy engine to manage data movement between different storage targets based on defined rules. The BlackPearl Storage Manager also supports integration with cloud storage providers, which allows for intelligent object placement and retrieval.

BlackPearl endpoint storage can be used as a path to tape storage. The BlackPearl Storage Manager uses the Amazon S3 Glacier compatible interface to store data on tape, offering a seamless backup and restore process using standard S3 commands.

Types of BlackPearl Storage

The Object Manager application supports using both bucket storage and NAS storage provided by a BlackPearl Storage Manager, each allowing for different use cases and operational needs.

- BlackPearl bucket storage is designed for object storage, using the S3 protocol, which is ideal for managing unstructured data such as backups, archives, and large data sets. This storage model is highly scalable, allowing for the efficient handling of large volumes of data with support for multipart uploads, object versioning, and lifecycle policies to automate data management tasks. Users interact with BlackPearl bucket storage using APIs, which allows for seamless integration with various applications and workflows that require object storage.
- BlackPearl NAS share storage is designed for direct file storage, providing a more traditional approach to storing and accessing data. NAS share storage supports common file protocols like SMB and NFS, making it suitable for environments where users and applications need shared access to files and directories. NAS share storage is particularly useful for collaborative work, as multiple users can read and write to the same files simultaneously. NAS share storage is often used for storing documents, media files, and other structured data that benefit from hierarchical organization and direct file access.

UNDERSTANDING OBJECT MANAGER CLOUD STORAGE

The Object Manager application uses cloud storage by seamlessly integrating with various cloud services, allowing you to manage and move data efficiently. The Object Manager application uses predefined policies and lifecycle rules to automate data migration, replication, and tiering within the cloud. This allows data to be optimally stored, balancing cost and accessibility.

The Object Manager application provides a unified management interface that allows you to oversee and control your data across different cloud environments. Data is stored in Object Manager buckets, which can link to cloud storage, allowing for flexible and scalable data management. The Object Manager software automates the process of moving data to different cloud storage tiers based on access frequency and other criteria, which allows for efficient use of cloud resources and cost savings.

Additionally, the Object Manager application supports object storage within the cloud, making it easy to store and retrieve large volumes of unstructured data. The integration with cloud storage services also enhances data durability and availability, leveraging the cloud's inherent redundancy and disaster recovery capabilities.

The Object Manager application supports bi-directional synchronization with cloud storage, allowing data to be synchronized between local BlackPearl buckets and cloud buckets. Any data placed in one location is automatically synchronized to the other location, facilitating seamless data access and management across different storage environments. This can be useful for distributed workflows where data needs to be accessed and processed in multiple locations.

The Object Manager application provides robust security measures to protect data during transfer to cloud targets. All network traffic between Object Manager nodes and cloud resources is secured using HTTPS with TLS encryption. This ensures that data is protected from unauthorized access during transit.

Object Manager Application with AWS Cloud Storage

The information below describes the features provided by Amazon AWS cloud storage when used with the Object Manager application.

- Bucket synchronization allows for seamless synchronization between AWS S3 buckets and Object Manager buckets. Synchronization occurs bi-directionally. This facilitates distributed and accelerated data ingestion by synchronizing data placed in an AWS bucket to a local Object Manager bucket and vice versa and allows you to apply AWS services to local data without permanently storing it in the cloud.
- The Object Manager application uses the multipart upload capabilities of AWS S3, which allows large objects to be uploaded in parts, with each part tracked to resume interrupted transfers seamlessly.

- AWS S3 supports immutable objects, preventing deletion during a specified retention period. The Object Manager application uses object locking so that objects stored in AWS S3 cloud storage comply with specified retention policies.
- AWS IAM policies are used for secure access and permissions management. AWS credentials (access keys and IAM roles) are used to authenticate and authorize access to S3 buckets.
- AWS S3 versioning is required for AWS buckets used with Object Manager, so that multiple versions of objects are maintained.
- AWS cloud storage supports creating lifecycle rules to transition objects between storage classes, such as moving infrequently accessed data to GLACIER or DEEP_ARCHIVE.
- Data security features include encrypting data using AWS Key Management Service (KMS) for secure key management, and using HTTPS and V4 authentication ensure data is protected in transit.

Object Manager Application with Microsoft Azure Cloud Storage

The information below describes the features provided by Microsoft Azure cloud storage when used with the Object Manager application.

- Data stored in Azure cloud pools is treated as native Azure objects, maintaining compatibility and allowing seamless access through Azure storage services.
- Azure cloud storage uses Azure block blobs for multipart uploads, determining the method based on object size. Multipart uploads on Azure do not provide a unique identifier. Part IDs must include a unique value in addition to the part number to prevent simultaneous uploads from interfering with each other.
- Object Manager object locking works with Azure immutable objects, allowing explicit control and expiration settings. The Object Manager application does not use Azure immutable storage settings directly, it manages immutable objects using special clone deletion processing.
- The Object Manager application uses the storage container shared secret key for authentication. Credentials must include permissions for deleting blobs and blob versions using Azure RBAC.
- Azure storage does not handle slashes and backslashes as ordinary characters, converting backslashes to slashes when writing blobs. Leading slashes and repeated slashes are ignored or compressed to a single slash respectively. The Object Manager application adjusts its behavior to accommodate these Azure storage constraints.

  Note: Azure storage restricts user metadata keys to C# naming conventions, and unsupported characters in user metadata are not copied to Azure storage.

Object Manager Application with Google Cloud Storage

- Object Manager maps AWS storage classes to Google Cloud Storage tiers, but note that GLACIER and DEEP_ARCHIVE storage classes are not supported with Google Cloud Storage.
- The Object Manager application uses role-based authentication to connect to Google cloud storage.
- Google cloud storage supports multipart uploads using Google SDK, which simplifies and optimizes large uploads, using resumable upload to track the progress.
- Object Manager object locking works with immutable objects, allowing explicit control and expiration settings. The Object Manager application recognizes and handles locked objects, but does not use Google immutable storage settings directly.
- Data stored by the Object Manager application in Google Cloud storage is stored in packs, with each pack assigned a unique identifier. These packs are then listed in the pack list for the corresponding object version in the Object Manager application. The version ID and ETag are used to validate the data integrity of an object before it is retrieved and reconstructed.

UNDERSTANDING OBJECT MANAGER LIFECYCLES

A Object Manager lifecycle is a set of automated policies that manage the lifecycle of data from creation to deletion. These policies dictate how data is transitioned through various stages, such as moving data between different storage tiers based on age, access frequency, or other criteria, and eventually deleting data that is no longer needed. The purpose of implementing lifecycle policies is to optimize storage costs, improve data management efficiency, and provide compliance with regulatory and organizational data retention requirements.

Lifecycles are controlled using placement and deletion rules. These rules specify the conditions under which data is moved or deleted, such as after a certain period or if it has not been accessed for a specified duration. Administrators can set a specific time for lifecycle actions to minimize disruption to users and system performance. Logging and auditing features keep a record of all actions taken by the lifecycle policies, providing an audit trail for compliance and troubleshooting purposes.

By automating data management through well-defined lifecycle policies, organizations can ensure efficient storage resource use, data retention policy compliance, and data loss risk reduction.

Considerations for Placement Rules

When creating a Object Manager lifecycle placement rule, consider the below information to provide efficient and effective data management.

- Define the specific criteria for transitioning data between storage tiers based on factors such as the age of the data, access frequency, and data size. These criteria help you determine when and how data is moved from a higher-cost, high-performance tier to a more cost-effective, lower-performance tier, or even to archival storage. It is crucial to understand the characteristics and costs associated with each storage tier to optimize storage expenses while maintaining the necessary performance levels for your data.
- Consider the impact of data transitions on access and retrieval times. Data moved to an archival tier might result in longer retrieval times and potentially higher costs when accessed. Lifecycle rules should be designed in accordance with your organization data access patterns and compliance requirements.
- Define clear retention periods for different types of data to comply with legal and regulatory requirements. This includes setting rules for deleting data after it has been retained for a specified duration.

Additionally, Spectra Logic recommends testing the lifecycle placement rules in a controlled environment before applying them broadly. This helps to identify any unintended consequences and confirms that the rules function as expected, preventing potential disruptions in data availability or performance.

Considerations for Delete Rules

The primary goal of a delete rule is to automate the removal of data that is no longer needed, thereby optimizing storage costs and maintaining a clutter-free environment. When creating a Object Manager lifecycle delete rule, consider the below information to provide effective data management and compliance.

- Define the criteria that determine when data should be deleted, such as the age of the data, last access time, or specific metadata attributes. These criteria should align with the data retention policies and regulatory requirements of your organization for compliance with legal mandates and avoid unintentional loss of important data.
- Consider the retention periods for different types of data. Some data may need to be retained for longer periods due to regulatory requirements, legal holds, or business needs. It is crucial to ensure that these retention requirements are incorporated into your lifecycle delete rules to prevent premature deletion. Verify that data scheduled for deletion is not part of critical backup sets or disaster recovery plans, as its removal could impact the ability to restore important information.
- Consider the impact on data access and performance. Deleting large volumes of data may affect system performance or disrupt ongoing operations. Spectra Logic recommends scheduling delete operations during off-peak hours or in a staggered manner to minimize any potential impact.

Additionally, Spectra Logic recommends testing the lifecycle deletion rules in a controlled environment before applying them broadly. This helps to identify any unintended consequences and confirms that the rules function as expected, preventing potential disruptions in data availability or performance.

UNDERSTANDING OBJECT STORAGE

Objects may have their content stored in any number of locations across the Object Manager sphere. This flexibility optimizes access and provides data redundancy and recovery.

The Object Manager application uses lifecycle rules to add and remove object storage locations. Lifecycles also can be used to delete the entire object. Lifecycle rules automate data placement and retention across storage locations in the Object Manager sphere.

A common scenario involves immediately adding duplicate storage locations when objects are created. For example, a lifecycle policy can be configured to add AWS cloud storage immediately after an object is placed into on-premise BlackPearl storage. This allows for data availability in both local and cloud environments for enhanced data access, protection, and disaster recovery.

UNDERSTANDING OBJECT MANAGER BUCKETS

Object Manager buckets provide a versatile and scalable object storage solution. A Object Manager bucket is a top level component of Object Manager application platform, designed to streamline and unify data management across multiple storage environments, including on-premises and cloud-based systems. This integration allows organizations to create a cohesive data management strategy, leveraging the strengths of different storage systems while maintaining a unified view of their data.

You can create a Object Manager bucket and assign it a lifecycle to manage the placement, movement, and retention. Through automated rules, data can be tiered across different storage types based on access patterns, age, and other criteria, optimizing both cost and performance.

Object Manager buckets support bi-directional synchronization, allowing data to be mirrored between local storage and cloud targets, allowing for high availability and redundancy. This functionality is particularly advantageous for organizations implementing a hybrid or multi-cloud approach, as it provides data access and management across various storage locations.

Additionally, Object Manager buckets offer advanced features such as versioning, metadata management, and robust security controls, so that data is not only stored efficiently but also protected and easily accessible.

Considerations for Object Manager Bucket Creation

When creating a Object Manager lifecycle bucket, consider the below information to optimize data organization and bucket functionality.

- Plan a method to organize your data in the Object Manager bucket. Consider using a hierarchical structure with clear naming conventions to facilitate easy data retrieval and management. Plan for the use of metadata to tag and categorize data, which improves searchability and organization.
- Decide on versioning requirements for your data. Versioning allows you to maintain multiple versions of objects, which provides data protection against accidental deletions or modifications. If you chose to use versioning, object locking can be used, which allows you to protect the state of an object when the lock is applied.
- Decide on a data security strategy that includes using encryption, access controls, and bucket and object ownership permissions.
- Plan for data redundancy and disaster recovery. The Object Manager application supports bi-directional synchronization of buckets, allowing data to be mirrored between local and cloud storage targets.
- Verify compatibility with your existing storage infrastructure by verifying that your chosen storage targets support the necessary APIs and protocols for seamless integration.

UNDERSTANDING AMAZON S3 WITH THE BLACKPEARL OBJECT MANAGER

The Object Manager application mimics the AWS S3 interface so that any client that uses S3 can interface with the Object Manager sphere without additional software. When integrating S3 with the Object Manager application, it is necessary to understand multiple technical aspects for consistent operation and optimal performance.

Configure AWS access keys (Access Key ID and Secret Access Key) for use with the Object Manager application, which uses the keys to authenticate API requests to S3 storage. Keys are configured in the Object Manager management console and provide programmatic access to S3 resources. Keys must be configured with sufficient permissions to access S3 buckets and perform required data storage operations. As a best practice, rotate access keys regularly and avoid embedding them in code. Store them securely using your security management tools.

Utilize IAM roles for secure and controlled access to data. IAM roles provide temporary security credentials, which reduce the risk of long-term credential exposure. The Object Manager application assumes an IAM role using AWS Security Token Service (STS). Use IAM policies that grant the minimum permissions necessary for Object Manager to function, following the principle of least privilege to minimize security risks. While less commonly used because of their complexity, ACLs can be configured to grant Object Manager access to individual objects in a bucket.

The Object Manager application supports multipart uploads for large files. For large file transfers, the Object Manager application breaks data into chunks to optimize upload and download performance. Configure chunk sizes appropriate for your network and storage performance requirements. If transferring large amounts of data over long distances, consider using AWS S3 Transfer Acceleration to speed up data transfers.

The Object Manager application uses AWS Signature Version 4 for signing API requests. Object Manager communicates with S3 over HTTPS so that data in transit is encrypted and secure. Additional security methods include using server-side encryption with AWS KMS (Key Management Service) for data at rest.

INTERFACING WITH TAPE LIBRARIES AND MEDIA

Tape storage is a highly reliable and cost-effective medium for long-term data archiving and backup. It offers substantial storage capacity at a lower cost per gigabyte compared to disk or solid-state storage, making it ideal for organizations managing large volumes of data. One of the key advantages of tape is its longevity, with a shelf life that can exceed 30 years, allowing for data preservation over extended periods.

Additionally, tape storage is known for its low energy consumption, as it does not require power when not in use, unlike spinning disks that consume power continuously. This can result in significant cost savings in terms of both energy and cooling requirements. Tapes also offer robust security features, including offline storage capabilities that provide an inherent protection against threats such as ransomware, which often target online systems.

The Object Manager application streamlines the data path to tape media using a BlackPearl Storage Manager, which provides the interface between the Object Manager application and tape storage. The BlackPearl system stores data in a local cache before writing it to tape media. The cache ensures that data is managed efficiently and tape drives are utilized effectively.

When data is requested, a client issues an S3 Glacier command to move data from tape media (Glacier) to the BlackPearl cache. A second S3 command retrieves the data from the BlackPearl cache.

For S3 clients that do not support S3 Glacier commands, Object Manager offers a compatibility mode. This mode automatically issues an object restore command for objects in Glacier-tape class, which allows for seamless data retrieval without client-side modifications.

The information below provides additional information on how the Object Manager application uses tape media storage.

Tape Ingest

Object Manager supports the ingest and synchronization of existing BlackPearl buckets currently on tape media. This is useful if you have been using a BlackPearl system and want to integrate your existing data with the Object Manager application. The ingestion process involves adding a BlackPearl ingest agent, which performs a HEAD operation to index the objects into its database, and applies lifecycle rules as needed. If a lifecycle rule is not applied, objects remain on the BlackPearl system but are accessible as Glacier objects through the Object Manager application, requiring an Object Restore command for retrieval.

Object Manager allows for universal tape ingest within a BlackPearl system managed by the same Object Manager Sphere. This means tapes exported from one BlackPearl system can be imported into another without database or object migration. Object Manager handles the metadata ingest and makes objects available across the sphere. The metadata on imported tapes is read and ingested into the new BlackPearl system database.

Glacier Tape Packing

The Object Manager application attempts to generate 64 GB packs of data before transferring it to tape media, which allows for increased performance both for write and read operations. When a file is requested from a pack, the entire 64 GB pack is restored to the BlackPearl cache.

When deleting data files, a pack is not deleted unless every object in a pack is deleted. Because of this, if only some files in a pack are deleted in the Object Manager application, the deleted files will no longer be available but will still count against the available storage space on the tape cartridge. When the remaining files in the pack are deleted, the entire pack is deleted and the previously used storage space is made available.

SPECTRA LOGIC BLACKPEARL OBJECT MANAGER NAMING CONVENTIONS

Before configuring the Spectra Object Manager, Spectra Logic recommends establishing a naming convention for your data storage infrastructure. A well-considered naming convention allows for easier setup and configuration, as well as a roadmap for naming Object Manager components added at a later date.

Use the information below to develop a naming convention for the Object Manager sphere and resources before you install and configure the Object Manager.

The Object Manager uses the same naming restrictions as Amazon Web Services. For more information on allowed naming conventions, see *AWS User Documentation*.

Object Manager Sphere Names

When using multiple Object Manager spheres, each sphere must have a unique name.

User Names

User names identify Object Manager administrator users, as well as IAM users associated with the Object Manager sphere administrator's AWS account. Spectra Logic suggests using the same naming convention as your corporate email for user names.

For example, if associate Jane Smith uses the email address janes@yourcompany.com, use "janes" for the user name.

Group Names

Groups of users are typically configured when all users of the group share the same access policies. Spectra Logic suggests using self-explanatory names for groups.

For example, if your company's groups are assigned by department, use a naming convention that directly identifies each department such as Production, Engineering, or Accounting.

Storage Names

Storage names identify a storage target in the Object Manager sphere. Storage names are used for Object Manager VM node storage, VM pool storage, cloud storage, BlackPearl storage, and buckets or NAS shares configured on a BlackPearl system. Use the sections below to assist you in creating a storage name convention.

Object Manager VM Node Storage

The Object Manager VM node storage name is used as the top level name of the storage endpoint displayed in the Object Manager user interface. Spectra Logic recommends using a name that includes both the location and type of storage.

For example, in the Dallas location, add the storage type as a suffix, such as Dallas-VM1 and Dallas-VM2.

VM Pool Storage

A Object Manager VM node uses one or more VM storage pools as data storage. Spectra Logic recommends using a name that includes the location, intended pool usage, and storage class.

For example, in the Dallas location, add suffixes for use and class such as Dallas_News_Standard and Dallas_Backup_Glacier.

BlackPearl Storage

BlackPearl storage includes disk pools and volumes configured on the BlackPearl system. Spectra Logic recommends using names that include the location, BlackPearl name, physical medium, and storage class.

For example, in the Dallas location, add suffixes for the BlackPearl name, physical medium, and storage class such as Dallas.BlackPearl1-Object-Standard and Dallas.BlackPearl2-Tape-Glacier.

Cloud Storage

Cloud storage includes storage locations provided by Amazon and other third-party vendors. Spectra Logic recommends using names that include the vendor, location, storage class, and intended usage.

For example, AWS_USEast1_Standard_MarketingArchive.

Object Manager Bucket Names

Object Manager buckets are the highest level of object grouping in the Object Manager sphere. Object Manager buckets are used with lifecycle rules, and buckets can include permissions by user, group, or role.

Spectra Logic recommends using names that either include the intended usage or user group name combined with intended usage. If you use a naming convention by groups, the associated group can be easily given access to all buckets sharing the group name prefix.

For example, use usage names such as news-breaking and external-archive, or group and usage names such as eng-dev and eng-test.

Note: Spectra Logic recommends following Amazon AWS documentation naming conventions and restrictions to maintain consistency and avoid potential issues. See *AWS Bucket Naming Rules* for more information.

Cloud Bucket Names

Cloud bucket names identify high-level containers in cloud storage and are not visible to end users. However, cloud bucket names are displayed in the configuration wizard. Spectra Logic recommends using names that include the type of cloud storage, location, and storage class.

Note: Cloud bucket names are restricted to lowercase characters, and do not allow underscores.

For example, use names for AWS cloud storage such as bpom-aws-uswest2-autotier and vail-aws-uswest2-S3glacier.

Note: Do not create AWS cloud storage buckets with the prefix "spectra-logic-vail-". Buckets with that prefix do not display in the storage creation wizard and cannot be configured for use.

BlackPearl Bucket Names

BlackPearl bucket names identify high-level containers configured on BlackPearl systems and are not visible to end users. However, BlackPearl bucket names are displayed in the configuration wizard. Spectra Logic recommends using names that include the storage policy used by the BlackPearl bucket.

For example, bpom-singlecopytape and bpom-dualcopytape.

Note: Spectra Logic recommends following Amazon AWS documentation naming conventions and restrictions to maintain consistency and avoid potential issues. See *AWS Bucket Naming Rules* for more information.

Lifecycle Names

Lifecycles are policies that control where data is cloned, moved, or expired over time. Spectra Logic recommends using names that directly indicate the specific lifecycle rule configuration.

For example, use names such as Copy_Everywhere_Keep4Days and Moveto_DallasNodeVM_After10Days.

Lifecycle Rule Names

Lifecycle rules are used within a Lifecycle to specify the parameters for clone, move, or expiration rules.

Additional AWS Account Role Names

By default, the Object Manager sphere is configured with a master Administrator AWS account. Additional AWS accounts can be configured in the Object Manager sphere. Spectra Logic recommends using a name that indicates the intended role for the additional AWS account.

For example, use a name such as BPOMSphereIAMreadandUserS3Control.

Object Manager Application Technical Information

This section provides information about various technical aspects of the Object Manager application.

Maximum Part and Object size

Starting with Object Manager 3.5.0, the maximum upload part size supported by the Object Manager application is 100 GiB, with a maximum object size of 1 PiB (10,000 parts of 100 GiB each). Not all cloud providers allow for objects of this size. An error is generated if an attempt is made to add cloud storage to an object that is larger than what the storage supports.

Chapter 2 - Important Information

This chapter provides important information to know before using the Object Manager.

REQUIREMENTS

The following sections describe the requirements for using the Object Manager.

Spectra Logic Products Requirements

- The Object Manager version 3.1.x or later requires either a BlackPearl Storage Manager or a Object Manager VM node.
  - The BlackPearl Storage Manager requires BlackPearl OS 5.8.x or later with a valid Object Manager Sphere activation key installed.
  - A Object Manager VM node requires a host machine with at a minimum 8 CPU cores, 16 GB of system memory, and a 10 GigE network connection.
- An S3 compatible client is required to access data stored in the Object Manager sphere.

  Note: S3 clients communicating with the Object Manager sphere must use AWS v4 authentication.
- The Object Manager uses the following ports for communication with BlackPearl systems and Object Manager VM Nodes. These ports must be open in your network infrastructure for the Object Manager to function correctly.
  - **Inbound 80 and/or 443**

    Inbound access is needed for these ports to access the BlackPearl user interface, and for S3 clients to transfer data to the Storage Manger, using either the open (80) or secure port (443).
  - **Outbound 443**

    Outbound access is needed for port 443 to allow data transfer to the Object Manager sphere, or other S3 endpoint nodes.

Supported Browsers

The Object Manager user interface supports the Google® Chrome™ browser running on a Microsoft® Windows® or MacOS® system.

The browser versions listed below are supported.

Google Chrome:

- **Windows:** 88.0.4324.104 (Official Build) (x86_64), or later
- **MacOS:** 88.0.4324.96 (Official Build) (x86_64), or later

OBJECT MANAGER MANAGEMENT CONSOLE OVERVIEW - LOCAL CONTROL

The Object Manager user interface provides browser-based configuration, management, and monitoring of the Object Manager sphere. The following sections describe the common features that appear in all screens in the management console when using Object Manager in a local control environment.

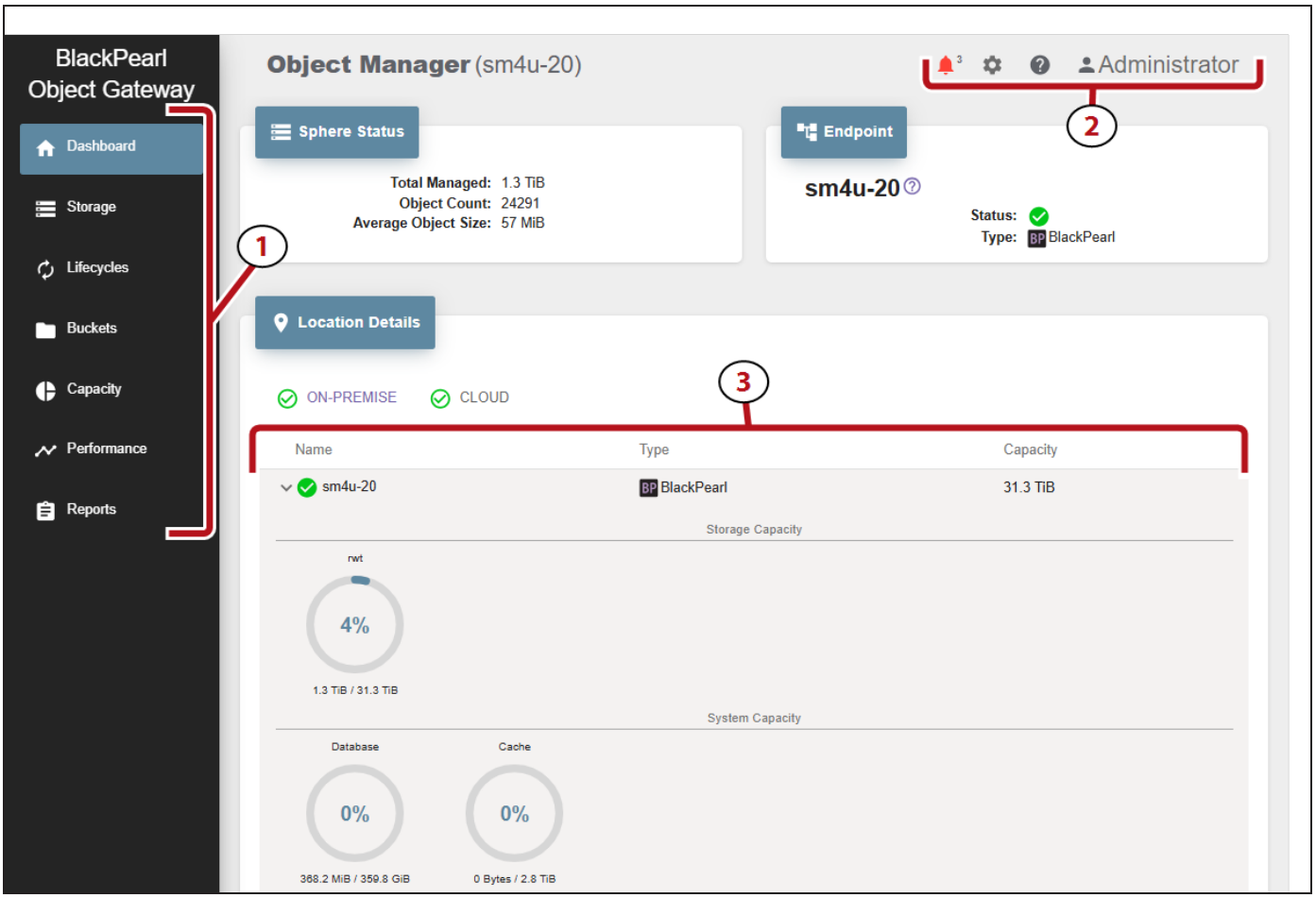


Figure 1 The Object Manager Sphere Dashboard screen.

Main window

The main window of the Object Manager user interface displays the screen associated with each navigation link.

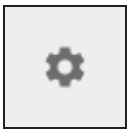
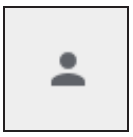
Taskbar

The taskbar (**1**) displays on the left side of all screens in the Object Manager user interface. The following table provides a description of the selections in the taskbar.

Selection	Description
Dashboard	The **Dashboard** navigation link takes you to the Dashboard screen which provides an overview of the Object Manager sphere status, the total managed data in the sphere, number and type of endpoints. The information displayed in the Location Details pane displays varies based on which type(s) of storage are configured for each location. For BlackPearl storage, the embedded dashboard displays allowing you to easily use the most common functions of a BlackPearl Storage Manager.
Storage	The **Storage** navigation link takes you to the Storage screen which displays configured endpoint and cloud storage, and provides access to the wizard for configuring new storage, as well as editing and deleting storage. See Create Storage on page 51.
Lifecycles	The **Lifecycles** navigation link takes you to the Lifecycles screen which displays configured lifecycles and provides access to the wizard to create new lifecycles, as well as editing and deleting lifecycles. See Create a Lifecycle on page 79
Buckets	The **Buckets** navigation link takes you to the Buckets screen which displays configured Object Manager buckets and provides access to the wizard to create new buckets, as well as editing and deleting buckets. See Create a Object Manager Bucket on page 88.
Capacity	The **Capacity** navigation link takes you to the Capacity screen which displays endpoint and cloud storage capacity information. See View Capacity Information on page 140.
Performance	The **Performance** navigation link takes you to the Performance screen which displays throughput and operation performance for both storage endpoints and the Object Manager sphere. See View Performance Metrics on page 143
Reports	The **Reports** navigation link takes you to the Reports screen which displays audit logs generated by the Object Manager sphere. Audit logs can be sorted by username or date. See View Reports on page 210.

Toolbar

The toolbar (**2**) displays in the upper-right of the Object Manager user interface. The following table provides an overview of the selections in the toolbar.

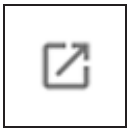
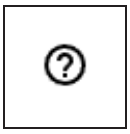
Icon	Meaning	Description
	**Messages**	Displays the number of unread messages generated by the Object Manager sphere. The messages icon changes color depending on the highest severity message. The messages are categorized as: • **Info** - An expected event occurred such as the completion of a software update. (Blue icon color). • **Warning** - An event that may impact the operation of the Object Manager sphere occurred. Determine the cause of the problem and remedy the issue if necessary. (Yellow icon color). • **Error** - An event which impacts data storage operations occurred. This may happen if the Object Manager sphere cannot communicate with storage endpoint. (Red icon color).
	**Settings**	The settings menu allows you to: • Configure IAM accounts, users, and groups • Update the Object Manager • Access Logs • Configure Global Settings • Configure Network Settings • Configure Entitlements (license keys)
	**Online Help**	Opens a web browser to the Object Manager online help guide, a browser-based version of the BlackPearl Object Manager User Guide.
	**User**	Displays the user currently logged-in and provides access to the logout function.

Embedded Dashboard

The BlackPearl embedded dashboard (**3**) displays in the bottom of the Object Manager user interface. See BlackPearl Embedded Dashboard on page 1 for detailed information and instructions on using the features of the embedded dashboard.

Icons

The table below describes the icons that display on various screens in the Object Manager user interface.

Icon	Meaning	Description
	**View Details**	Displays a detail screen for various aspects of the Object Manager sphere.
	**Unknown Status - Group**	Displays when the status of the subcomponents of a group are unknown.
	**Good Status - Single**	Indicates a good, working single component of the Object Manager sphere.
	**Good Status - Group**	Indicates a good, working group of components of the Object Manager sphere. This displays when all subcomponents of the group display good status.
	**Warning Status**	Indicates a problem with a component of the Object Manager sphere.
	**Error Status - Single**	Indicates an error of a component of the Object Manager sphere.
	**Error Status - Group**	Indicates an error with one or more subcomponents of the group.

OBJECT MANAGER MANAGEMENT CONSOLE OVERVIEW - CLOUD CONTROL

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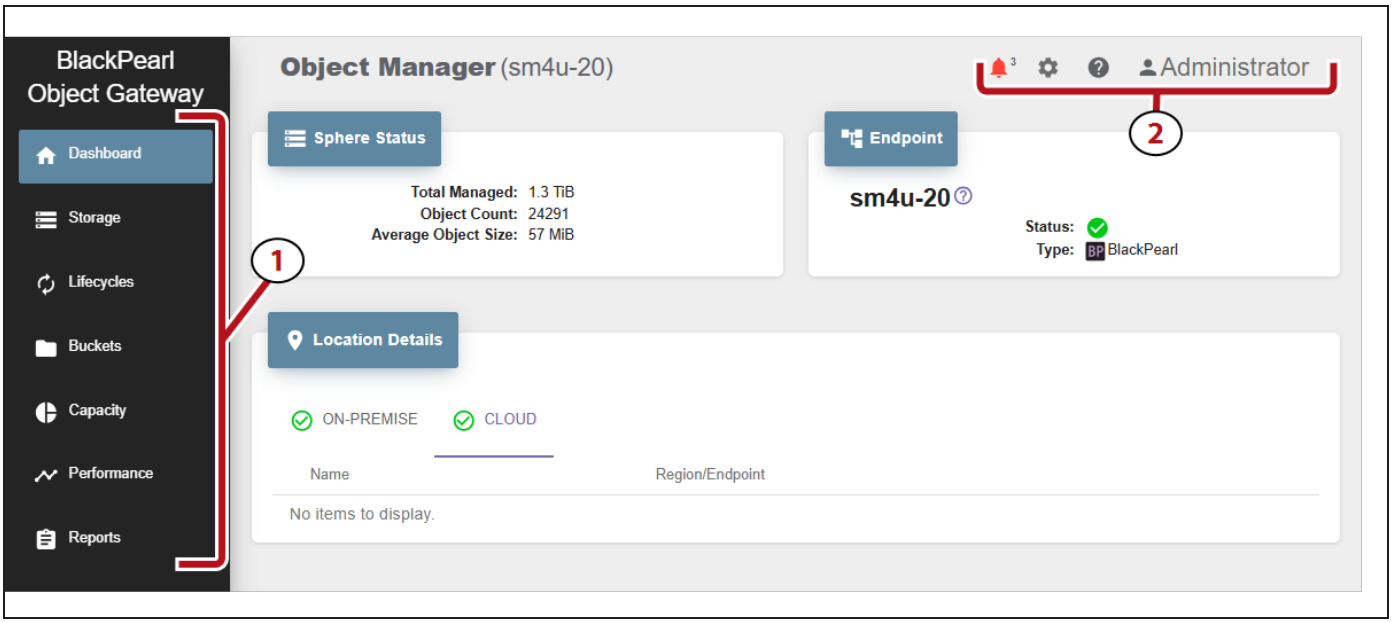

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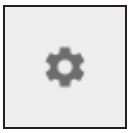
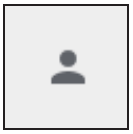
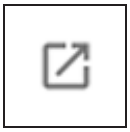
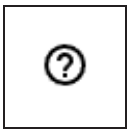
Icon	Meaning	Description
	**Messages**	Displays the number of unread messages generated by the Object Manager sphere. The messages icon changes color depending on the highest severity message. The messages are categorized as: • **Info** - An expected event occurred such as the completion of a software update. (Blue icon color). • **Warning** - An event that may impact the operation of the Object Manager sphere occurred. Determine the cause of the problem and remedy the issue if necessary. (Yellow icon color). • **Error** - An event which impacts data storage operations occurred. This may happen if the Object Manager sphere cannot communicate with storage endpoint. (Red icon color).
	**Settings**	The settings menu allows you to: • Configure Administrators • Configure IAM accounts, users, and groups • Configure Locations • Update the Object Manager • Access Logs • Configure Global Settings • Configure Network Settings • Configure Entitlements (license keys)
	**Online Help**	Opens a web browser to the Object Manager online help guide, a browser-based version of the BlackPearl Object Manager User Guide.
	**User**	Displays the user currently logged-in and provides access to the logout function.

Icons

The table below describes the icons that display on various screens in the Object Manager user interface.

Icon	Meaning	Description
	**View Details**	Displays a detail screen for various aspects of the Object Manager sphere.
	**Unknown Status - Group**	Displays when the status of the subcomponents of a group are unknown.
	**Good Status - Single**	Indicates a good, working single component of the Object Manager sphere.
	**Good Status - Group**	Indicates a good, working group of components of the Object Manager sphere. This displays when all subcomponents of the group display good status.
	**Warning Status**	Indicates a problem with a component of the Object Manager sphere.
	**Error Status - Single**	Indicates an error of a component of the Object Manager sphere.
	**Error Status - Group**	Indicates an error with one or more subcomponents of the group.

Chapter 3 - Configuring Object Manager

This chapter describes the configuration steps for the Object Manager.

LOG IN TO THE OBJECT MANAGER MANAGEMENT CONSOLE

Use the instructions below to log in to the Object Manager user interface.

1. Use one of the following methods:
   - Open a compatible web browser and enter the Object Manager user interface URL into the address bar.
   - In the BlackPearl Storage Manager management console, select **Configuration > Services**, then double-click the Object Manager service, and click the **Endpoint** URL displayed on the Object Manager Service screen.

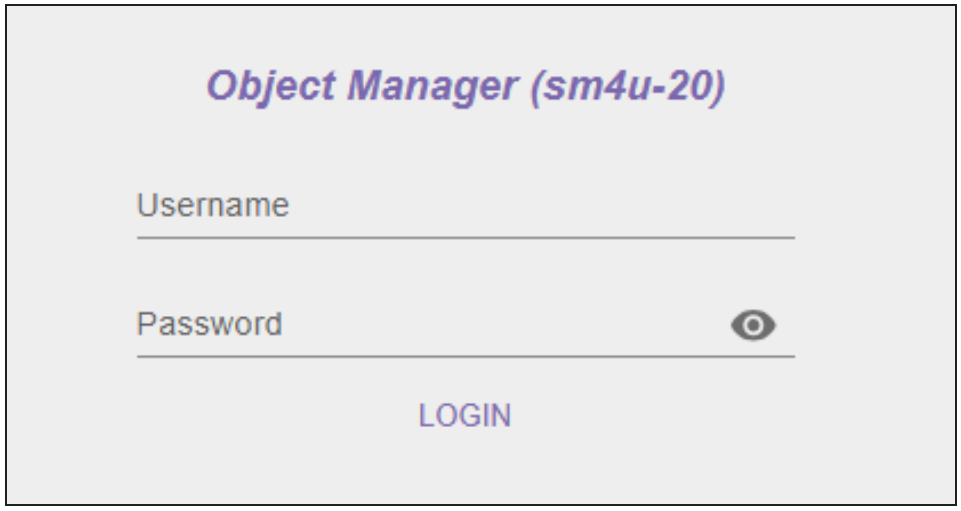


Figure 3 The Object Manager Sphere Login screen.

Note: Your web browser may display an invalid certificate warning page. Resolve the warning, and continue to Step 2 below.

2. Use one of the below methods:
   - For a **cloud control** system - Enter the **Username** and **Password** you specified when you registered the first BlackPearl system with the Object Manager sphere.
   - For a **local control** system - Enter the **Username** and **Password** of the BlackPearl system administrator.
3. Click **LOGIN**.

CREATE STORAGE

Storage is used by the Object Manager as targets for S3 clients and lifecycles to store data. There are two basic types of storage: endpoint storage and cloud storage. Endpoint storage includes a BlackPearl Storage Manager, or block VM storage such as a Object Manager VM node. Cloud storage is S3 object storage on AWS or other S3 cloud storage provider.

Use one of the sections below to create storage.

- **Create BlackPearl Storage on the next page**
- **Create Cloud Storage on page 61**
- **Create a Object Manager VM Node on page 228**

CREATE BLACKPEARL STORAGE

BlackPearl storage uses a bucket or volume pool configured on a BlackPearl Storage Manager. You can select the same BlackPearl Storage Manager multiple times when creating BlackPearl storage, but each storage instance must use a unique bucket or volume pool.

When creating BlackPearl storage, you can select to create storage using a standard bucket, or to create storage using a linked bucket. Use one of the sections below:

- **Create BlackPearl Standard Bucket Storage below**
- **Create BlackPearl Legacy Storage on page 55**
- **Create BlackPearl Volume Pool Storage on page 57**

Create BlackPearl Standard Bucket Storage

The instructions below assume a storage domain and data policy were previously configured on your BlackPearl Storage Manager. For information on configuring a storage domain and data policy, see the *BlackPearl Storage Manager User Guide*.

A BlackPearl bucket does not need to be created before creating BlackPearl storage in the Object Manager application. A bucket is created automatically on the BlackPearl system during the process described below.

Here is how to create BlackPearl storage:

1. Log in to the Object Manager user interface.
2. In the taskbar of the Object Manager user interface, click **Storage**.

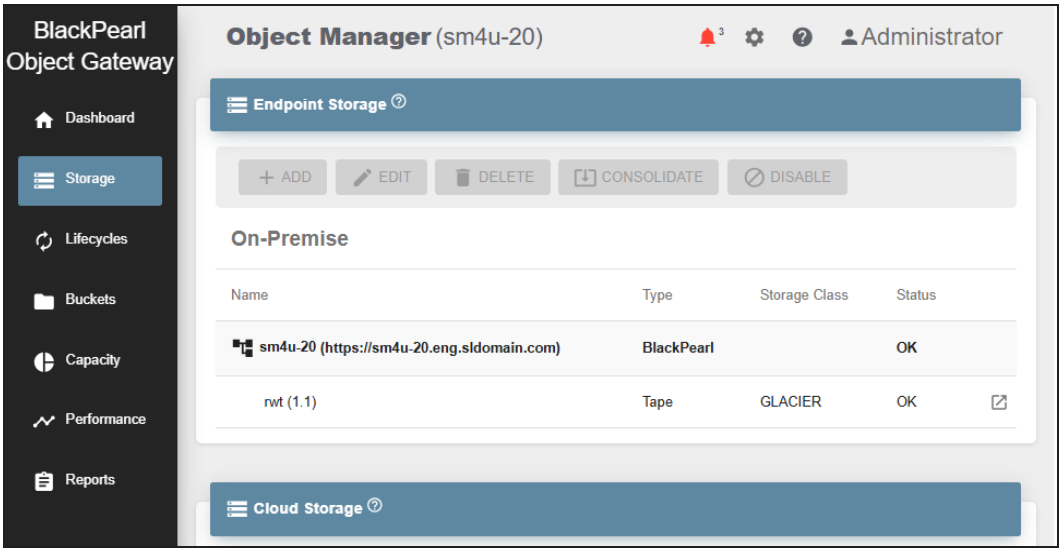


Figure 4 The Storage screen.

3. Select the row of the BlackPearl Storage Manager where you want to create storage.
4. Under the **Endpoint Storage** banner, click **Add**.
5. Use the **Select Storage Type** drop-down menu to select **BlackPearl Data Policy**, then click **Next**.

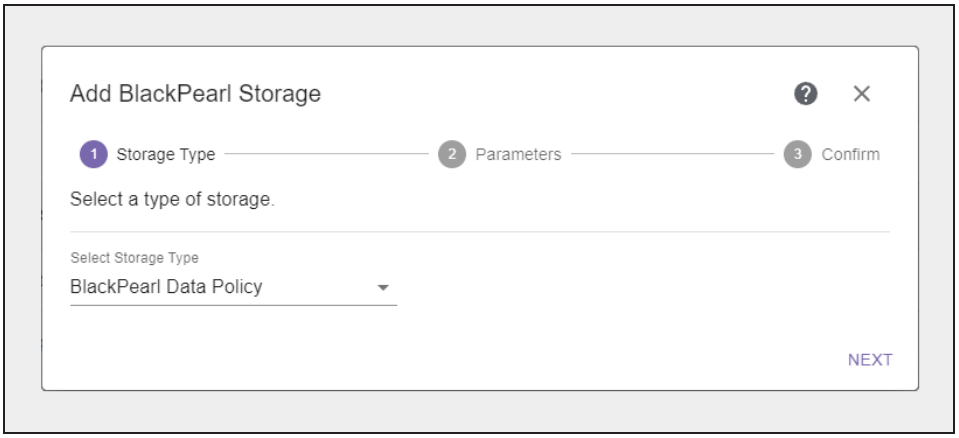


Figure 5 The Add BlackPearl Storage - Select Storage Type screen.

6. Use the **Select BlackPearl Data Policy** drop-down menu to select a previously configured data policy on the BlackPearl Storage Manager. Only data policies configured to use Object Naming display in the drop-down menu.

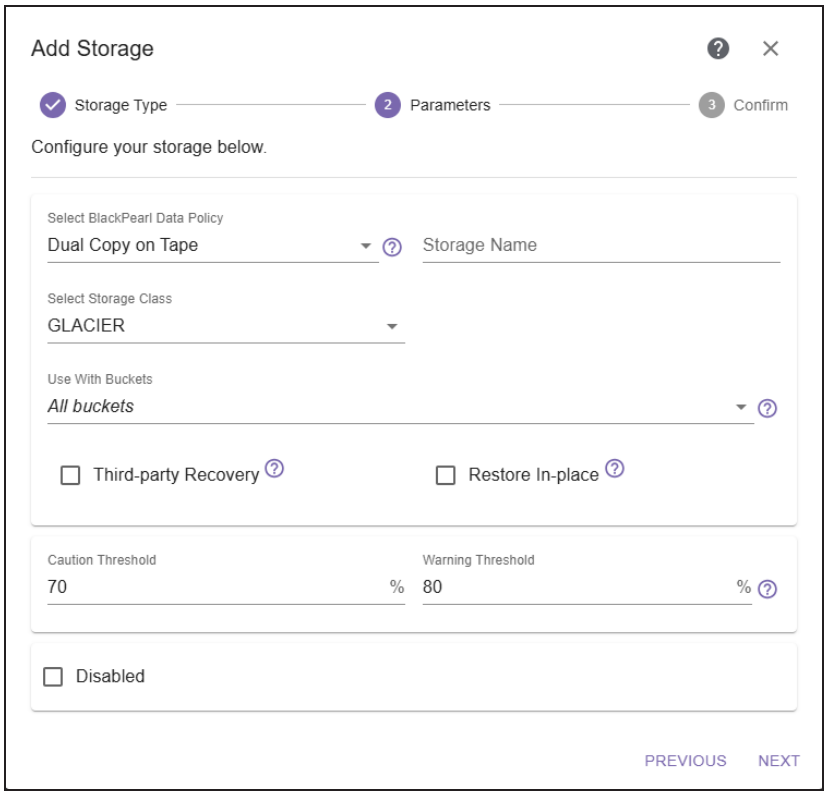


Figure 6 The Add BlackPearl Storage - Parameters screen.

7. Enter a **Storage Name** for the BlackPearl storage.

Spectra Logic recommends using names that include the location, BlackPearl name, physical medium, and storage class.

For example, in the Dallas location add suffixes for the BlackPearl name, physical medium and storage class such as Dallas-BlackPearl1-Object-SA and Dallas-BlackPearl2-Tape-Glacier.

8. Use the **Select Storage Class** drop-down menu to select the storage class for the BlackPearl storage. The selections that display depend on the type of storage medium targeted by the BlackPearl data policy.
9. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
10. Select to enable **Third-party Recovery**. This option writes additional information and writes full object metadata, enabling you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and may impact performance.

IMPORTANT

- For many storage configurations, this option is automatically selected by default and **should not be disabled**.
- Spectra Logic recommends Third-Party Recovery be **enabled** for all configurations of BlackPearl storage.

11. If desired, select to enable **Restore In Place**.
    - If enabled, the Object Manager application creates an additional data clone of objects on the same storage where the object exists.
    - If you do not enable this option, an additional data clone of objects is created on different storage.
12. If desired, edit the **Caution Threshold** and **Warning Threshold**. These settings control when the Object Manager sends a notification that the selected bucket capacity reaches the configured thresholds.
13. If desired, select **Disabled**. This creates the endpoint storage in a disabled state. The endpoint storage must be manually enabled before it can be used for data storage operations.
14. Click **Next**.
15. Review the configuration and click **Submit** to create the BlackPearl storage. The BlackPearl bucket to be used with this storage is automatically created on the BlackPearl system.

Create BlackPearl Legacy Storage

BlackPearl legacy storage allows you to link a BlackPearl bucket with a Object Manager bucket. When linking these buckets, changes made in the BlackPearl bucket are not automatically detected by the Object Manager application. The Object Manager bucket must be manually scanned to determine object changes in the BlackPearl bucket. See Scan a Object Manager Bucket on page 1 for instructions on scanning a Object Manager bucket.

Here is how to create BlackPearl legacy storage:

1. Log in to the Object Manager user interface.
2. If necessary, create a bucket as described in Create a Object Manager Bucket on page 88, then return to this section.
3. In the taskbar of the Object Manager user interface, click **Storage**.
4. Select the row of the BlackPearl Storage Manager where you want to create the storage endpoint.
5. Under the **Endpoint Storage** banner, click **Add**.

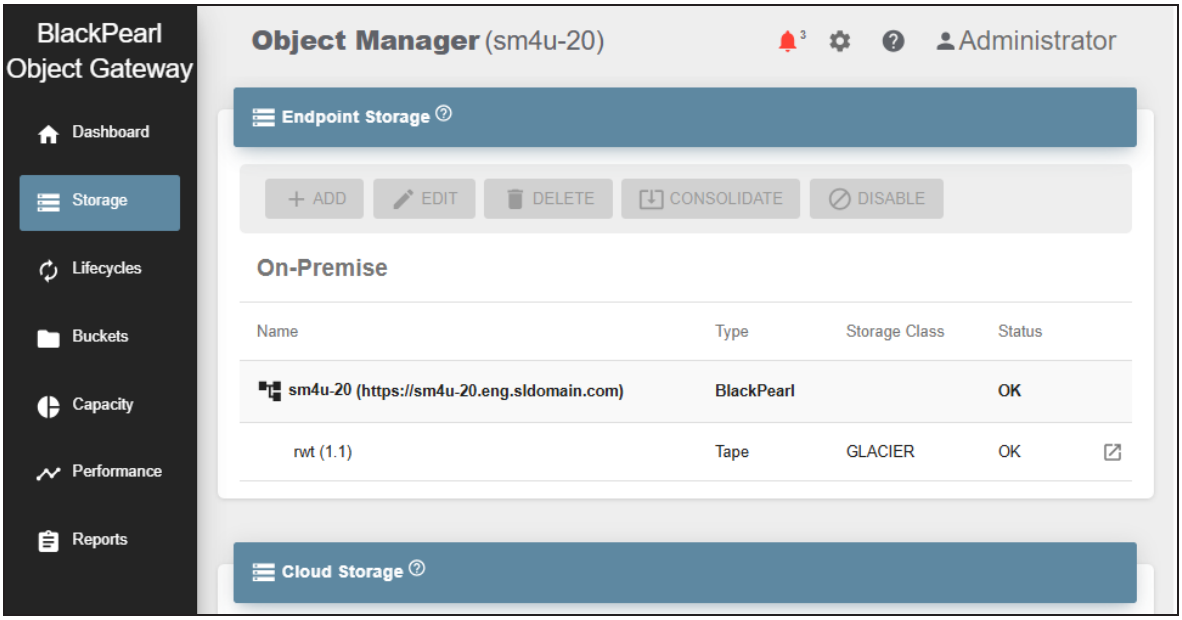


Figure 7 The Storage screen.

6. Use the **Select Storage Type** drop-down menu to select **BlackPearl Legacy Storage**, then click **Next**.

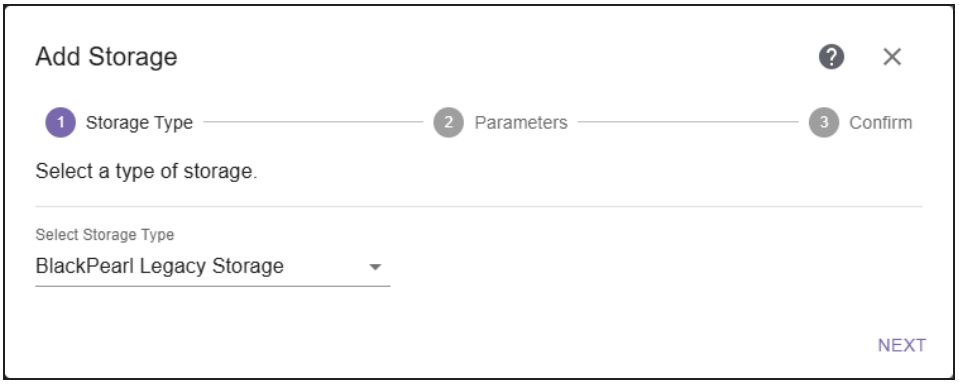


Figure 8 The Add BlackPearl Storage - Select Storage Type screen.

7. Use the **Select BlackPearl Linked Bucket** drop-down menu to select a previously configured BlackPearl bucket.

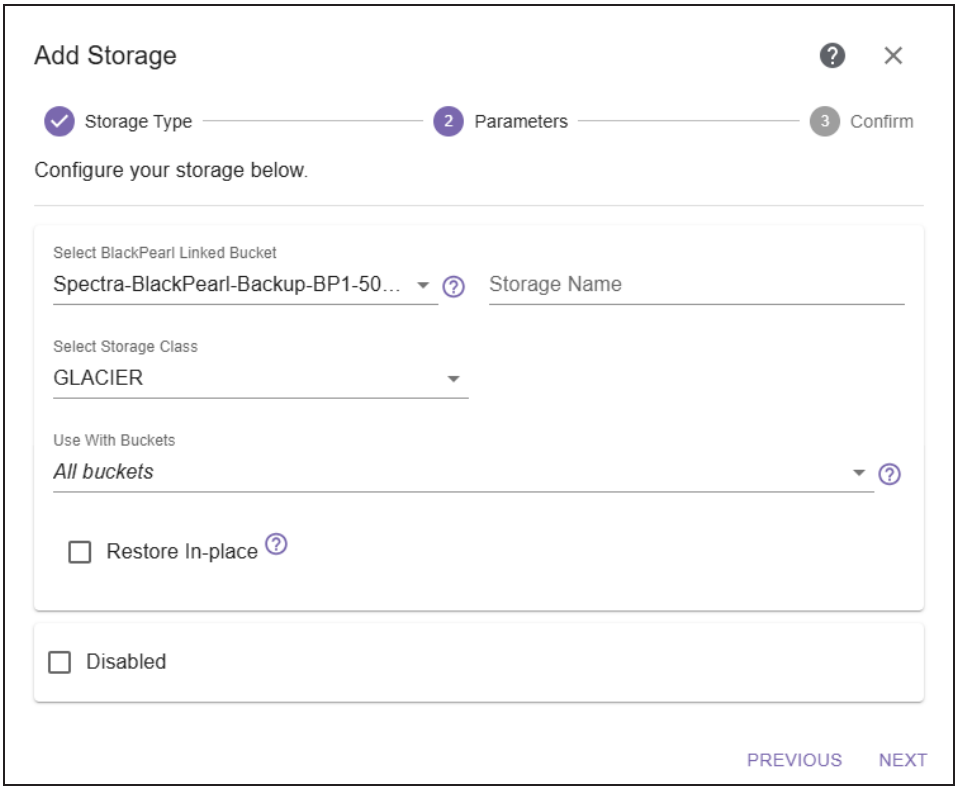


Figure 9 The Add Storage - Parameters screen.

8. Enter a **Storage Name** for the BlackPearl storage.

   Spectra Logic recommends using names that include the location, BlackPearl name, physical medium, and storage class.

   For example, in the Dallas location add suffixes for the BlackPearl name, physical medium and storage class such as Dallas-BlackPearl1-Object-SA and Dallas-BlackPearl2-Tape-Glacier.

9. Use the **Select Storage Class** drop-down menu to select the storage class for the BlackPearl storage. The selections that display depend on the type of storage medium targeted by the BlackPearl data policy used by the BlackPearl bucket selected in Step 7.

10. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

11. If desired, select to enable **Restore In Place**.

    - If enabled, the Object Manager application creates an additional data clone of objects on the same storage where the object exists.
    - If you do not enable this option, an additional data clone of objects is created on different storage.

12. If desired, select **Disabled**. This creates the endpoint storage in a disabled state. The endpoint storage must be manually enabled before it can be used for data storage operations.

13. Click **Next**.

14. Review the configuration and click **Submit** to create the BlackPearl linked bucket storage.

Create BlackPearl Volume Pool Storage

BlackPearl volume pool storage is NAS storage provided by a BlackPearl system.

The instructions below assume a storage pool was previously configured on your BlackPearl Storage Manager. For information on configuring a storage pool, see the *BlackPearl Storage Manager User Guide*.

Here is how to create BlackPearl volume pool storage:

1. In the taskbar of the Object Manager user interface, click **Storage**.

2. Select the row of the BlackPearl Storage Manager where you want to create storage.

3. Under the **Endpoint Storage** banner, click **Add**.

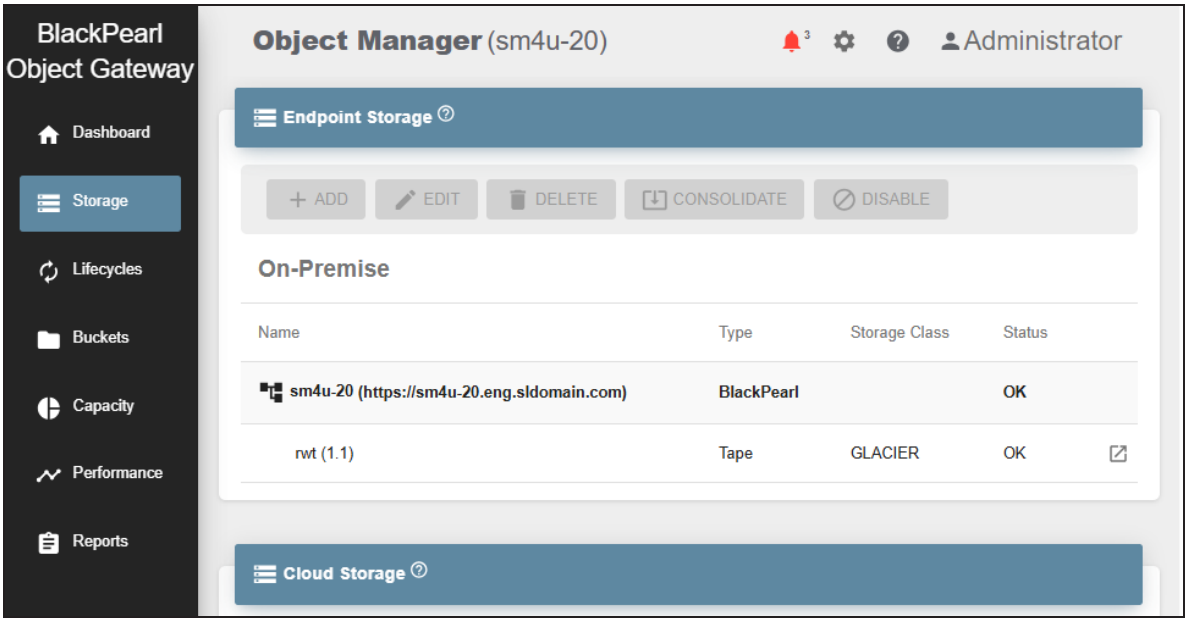


Figure 10 The Storage screen.

4. Use the **Select Storage Type** drop-down menu to select **Volume Storage**, then click **Next**.

Note: This option only displays if a volume is detected on the BlackPearl system.

Figure 11 The Add BlackPearl Storage - Select Storage Type screen.

5. Use the **Select BlackPearl Volume Pool** drop-down menu to select a previously configured storage pool on the BlackPearl system. The Parameters screen updates to show available options based on the storage pool selected.

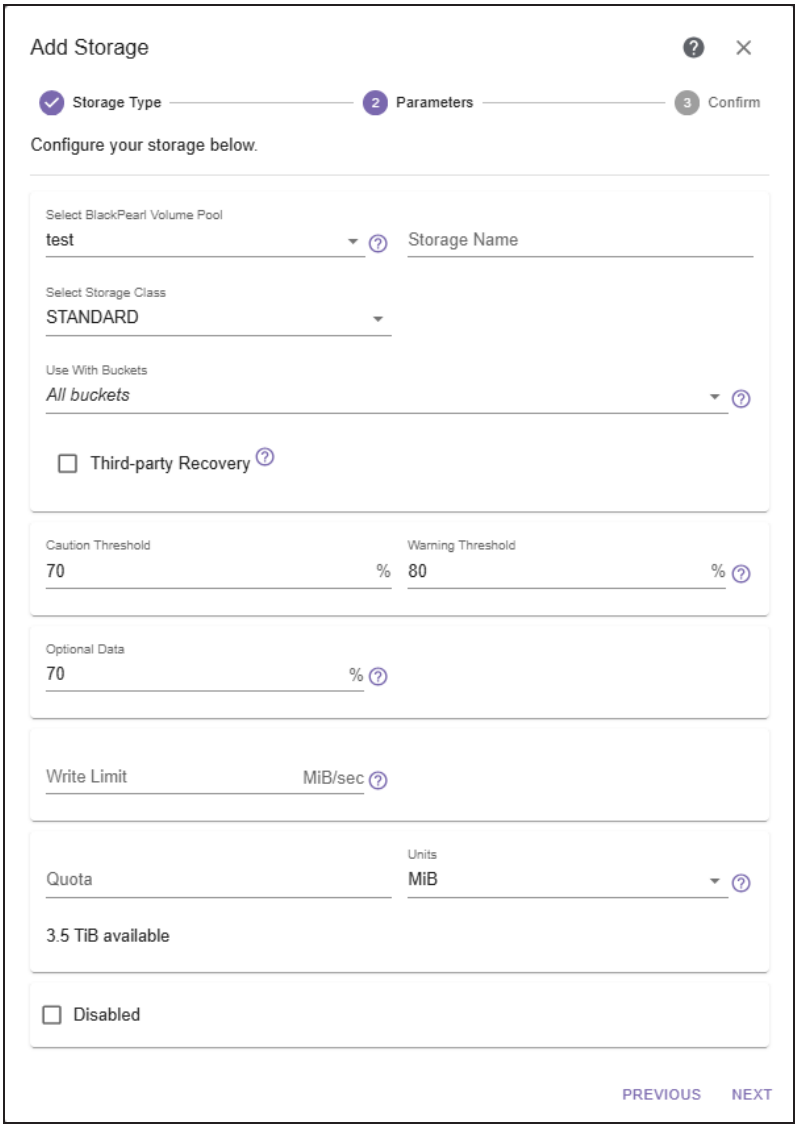


Figure 12 The Add BlackPearl Volume Pool Storage - Parameters screen.

6. Enter a **Storage Name**.

   Spectra Logic recommends using names that include the location, BlackPearl name, physical medium, and storage class.

   For example, in the Dallas location add suffixes for the BlackPearl name, physical medium and storage class such as Dallas-BlackPearl1-Object-SA and Dallas-BlackPearl2-Tape-Glacier.

7. Using the **Select Storage Class** drop-down menu, select the storage class you want to use for this volume pool storage endpoint.

8. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
9. Select to enable **Third-party Recovery**. This option writes additional information and writes full object metadata, enabling you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and may impact performance.

IMPORTANT

- For many storage configurations, this option is automatically selected by default and **should not be disabled**.
- Spectra Logic recommends Third-Party Recovery be **enabled** for all configurations of BlackPearl storage.

10. If desired, edit the **Caution Threshold** and **Warning Threshold**. These settings control when the Object Manager sends a notification that the selected bucket capacity reaches the configured thresholds.
11. If desired, edit the **Optional Data** percentage. This setting controls the amount of space used by optional data clones, which use available storage space to speed up data access. When the system reaches the percentage value specified, optional clones are deleted to maintain the percentage of used storage space under the specified value.

Note: If this field is left blank, no optional clones are stored and object access times are not recorded.

12. If desired, enter a value for **Write Limit**. This setting reduces the write speed when volume usage exceeds the caution threshold. If the storage usage is below the caution threshold, writes are unlimited. The configured rate limit is enforced at the caution threshold, and the rate is then reduced linearly as the volume usage increases. The rate limit applies to lifecycle processing and all data writes to the given storage.
13. If desired, enter a value for a **Quota**, and use the **Units** drop-down menu to select a unit size for the quota value. This setting controls the maximum amount of storage space on the storage pool that is used for the BlackPearl volume pool storage endpoint. When this percentage is reached, no additional data is added to the storage endpoint. If you do not want to use a quota limit, leave the fields blank.

Notes:

- Spectra Logic recommends setting a quota of 90% of volume storage space, or lower if desired.
- This setting can be modified after the BlackPearl volume pool storage is created.

14. If desired, select **Disabled**. This creates the endpoint storage in a disabled state. The endpoint storage must be manually enabled before it can be used for data storage operations.
15. Click **Next**.
16. Confirm all settings are correct and click **Submit**.

CREATE CLOUD STORAGE

Use one of the sections below to configure cloud storage:

Create Amazon S3 Cloud Storage

In Object Manager, Amazon S3 cloud storage uses a previously configured AWS endpoint target for object storage.

Here is how to create Amazon S3 cloud storage:

1. In the taskbar of the Object Manager user interface, click **Storage**.
2. Under the **Cloud Storage** banner, click **Add**.

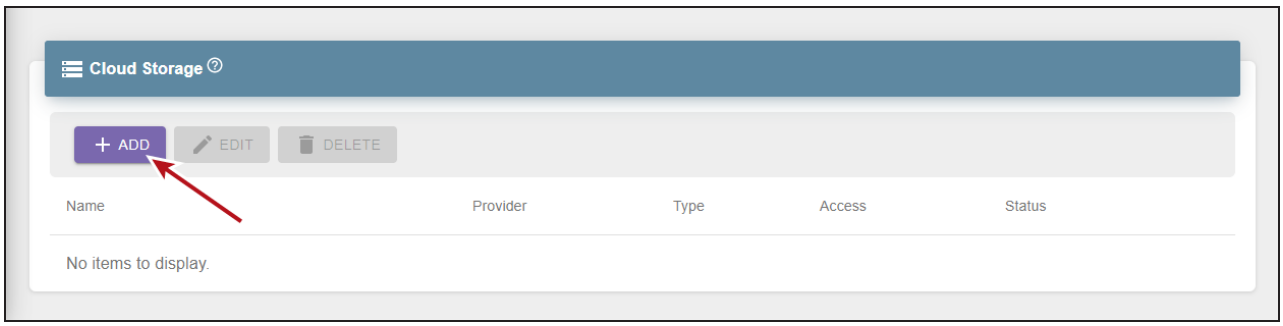


Figure 13 The Cloud Storage pane.

3. Use the **Select Storage Type** drop-down menu to select **Amazon S3 Storage**, and click **Next**.

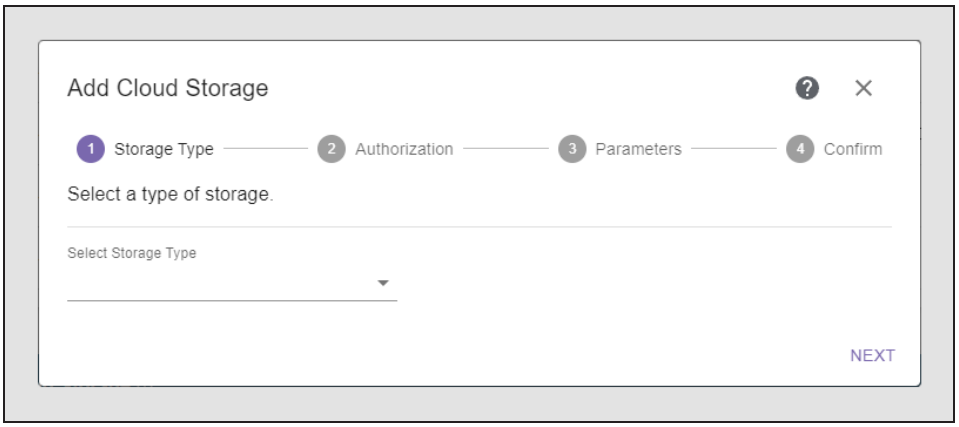


Figure 14 The Add Cloud Storage - Storage Type screen.

4. Enter the **Region**, **AWS Access Key ID**, **AWS Secret Access Key**, and the **AWS IAM Role ARN** of the account. Optionally, enter the **AWS IAM Role External ID**.

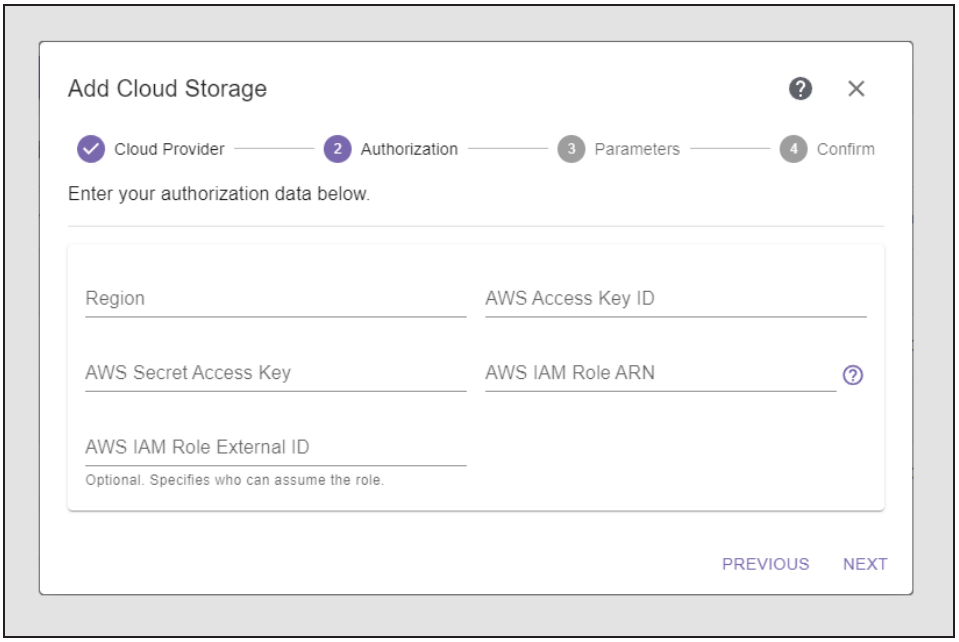


Figure 15 The Add Cloud Storage - AWS Authorization screen.

5. Click **Next**.

6. Use the **Select Amazon S3 Cloud Bucket** drop-down menu to select a cloud bucket associated with the AWS or IAM user configured for cloud storage.

Note: AWS Buckets must be configured to use versioning before they can be used as cloud storage, even if they are assigned to a Object Manager bucket that has versioning disabled. Although the AWS bucket is capable of storing multiple versions of an object, if the Object Manager bucket does not have versioning enabled, only the latest version is preserved in the AWS bucket.

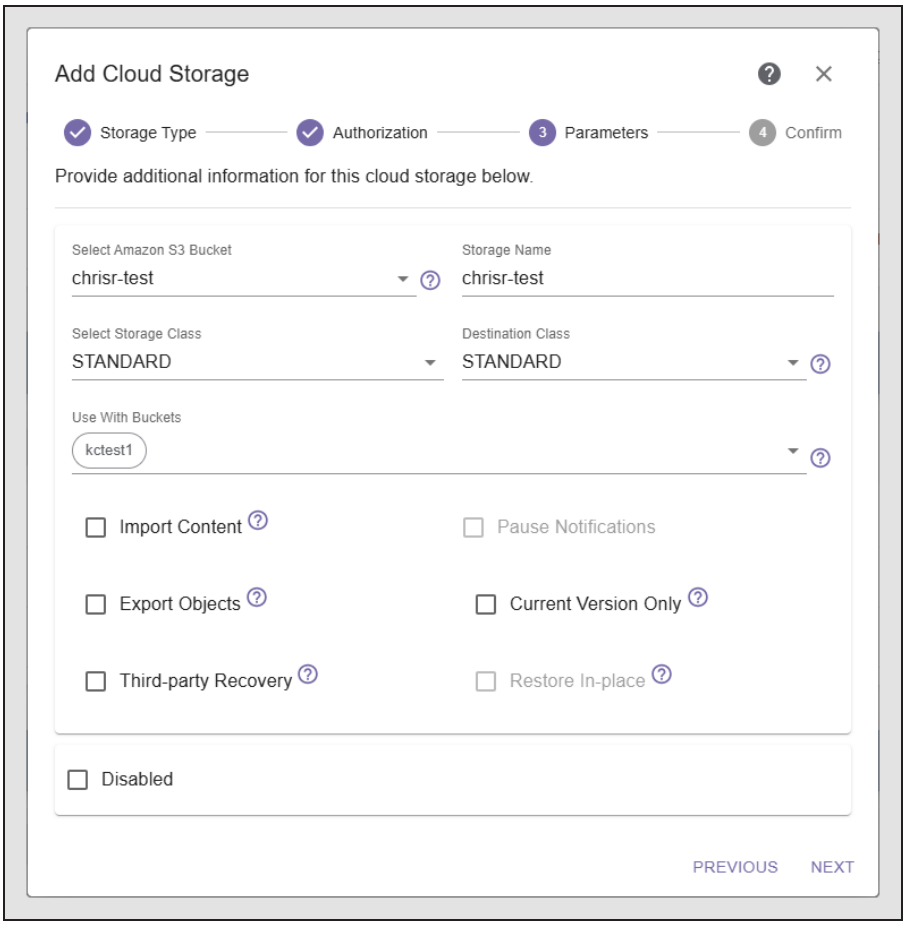


Figure 16 The Add Cloud Storage - Parameters screen.

7. The **Storage Name** field is automatically populated with the name of the bucket selected in Step 6. If desired, you can change the **Storage Name**. Spectra Logic recommends using names that include type of cloud storage, location, and storage class.

   For example, use names for Amazon cloud storage such as AWS_uswest2_autotier and AWS_uswest2_S3glacier.

8. Use the **Select Storage Class** drop-down menu to select a storage class for the AWS S3 storage.

9. Use the drop-down menu to select the **Destination Class**.

   If you select **Use Default**, objects are created without specifying a storage class value. Otherwise, Object Manager attempts to create objects on the storage with the specified storage class.

Notes:
- If a Lifecycle using this storage has **Ignore Storage Class** enabled, this setting is ignored.
- The financial costs associated withe each storage type are controlled by the cloud provider.

10. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

11. If desired, select **Import Content**. This option requires you to select a single bucket with the **Use With Buckets** drop-down menu. The selected bucket stores object references without copying data. Lifecycles can be used to copy data if desired.

Note: Including this storage endpoint as a destination in a lifecycle allows you to synchronize the selected bucket with the storage endpoint. Synchronizing allows the bucket to maintain consistency with an external bucket regardless of whether objects are added locally or to the external bucket.

12. Select or clear **Pause Notifications** as desired. When notifications are paused, changes are only recognized when the bucket scan is manually triggered, either through the Object Manager user interface or by API call. Otherwise changes are automatically recognized and linked bucket contents update automatically.

13. If desired, select to enable **Export Objects**. This option configures the cloud storage as write-only and directly migrates data to the cloud bucket instead of creating and managing clones of the object data. After the export completes, the Object Manager application does not retain any record of the exported data.

    If you enable this option:

    - The Third-Party Recovery option is enabled automatically.
    - You cannot enable the Restore In-Place option.
    - You cannot use the storage as part of a Lifecycle.
    - The storage does not display capacity or usage information.

IMPORTANT Once enabled, you cannot disable this setting for the cloud storage. Additionally, you cannot enable Export Objects at a later time, only when you are creating the cloud storage.

14. If desired, select **Current Version Only**. This option limits storing object clones on the storage endpoint to the most recent version only. This setting enables the use of cloud storage that does not support object versioning.

Note: This option can only be enabled during creation.

15. Select to enable **Third-party Recovery**. This option writes additional information and writes full object metadata, enabling you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and may impact performance.

IMPORTANT

- For many storage configurations, this option is automatically selected by default and **should not be disabled**.
- Spectra Logic recommends Third-Party Recovery be **enabled** for all configurations of BlackPearl storage.

16. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.

Note: You cannot enable this setting if you selected to enable Export Objects.

17. If desired, select **Disabled**. This creates the cloud storage in a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

18. Click **Next**.

19. Verify the information for the cloud storage is correct, and click **Submit**.

Notes:

- There is a seven minute delay before the contents of the AWS bucket appear in the Object Manager bucket. If the Object Manager bucket is assigned to a lifecycle that is configured to run immediately, any data present in the AWS bucket is processed by the lifecycle after seven minutes.

Create Microsoft Azure Cloud Storage

In the Object Manager application, Microsoft Azure cloud storage uses a previously configured Azure container for storage.

Here is how to create Microsoft Azure cloud storage:

1. In the taskbar of the Object Manager user interface, click **Storage**.
2. Under the **Cloud Storage** banner, click **Add**.

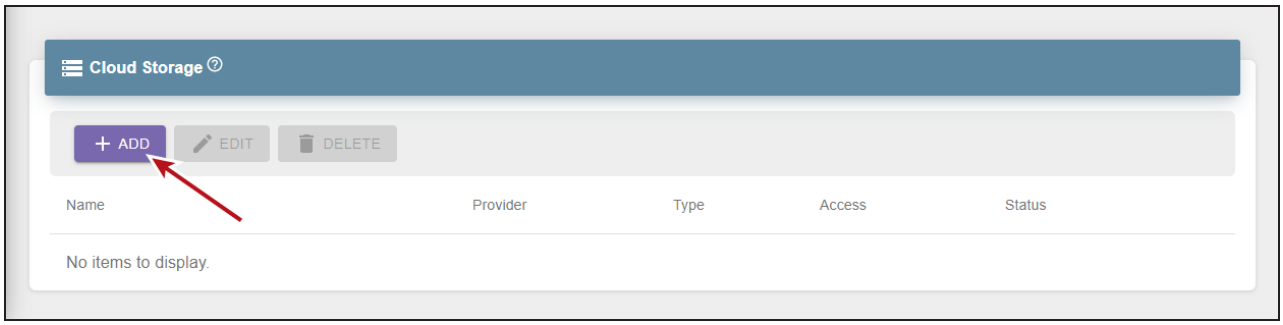


Figure 17 The Cloud Storage pane.

3. Use the **Select Storage Type** drop-down menu to select **Azure Cloud Storage**, and click **Next**.

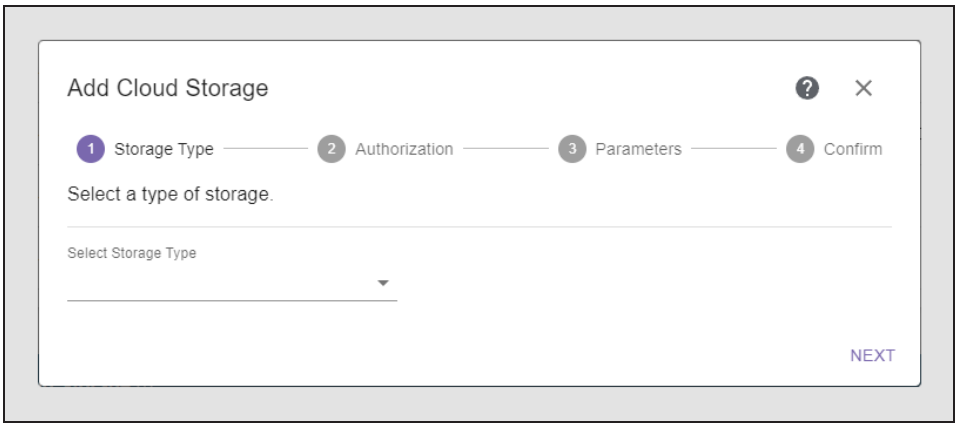


Figure 18 The Add Cloud Storage - Storage Type screen.

4. Enter the **Storage Account** and **Shared Secret** information for the Azure container.

Note: You cannot change the Storage Account after you create the cloud storage.

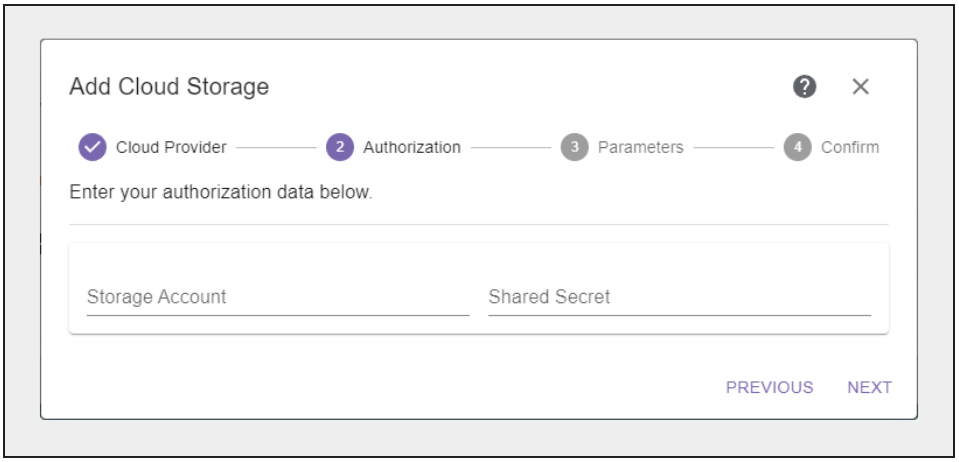


Figure 19 The Add Cloud Storage - Authorization screen.

5. Click **Next**.

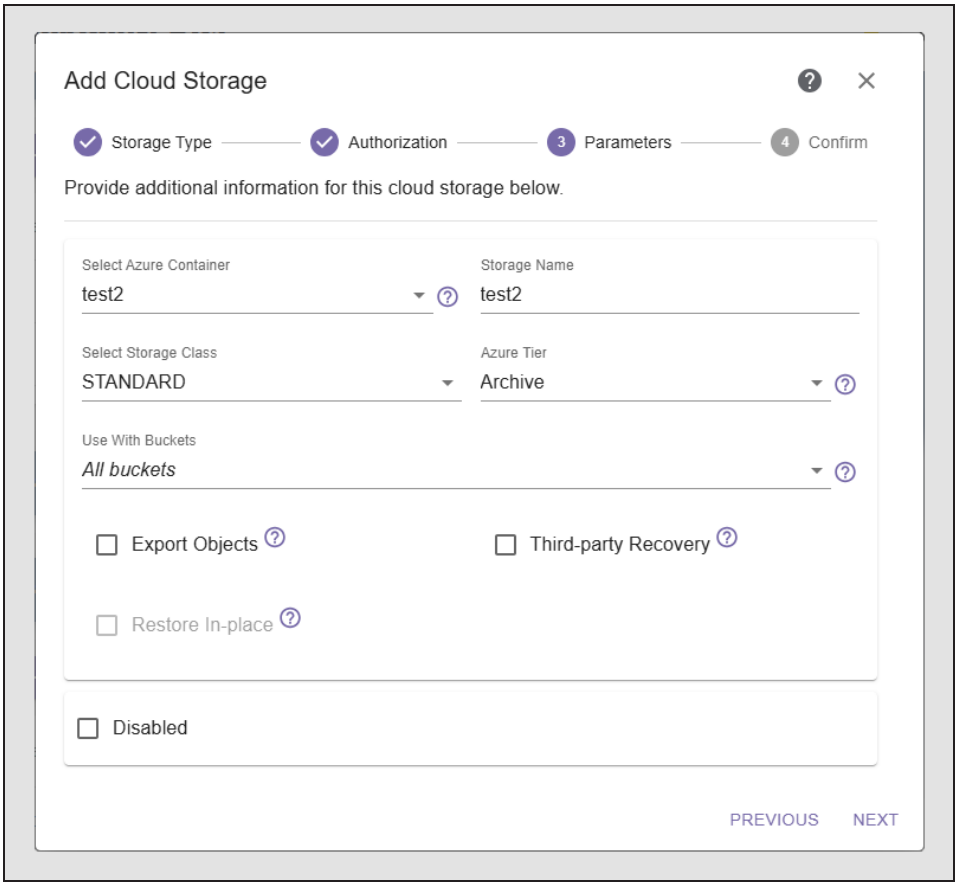


Figure 20 The Add Cloud Storage - Parameters screen.

6. Using the **Select Azure Container** drop-down menu, select a previously created container on the Azure storage target.

7. If desired, you can change the **Storage Name**. Spectra Logic recommends using names that include type of cloud storage, location, and storage class. For example, use names for Azure cloud storage such as Azure-Production-Denver.
8. Use the **Select Storage Class** drop-down menu to select a storage class for the Azure storage endpoint.
9. Use the drop-down menu to select the **Azure Tier**.

   If you select **Use Default**, objects are created without specifying a storage class value. Otherwise, Object Manager attempts to create objects on the storage with the specified storage class.

Notes:
- If a Lifecycle using this storage has **Ignore Storage Class** enabled, this setting is ignored.
- The financial costs associated withe each storage type are controlled by the cloud provider.

10. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
11. If desired, select to enable **Export Objects**. This option configures the cloud storage as write-only and directly migrates data to the cloud bucket instead of creating and managing clones of the object data. After the export completes, the Object Manager application does not retain any record of the exported data.

    If you enable this option:
    - The Third-Party Recovery option is enabled automatically.
    - You cannot enable the Restore In-Place option.
    - You cannot use the storage as part of a Lifecycle.
    - The storage does not display capacity or usage information.

IMPORTANT Once enabled, you cannot disable this setting for the cloud storage. Additionally, you cannot enable Export Objects at a later time, only when you are creating the cloud storage.

12. Select to enable **Third-party Recovery**. This option writes additional information and writes full object metadata, enabling you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and may impact performance.

IMPORTANT

- For many storage configurations, this option is automatically selected by default and **should not be disabled**.
- Spectra Logic recommends Third-Party Recovery be **enabled** for all configurations of BlackPearl storage.

13. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.

Note: You cannot enable this setting if you selected to enable Export Objects.

14. If desired, select **Disabled**. This creates the cloud storage in a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

15. Click **Next**.

16. Verify the information for the cloud storage is correct, and click **Submit**.

Create Google Cloud Platform Storage

In Object Manager, Google Cloud Platform storage uses a previously configured Google storage endpoint target for storage.

Here is how to create Google Cloud Platform storage:

1. In the taskbar of the Object Manager user interface, click **Storage**.
2. Under the **Cloud Storage** banner, click **Add**.

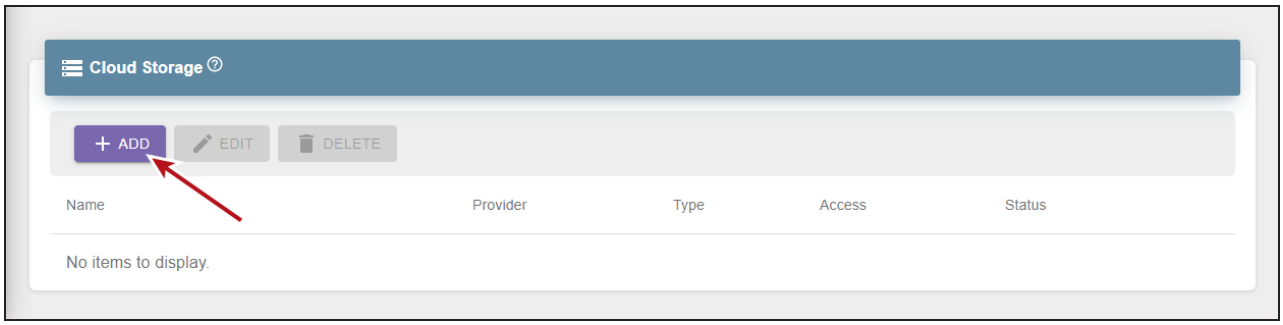


Figure 21 The Cloud Storage pane.

3. Use the **Select Storage Type** drop-down menu to select **Google Cloud Storage**, and click **Next**.

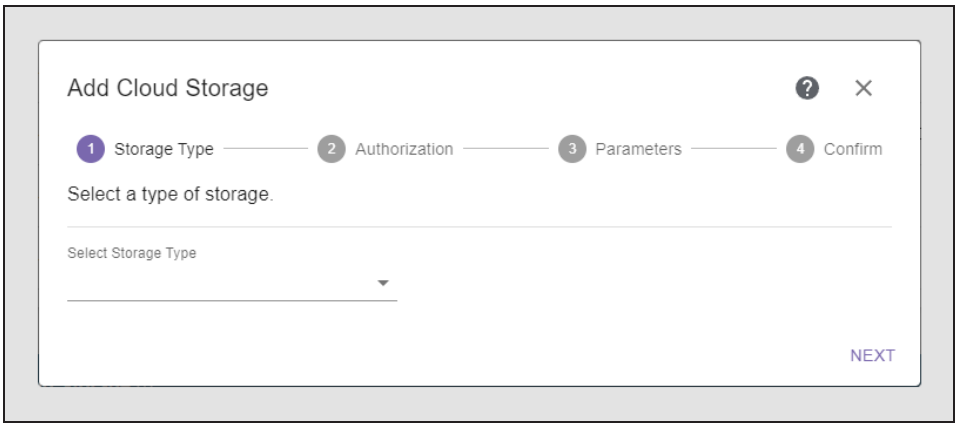


Figure 22 The Add Cloud Storage - Storage Type screen.

4. Enter the **Google Could Platform JSON Credentials** information for the endpoint.

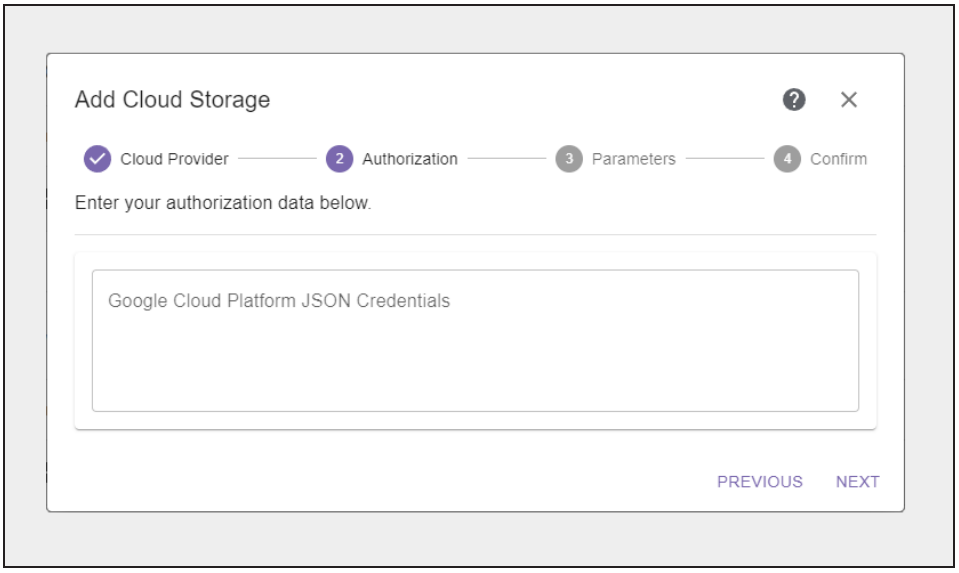


Figure 23 The Add Cloud Storage - Authorization screen.

5. Click **Next**.

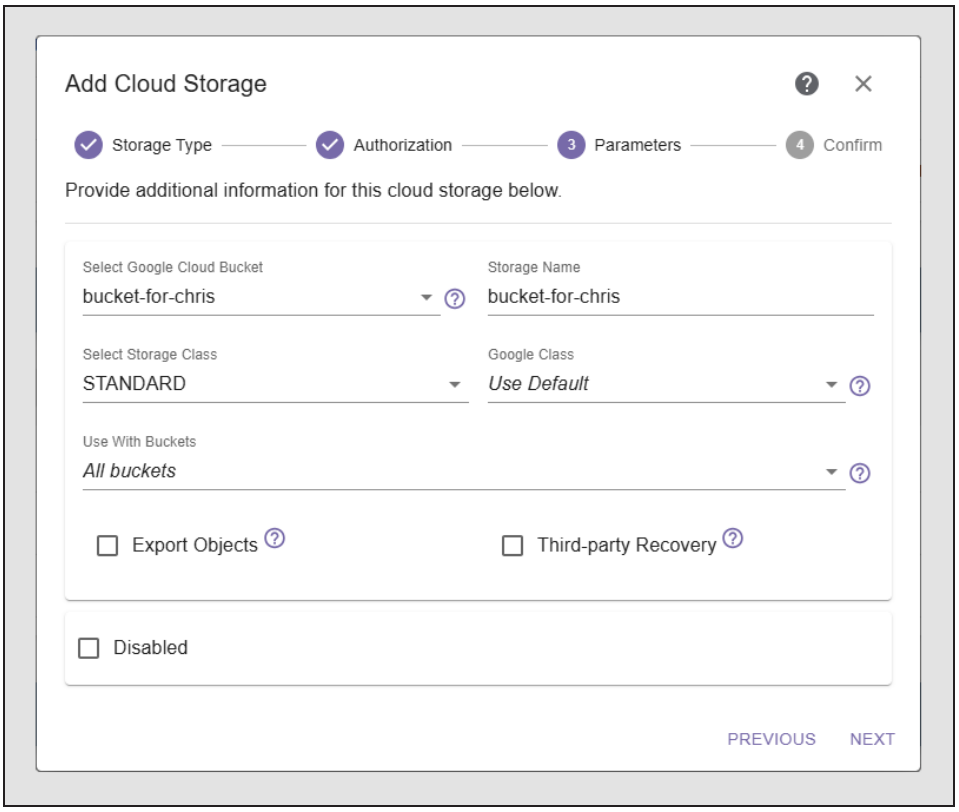


Figure 24 The Add Cloud Storage - Parameters screen.

6. Using the **Select Google Cloud Bucket** drop-down, select a previously created bucket in the Google Cloud Storage target.

7. Enter a **Storage Name**. Spectra Logic recommends using names that include type of cloud storage, location, and storage class. For example, use names for Google cloud storage such as Google-Production-Denver.
8. Use the **Select Storage Class** drop-down menu to select a storage class for the Google cloud storage endpoint.
9. Use the drop-down menu to select the **Google Class**.

   If you select **Use Default**, objects are created without specifying a storage class value. Otherwise, Object Manager attempts to create objects on the storage with the specified storage class.

Notes:
- If a Lifecycle using this storage has **Ignore Storage Class** enabled, this setting is ignored.
- The financial costs associated withe each storage type are controlled by the cloud provider.

10. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
11. If desired, select to enable **Export Objects**. This option configures the cloud storage as write-only and directly migrates data to the cloud bucket instead of creating and managing clones of the object data. After the export completes, the Object Manager application does not retain any record of the exported data.

    If you enable this option:
    - The Third-Party Recovery option is enabled automatically.
    - You cannot enable the Restore In-Place option.
    - You cannot use the storage as part of a Lifecycle.
    - The storage does not display capacity or usage information.

IMPORTANT Once enabled, you cannot disable this setting for the cloud storage. Additionally, you cannot enable Export Objects at a later time, only when you are creating the cloud storage.

12. Select to enable **Third-party Recovery**. This option writes additional information and writes full object metadata, enabling you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and may impact performance.

IMPORTANT

- For many storage configurations, this option is automatically selected by default and **should not be disabled**.
- Spectra Logic recommends Third-Party Recovery be **enabled** for all configurations of BlackPearl storage.

13. If desired, select **Disabled**. This creates the cloud storage in a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.
14. Click **Next**.
15. Verify the information for the cloud storage is correct, and click **Submit**.

Create S3 Compatible Cloud Storage

Cloud storage that is not an AWS, Azure, or Google Cloud endpoint is configured as S3 compatible cloud storage.

Note: The bucket on the cloud storage target must be configured to use versioning.

Here is how to create S3 compatible cloud storage:

1. In the taskbar of the Object Manager user interface, click **Storage**.
2. Under the **Cloud Storage** banner, click **Add**.
3. Use the **Select Storage Type** drop-down menu to select **S3 Compatible Storage** and click **Next**.

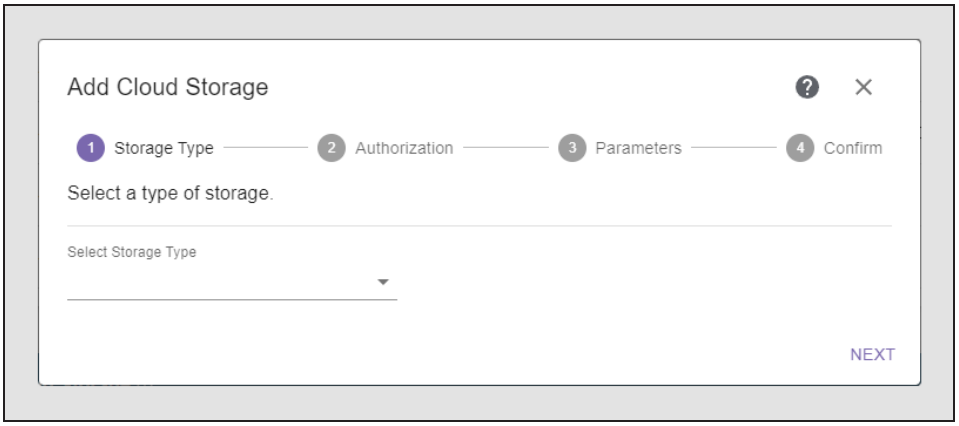


Figure 25 The Add Cloud Storage - Storage Type screen.

4. Enter the URL address for the **Data Path Endpoint**.

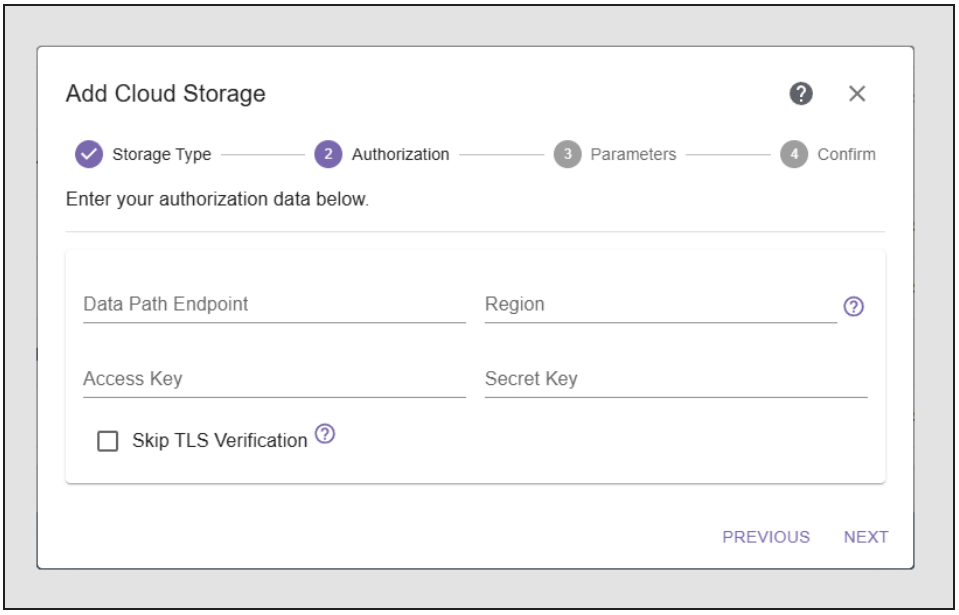


Figure 26 The Add Cloud Storage - S3 Compatible Storage Authorization screen.

5. If required, enter a **Region** where the S3 compatible storage is located. If the region is not required, leave this field empty.
6. Enter the **Access Key** and **Secret Key** for the administrator of the cloud endpoint.
7. If desired, select **Skip TLS Verification**. This option disables TLS certificate verification for HTTPS endpoints.

Note: This setting does not apply to HTTP endpoints.

8. Click **Next**.

9. Using the **Select Cloud Bucket** drop-down menu, select a bucket previously configured on the cloud endpoint. The Parameters screen updates to show options applicable to the type of bucket selected.

Note: Versioning must be enabled on the target bucket.

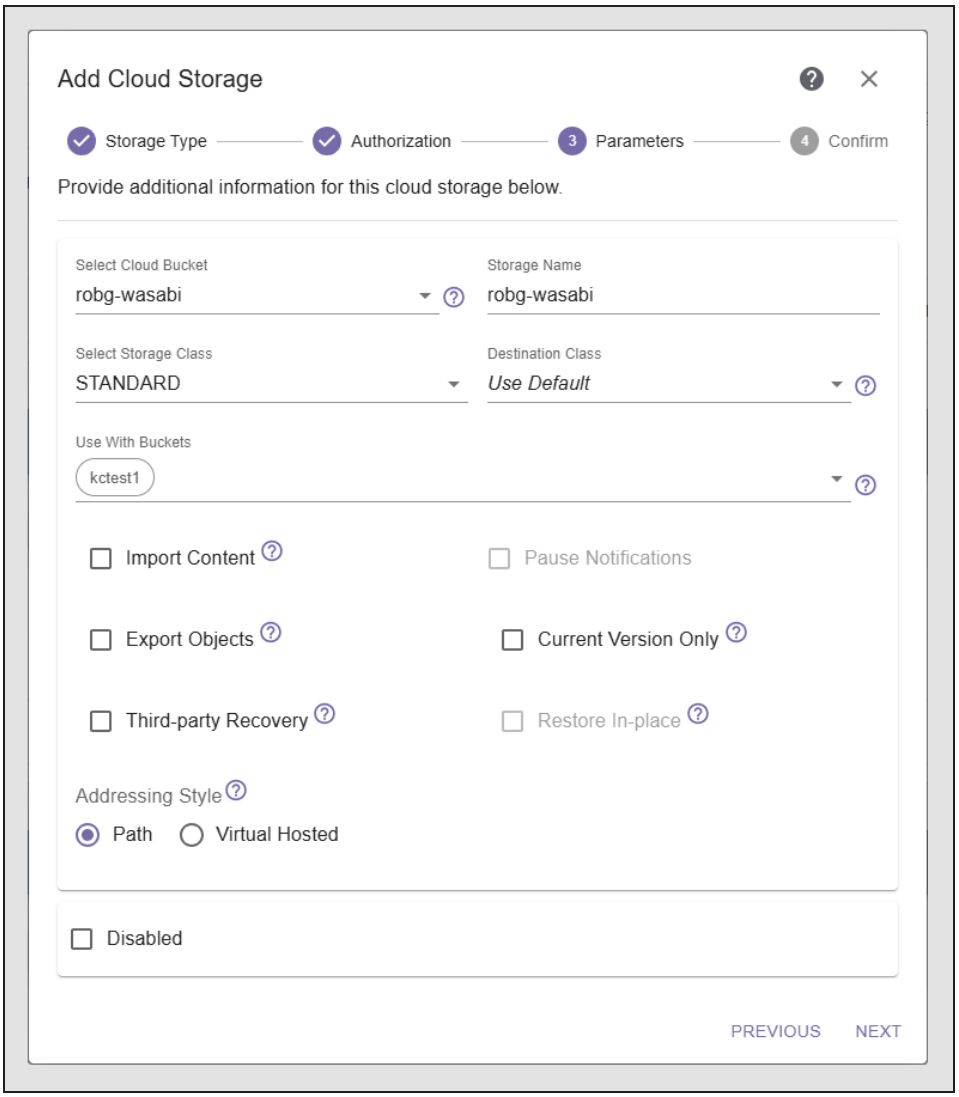


Figure 27 The Add Cloud Storage - S3 Compatible Parameters screen displaying all possible settings. Your screen may appear different depending on the type of bucket selected.

10. The **Storage Name** is automatically populated with the name of the bucket selected in Step 9. If desired, you can change the **Storage Name**.

11. Use the **Select Storage Class** drop-down menu to configure the storage class you want to use for this endpoint. The selected storage class is used when creating clones on the cloud bucket.

Note: The financial costs associated with each storage type are controlled by the cloud provider.

12. Use the drop-down menu to select the **Destination Class**.

    If you select **Use Default**, objects are created without specifying a storage class value. Otherwise, Object Manager attempts to create objects on the storage with the specified storage class.

Notes:
- If a Lifecycle using this storage has **Ignore Storage Class** enabled, this setting is ignored.
- The financial costs associated withe each storage type are controlled by the cloud provider.

13. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

14. If desired, select **Import Content**. This option requires you to select a single bucket with the **Use With Buckets** drop-down menu. The selected bucket stores object references without copying data. Lifecycles can be used to copy data if desired.

Note: Including this storage endpoint as a destination in a lifecycle allows you to synchronize the selected bucket with the storage endpoint. Synchronizing allows the bucket to maintain consistency with an external bucket regardless of whether objects are added locally or to the external bucket.

15. Select or clear **Pause Notifications** as desired. When notifications are paused, changes are only recognized when the bucket scan is manually triggered, either through the Object Manager user interface or by API call. Otherwise changes are automatically recognized and linked bucket contents update automatically.

16. If desired, select to enable **Export Objects**. This option configures the cloud storage as write-only and directly migrates data to the cloud bucket instead of creating and managing clones of the object data. After the export completes, the Object Manager application does not retain any record of the exported data.

    If you enable this option:

    - The Third-Party Recovery option is enabled automatically.
    - You cannot enable the Restore In-Place option.
    - You cannot use the storage as part of a Lifecycle.
    - The storage does not display capacity or usage information.

IMPORTANT Once enabled, you cannot disable this setting for the cloud storage. Additionally, you cannot enable Export Objects at a later time, only when you are creating the cloud storage.

17. If desired, select **Current Version Only**. This option limits storing object clones on the storage endpoint to the most recent version only. This setting enables the use of cloud storage that does not support object versioning.

Note: This option can only be enabled during creation.

18. Select to enable **Third-party Recovery**. This option writes additional information and writes full object metadata, enabling you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and may impact performance.

IMPORTANT

- For many storage configurations, this option is automatically selected by default and **should not be disabled**.
- Spectra Logic recommends Third-Party Recovery be **enabled** for all configurations of BlackPearl storage.

19. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.

Note: You cannot enable this setting if you selected to enable Export Objects.

20. Select the desired **Addressing Style**. This setting controls the URL format used when communicating with the cloud storage provider.

Selection	Description
Path Style	Path style formatting uses the bucket name as part of the URL path. **Example**: *http://endpoint/bucket-name/object-key*
Virtual-Hosted	Virtual-hosted style addressing uses the bucket as the prefix to the endpoint name **Example**: *http://bucket-name.endpoint/object-key*

21. If desired, select to **Disable** the cloud storage. This creates the cloud storage in a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

22. Click **Next**.

23. Verify the information for the cloud storage is correct, and click **Submit**.

CREATE STORAGE GROUPS

Storage groups combine smaller existing storage pools into a common pool.

Considerations for Expanding Storage

- When you combine storage, if there are current clone processing jobs to storage, adding new storage to a storage group does not help clones complete if they are already pending when the storage is added. This occurs because the application does not change the destination storage once it has been selected. This is true even if the newly added storage is on the endpoint performing the operations.
- When objects are transferred to a storage group, a check is performed to determine if the storage group has enough space to land the objects. This check is only valid if all storage in the storage group is on the same storage endpoint. If you create a storage group with storage from different endpoints, the Object Manager application may select a storage destination that does not have sufficient space.

Create a Storage Group

Here is how to create a Storage group:

1. In the taskbar of the Object Manager user interface, click **Storage**.
2. Under the Storage Groups banner, click **Create**.

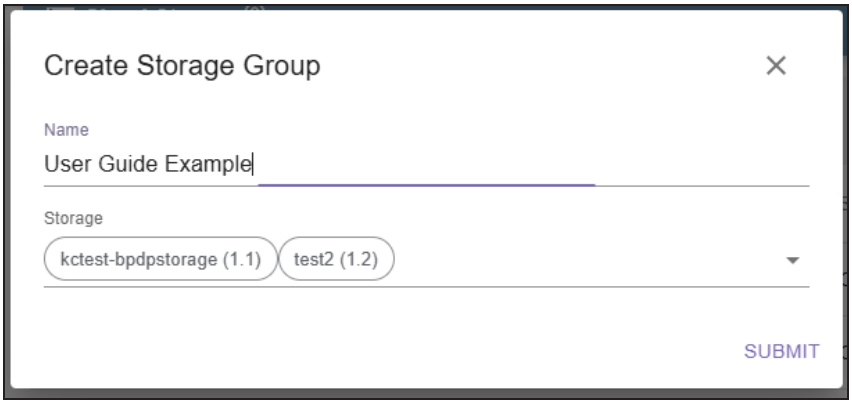


Figure 28 The Create Storage Group screen.

3. Enter a **Name** for the storage group.
4. Use the **Storage** drop-down menu to select the storage endpoints you want to group.

Note: All selected storage endpoints must be the same storage class.

5. Click **Submit**.

CREATE A LIFECYCLE

Lifecycles control where data is located, at what times, and for how long. When data is added to a Object Manager bucket, lifecycle rules determine where objects are initially placed, how data placement changes over time, and when to delete objects. Placement rules change data placement without altering the bucket contents. Deletion rules delete objects and should be used with caution.

Lifecycle rules are processed once per day. When this occurs, the Object Manager application generates a list of objects to be moved or expired and then processes the objects as a background process. The default processing time is midnight UTC, but processing time of day can be changed in the Global Settings. See Change Lifecycle Rule Nightly Processing Time on page 161.

IMPORTANT The Object Manager application does not support aggregating storage pools that use the same storage class. You must configure separate Lifecycles that each target different storage to use multiple storage pools of the same storage class.

Here is how to create a lifecycle:

1. In the Object Manager user interface taskbar, click **Lifecycles**.
2. Under the **Lifecycles** banner, click **Create**.

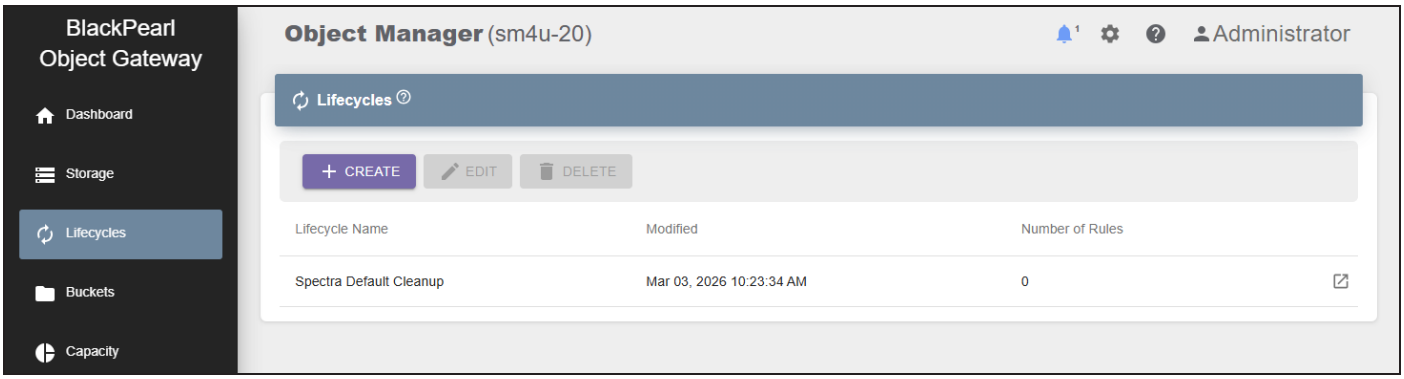


Figure 29 The Lifecycles screen.

3. Enter the desired **Name**.

   Spectra Logic recommends using names that directly indicate the specific lifecycle rule configuration.

   For example, use names such as Clone_Everywhere_Keep4Days and Moveto_DallasNodeVM_After10Days.

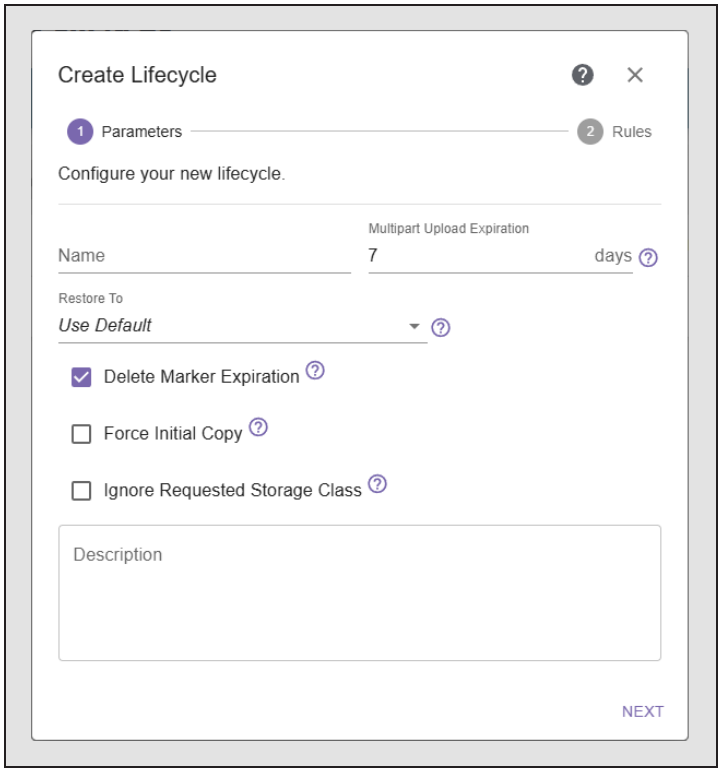


Figure 30 The Create Lifecycle - Parameters screen.

4. Enter a value for **Multipart Upload Expiration** in days. This setting controls how long the Object Manager waits before aborting multipart uploads. When the multipart upload aborts, all parts of the upload are deleted. This prevents retaining multiple incomplete uploads.

Note: To prevent multipart uploads from expiring, enter zero.

5. Use the **Restore To** drop-down menu to select a specific storage pool where you want to restore bucket objects. If you use the default setting, the Object Manager application decides which storage pool to restore objects.

6. Select or clear **Delete Marker Expiration**. A delete marker keeps track of deletions of versioned objects so that the application can determine if the object is missing. If enabled, the Object Manager removes delete markers when they are the last remaining version of an object.

7. Select or clear **Force Initial Copy**. When enabled, the Object Manager initially places data as STANDARD storage. Additional clones are created immediately as GLACIER storage. This may provide performance advantages as copying clones to GLACIER results in a clone that is ordered sequentially and more optimally packed.
8. Select or clear **Ignore Requested Storage Class**. When enabled, the Object Manager application does not consider the storage class requested in a PUT or upload operation and instead uses the storage class of the selected storage endpoint.
9. If desired, use the **Description** field to enter any additional information.
10. Click **Next**.
11. Add one or more placement or deletion rules. Placement rules add and remove clones from storage destinations, but do not change bucket contents. Deletion rules delete objects and should be used with caution.

Note: Each lifecycle is limited to five total rules.

- **Add a Transfer Rule on the next page**
- **Add a Deletion Rule on page 85**

Add a Transfer Rule

Transfer rules add object clones to the selected destination storage and optionally remove clones from storage destinations not specified in the placement rule. Transfer rules do not alter bucket contents.

1. Click **New Transfer Rule.**

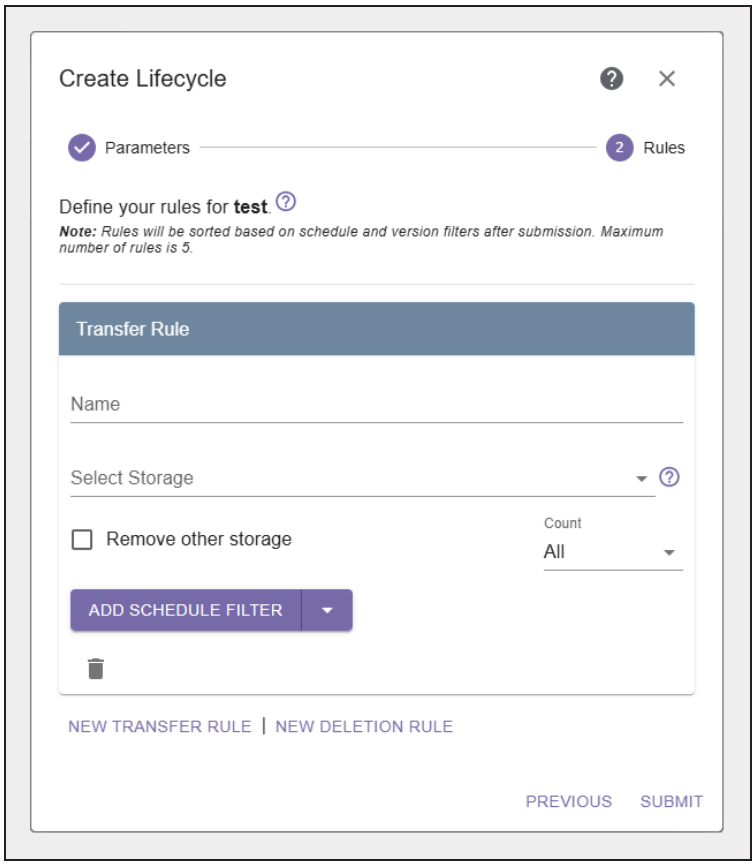


Figure 31 The Create Lifecycle - Transfer Rule screen.

2. Enter the desired **Name**.
3. Use the **Select Storage** drop-down menu to select up to five previously configured storage destinations.

Note: To remove a destination from the list, select the **Select Storage** drop-down menu, and click on the purple highlighted row of the destination you want to remove.

4. If desired, select **Remove Other Storage**. This option removes clones from any destination storage not selected in Step 3.

Note: This option only removes object clones. It does not change bucket contents.

5. Use the **Count** drop-down menu to select the number of storage destinations you want to maintain a copy of the data when the rule executes, up to a maximum of five. If you have less than five storage endpoints, you are only able to select a number equal to or less than the number of storage endpoints. If you select **All**, every storage endpoint maintains a copy of object data

Note: If you select two destinations, but enter five storage destinations, then two copies of the object are maintained on any of the five specified destinations. The order in which you select destinations is the order the Object Manager sphere uses to determine where to store a copy of the data. If a storage destination is not available or busy when the rule executes, the Object Manager sphere selects the next destination.

6. Using the Filter drop-down menu (**1**) , select the desired filter, then click the **Add *Filter Name*** button (**2**). The screen expands to show the details of the selected filter.

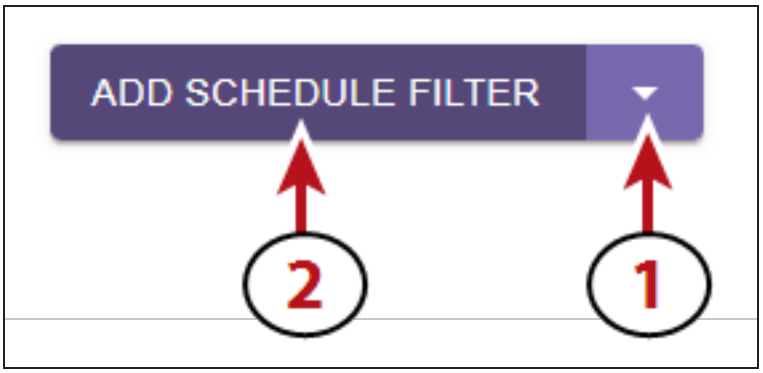


Figure 32 The Select Filter drop-down menu (1) and Add Filter Name button (2).

7. Use the table below to complete configuring the filter.

If you selected...	Do the following...
Schedule Filter	• Specify a **Older Than number of days**. When an object is older than this value, the Object Manager application applies the placement rule on the objects at the next daily processing time. • Entering a value of **zero** applies the placement rule on the next daily processing time, which is between zero and 24 hours later. • To apply the placement rule **immediately** after the lifecycle is created, do not configure a schedule filter. Click the trashcan icon to remove the schedule filter. See Edit Global Settings on page 161 to view the currently configured daily processing time. **Note:** You can only configure one Schedule filter.
Current Version Filter	No actions are required. The Object Manager applies the placement rule to the current version of objects. **Note:** If you select the Current Version filter, you cannot select the Non-Current Version filter.
Non-Current Version Filter	No actions are required. The Object Manager applies the placement rule to the non-current version of objects. **Note:** If you select the Non-Current Version filter, you cannot select the Current Version filter.
Include Name Filter	Enter a regular expression. The placement rule applies to any object with a name that matches the provided expression. **Note:** If multiple Include Name filters are applied to the placement rule, the placement rule applies if any of the filters match the object name.
Exclude Name Filter	Enter a regular expression. The placement rule applies to any object with a name that matches the provided expression. **Note:** If multiple Exclude Name filters are applied to the placement rule, the placement rule applies if any of the filters match the object name.
Include Object Tag Filter	• Enter a **Key** and **Value**. The placement rule applies to any object with a matching object tag. The fields are case-sensitive. Object tag filtering is case-sensitive and object tags must be an exact match. • If no **Value** setting is entered, the placement rule applies to all objects with an object tag that matches the specified **Key**. **Note:** If multiple Include Object Tag filters are applied to the placement rule, the placement rule applies if any of the filters match the object name.

If you selected...	Do the following...
Exclude Object Tag Filter	• Enter a **Key** and **Value**. The placement rule applies to any object with a matching object tag. The fields are case-sensitive. Object tag filtering is case-sensitive and object tags must be an exact match. • If no **Value** setting is entered, the placement rule applies to all objects with an object tag that matches the specified **Key**. **Note:** If multiple Exclude Object Tag filters are applied to the placement rule, the placement rule applies if any of the filters match the object name.

8. If desired, add additional Placement or Deletion rules.
9. Click **Submit**.

Add a Deletion Rule

Use deletion rules to delete objects at a specified interval. If a storage location uses versioning, deletion rules can be configured to delete the latest or previous version of an object, or all versions.

Note: Deletion rules always removes delete markers if the rule criteria are met.

CAUTION A deletion rule deletes data from **all** storage locations configured in the lifecycle.

1. Click **New Deletion Rule.**

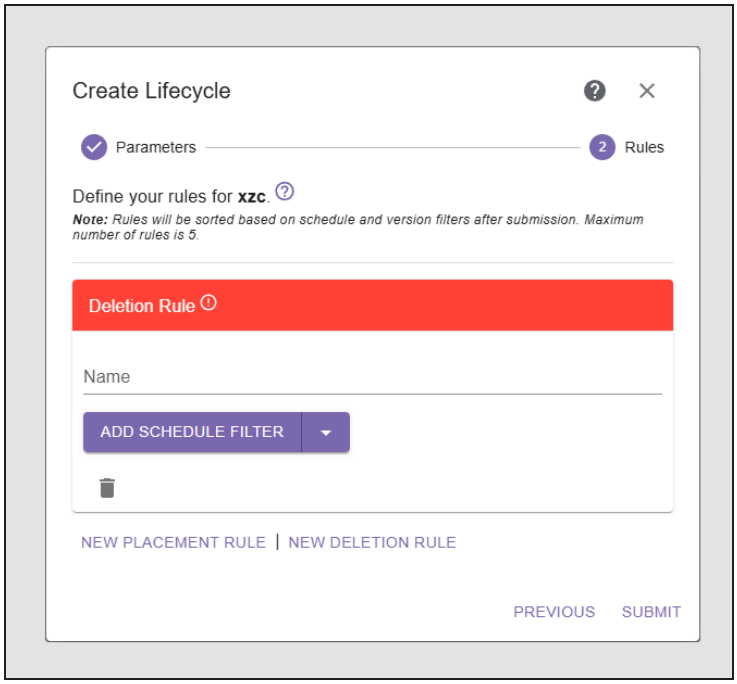


Figure 33 The Create Lifecycle - Deletion Rule screen.

2. Enter the desired **Name**.
3. Using the Filter drop-down menu (**1**) , select the desired filter, then click the **Add *Filter Name*** button (**2**). The screen expands to show the details of the selected filter.

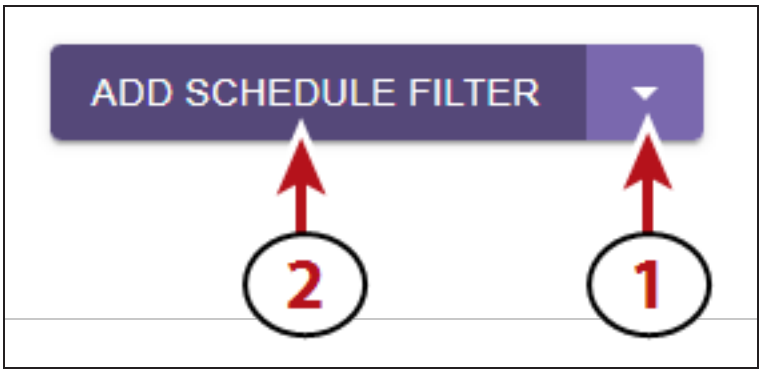


Figure 34 The Select Filter drop-down menu (1) and Add Filter Name button (2).

4. Use the table below to complete configuring the filter.

If you selected...	Do the following...
Schedule Filter	• Specify a **Older Than number of days**. When an object is older than this value, the Object Manager application applies the deletion rule on the objects at the next daily processing time. • Entering a value of **zero** applies the deletion rule on the next daily processing time, which is between zero and 24 hours later. • To apply the deletion rule **immediately** after the lifecycle is created, do not configure a schedule filter. Click the trashcan icon to remove the schedule filter. See Edit Global Settings on page 161 to view the currently configured daily processing time. **Note:** You can only configure one Schedule filter.
Current Version Filter	No actions are required. The Object Manager applies the deletion rule to the current version of objects. **Note:** If you select the Current Version filter, you cannot select the Non-Current Version filter.
Non-Current Version Filter	Enter a number of non-concurrent versions of an object that should be kept and not expired. When this limit is reached, any excess non-concurrent versions are allowed to expire based on the configured schedule filter. **Note:** If you select the Non-Current Version filter, you cannot select the Current Version filter.
Include Name Filter	Enter a regular expression. The deletion rule applies to any object with a name that matches the provided expression.

If you selected...	Do the following...
	Note: If multiple Include Name filters are applied to the deletion rule, the deletion rule applies if any of the filters match the object name.
Exclude Name Filter	Enter a regular expression. The deletion rule applies to any object with a name that matches the provided expression. **Note:** If multiple Exclude Name filters are applied to the deletion rule, the deletion rule applies if any of the filters match the object name.
Include Object Tag Filter	• Enter a **Key** and **Value**. The deletion rule applies to any object with an matching object tag. The fields are case-sensitive. Object tag filtering is case-sensitive and object tags must be an exact match. • If no **Value** setting is entered, the deletion rule applies to all objects with an object tag that matches the specified **Key**. **Note:** If multiple Include Object Tag filters are applied to the deletion rule, the deletion rule applies if any of the filters match the object name.
Exclude Object Tag Filter	• Enter a **Key** and **Value**. The deletion rule applies to any object with an matching object tag. The fields are case-sensitive. Object tag filtering is case-sensitive and object tags must be an exact match. • If no **Value** setting is entered, the deletion rule applies to all objects with an object tag that matches the specified **Key**. **Note:** If multiple Exclude Object Tag filters are applied to the deletion rule, the deletion rule applies if any of the filters match the object name.

5. If desired, add additional Placement or Deletion rules.
6. Click **Submit**.

CREATE A OBJECT MANAGER BUCKET

A Object Manager bucket is a logical target that is shared across the entire Object Manager sphere. Objects are placed and retrieved from a Object Manager bucket using an S3 compatible client. Data is then migrated to storage locations using the lifecycle associated with the bucket.

Note: A Object Manager sphere is limited to 1000 buckets.

Object Manager buckets can also be linked to an existing bucket on a BlackPearl system or S3 compatible storage endpoint. When buckets are linked, any changes to one bucket are propagated to the other bucket automatically.

Note: When a Object Manager bucket is linked to an S3 cloud bucket, the Object Manager synchronizes the buckets such that changes made on one bucket are propagated to the other bucket. In normal S3 operations, a very small object, such as a 0-length delete marker, is not cloned. However in a linked bucket configuration, small objects created on the linked cloud storage are represented by a clone in the Object Manager because of the bucket synchronization. These clones display in the Object Manager management console and can be deleted. Deleting the clone of an object results in the object appearing that it was originally created on the Object Manager storage, not the linked cloud bucket.

IMPORTANT

If a Object Manager bucket is linked to a S3 cloud bucket, when an object is added to a S3 cloud bucket, the Object Manager creates a version of the object with a clone that references the object in the S3 bucket. Because the objects are linked, if the object is deleted in the Object Manager, the object on the S3 cloud bucket is deleted, even if no lifecycle is defined. If there are multiple versions of the object in the Object Manager, when the object is deleted, only the object on the S3 cloud bucket that matches the version deleted in the Object Manager is deleted from the S3 bucket.

Here is how to create a Object Manager bucket:

1. In the Object Manager user interface taskbar, click **Buckets**.
2. Under the **Buckets** banner, click **Create**.

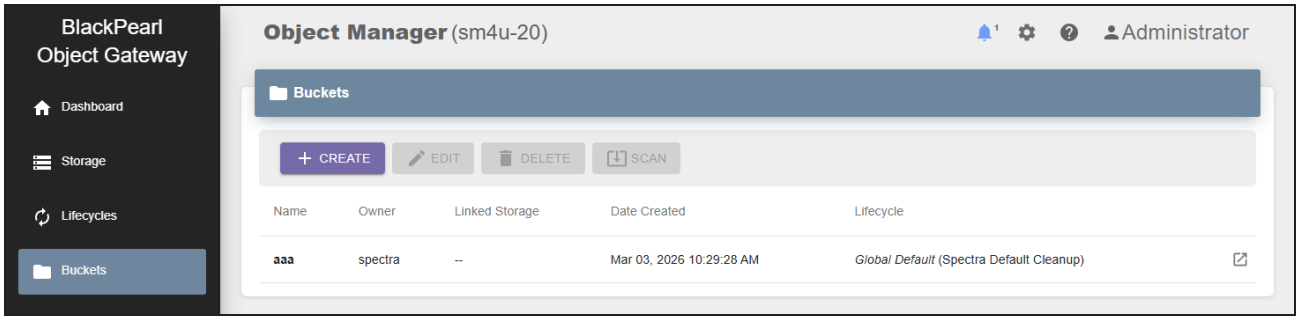


Figure 35 The Buckets screen.

3. Enter the desired **Bucket Name**. Spectra Logic recommends using names that either include the intended usage or user a group name combined with intended usage. If you use a naming convention by groups, the associated group can be easily given access to all buckets sharing the group name prefix.

   For example, use usage names such as news-breaking and external-archive, or group and usage name such as eng-dev and eng-test.

Note: Object Manager bucket names must be between three and 63 characters, using only lowercase letters and numbers. The period (.) and dash (-) characters are valid in the middle of the bucket name, but are not valid as the first or last character of a bucket name.

Note: Spectra Logic recommends following Amazon AWS documentation naming conventions and restrictions to maintain consistency and avoid potential issues. See *AWS Bucket Naming Rules* for more information.

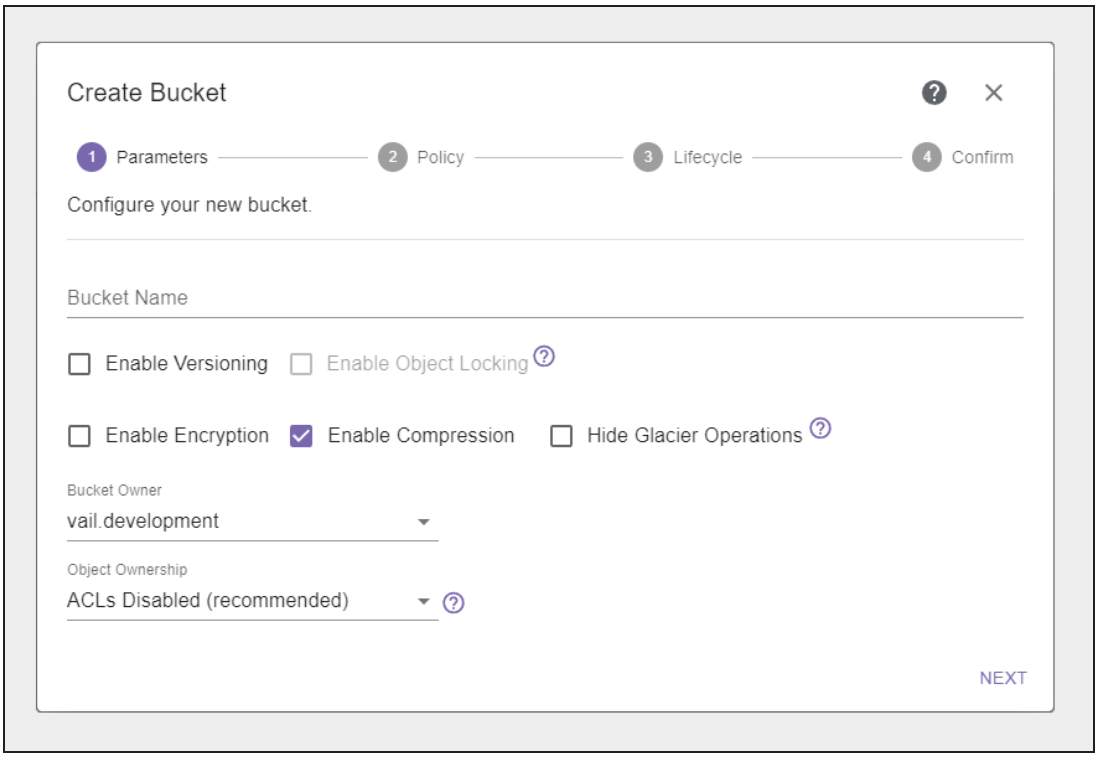


Figure 36 The Create Bucket - Parameters screen.

4. If desired, select **Enable Versioning** to allow the bucket to store multiple versions of an object.

5. If desired, select **Enable Object Locking**. This allows you to protect the state of an object when the lock is applied, while also allowing other versions non-locked versions to be modified, and allows new versions of an object to be added to the bucket.

   There are two types of locks that can be used. A retention lock expires on a specific date and time. A legal lock must be manually removed.

Notes:
- Objects can be locked both when they are added to the bucket, and while they reside in the bucket using the Object Manager API.
- Locked objects display a locked in the Object Manager user interface.
- This option is greyed-out unless you selected to enable versioning in Step 4.

6. If desired, select **Enable Encryption** to encrypt data copied to the Object Manager bucket.

IMPORTANT Files archived to an encrypted Object Manager bucket can only be decrypted by the Object Manager.

Note: You must use the key provided by Spectra Logic when transferring data to a Object Manager bucket configured to use encryption, or data transfers to the bucket fail.

7. If desired, select **Enable Compression** to allow the Object Manager to compact objects placed in the Object Manager bucket.

Note: Compression is not recommended if your workflow only uses files that are already compressed, such as ZIP files.

8. If desired, select **Hide Glacier Operations**. This option allows S3 clients that do not fully support restoring from AWS S3 Glacier tier storage by automatically requesting the object from Glacier storage when the client requests the object.

Note: Enabling this option changes the response from the Object Manager to the S3 client when an object is not immediately available. Instead of a 403 invalid object state error, a 503 service unavailable error is returned.

IMPORTANT This option is not compatible with S3 clients that fully support Glacier storage restores and may interfere with normal operation.

9. Use the **Bucket Owner** drop-down menu to select a user to own the bucket. The bucket owner sets permissions for the bucket.

10. Use the **Object Ownership** drop-down menu to select the type of ownership used for new objects, and how Access Control Lists (ACLs) are used.

Option	Description
ACLs Disabled	New objects written to this bucket are always owned by the bucket owner configured in Step 9. • Access to this bucket and its objects is specified using only policies. **Note:** This is the recommended setting.
Bucket Owner Preferred	If new objects written to this bucket specify the *bucket-owner-full-control* canned ACL, the objects are owned by the bucket owner. Otherwise they are owned by the object writer. • Access to this bucket and its objects can be specified using ACLs or policies.
Object Writer	New objects written to the bucket are always owned by the object writer. • Access to this bucket and its objects can be specified using either ACLs or policies.

Note: If Object Permissions is configured to use Object Writer, if an object is added to the bucket by a different account, that object is owned by the other account, but permissions for bucket operations are still controlled on the bucket owner

11. Click **Next**.

- If you selected **Enable Object Locking** in Step 5 on page 90, continue with Step 12 below
- Otherwise, skip to Step 19 on page 93.

12. If desired, select **Use Default Retention** to configure a retention policy for objects to use if they are not uploaded to the bucket with a specified retention lock. To continue without specifying a default retention policy, click **Next** and skip to Step 19 on page 93.

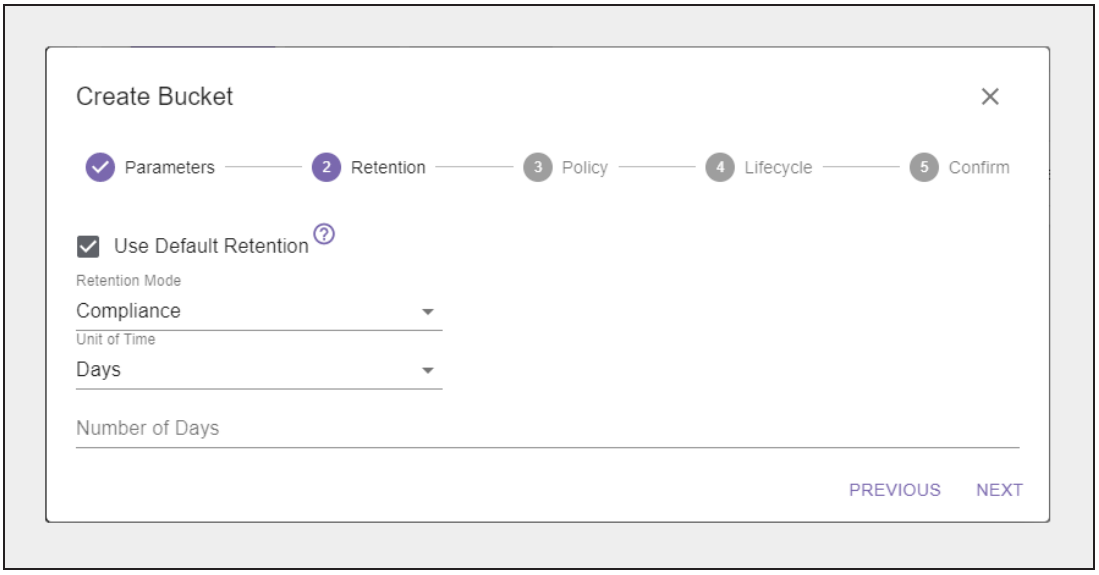


Figure 37 The Create Bucket - Retention screen.

13. Use the **Retention Mode** drop-down menu to select the type of default retention lock. Retention locks have two modes that specify how the lock can be modified. Both Governance and Compliance mode locks can have the retention period extended.
    - Retention locks in **Governance** mode can be reduced or removed if the user making the request has the correct permissions.
    - Retention locks in **Compliance** mode can only be extended, and the retention period cannot be removed or reduced. You must wait for the lock to expire.
14. Use the **Unit of Time** drop-down menu to select a unit of time for the default retention lock, then enter a value for **Number of *Unit of Time***. The minimum value is 1 day and the maximum value is 36500 days (100 years).
15. Click **Next**.

16. If desired, select or clear **Block Public Policies**. Enabling this setting blocks new bucket policies that grant public access to buckets and objects. This setting does not change existing policies that allow public access.

17. If desired, select or clear **Restrict Public Buckets**. Enabling this setting ignores public and cross-account access for buckets with policies that grant public access to buckets and objects.

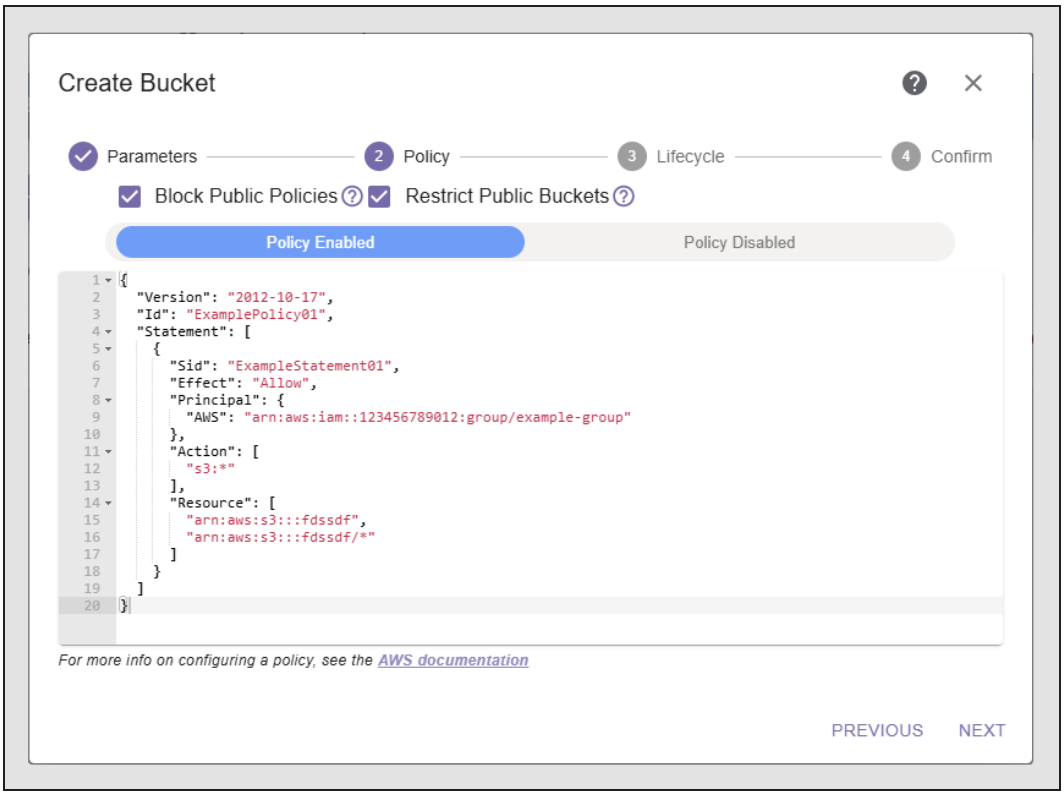


Figure 38 The Create Bucket - Policy screen.

18. Use the **Policy** slider to enable or disable using a policy with the bucket. Policy permissions are used if you want to exclude IAM user(s) under the main AWS account from accessing the Object Manager bucket.

19. If you selected **Policy Enabled**, edit the example policy code as required.

Note: For additional information on configuring a policy, see the *Amazon S3 Actions* documentation.

20. Click **Next**.

- If you selected **ACLs Disabled** in Step 10 on page 91, skip to Step 27 on page 95.
- Otherwise continue with Step 21 below.

21. If desired, select or clear **Block Public ACLs**. Enabling this setting this blocks public access to ACL permissions applied to newly added buckets or objects, and prevents the creation of new public access ACLs for existing buckets and objects. This setting does not change any existing permissions that allow public access to S3 resources using ACLs.

22. If desired, select or clear **Ignore Public ACLs**. Enabling This setting ignores all ACLs that grant public access to objects or directories.

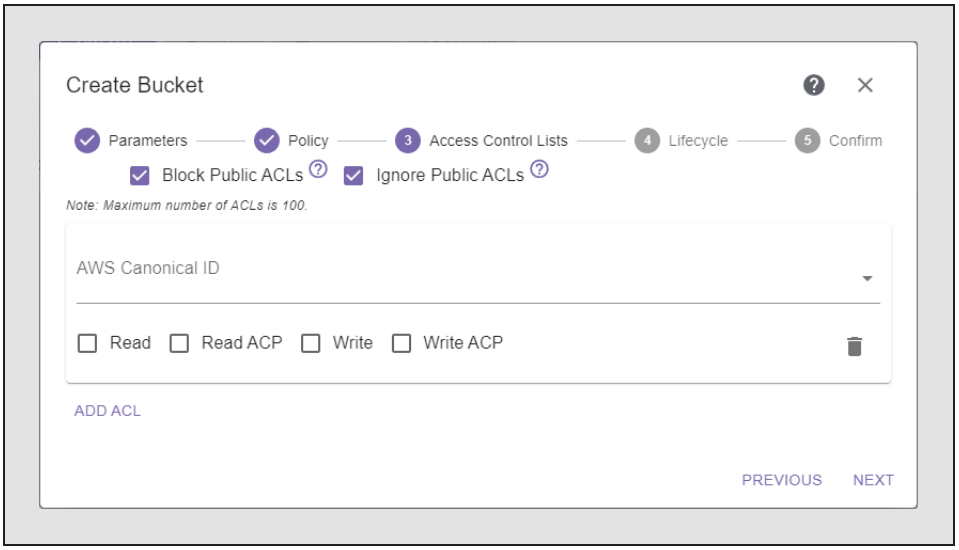


Figure 39 The Create Bucket - Access Control List screen.

23. Click **Add ACL** to configure ACL bucket permissions. ACL permissions are used when the bucket is shared across AWS accounts, and when older applications are being used that are not compatible with bucket policies.

24. Using the **AWS Canonical ID** drop-down menu, select an ID.

Note: The ID of the Object Manager sphere administrator is automatically configured in the Object Manager. To add additional AWS accounts, see Configure & Manage IAM Accounts.

25. Using the **Permissions** check boxes, set the permissions for the Object Manager bucket. If desired, you can assign multiple permissions.

Option	Description
Read	Allows the user to list the objects in a bucket.
Read ACP	Allows the user to read the bucket ACL information.
Write	Allows the user to create new objects in the bucket, and to overwrite existing objects.
Write ACP	Allows the user to write the ACL for the bucket.

If necessary, repeat Step 21 through Step 25 to configure additional ACLs.

Note: Use the trashcan icon to remove an ACL.

26. Click **Next**.

27. Using the **Select Lifecycle** drop-down menu, select a previously configured lifecycle and click **Next**.

Note: All buckets must be assigned a lifecycle. The Use Default option uses the lifecycle configured as the bucket owner's default lifecycle. If that option is not set, the global lifecycle default is used.

Figure 40 The Create Bucket - Lifecycle screen.

28. Review the configuration, then click **Submit** to create the bucket.

Note: A Object Manager sphere is limited to 1000 buckets.

CONFIGURE AN OBJECT STORAGE BROWSER

Before you can access and transfer data to a BlackPearl Storage Manager or Object Manager VM node, you must configure an object storage browser. The instructions in this section describe how to configure the S3 Browser and Cyberduck® cloud storage browser software.

Note: For other object browser programs compatible with the Object Manager, refer to the documentation included with the software.

The instructions below assume you have previously installed the browser software.

Configure S3 Browser

Here is how to configure the S3 Browser:

1. Launch the S3 Browser software.

   Note: You must use S3 Browser program version 9.0.8 or later.

2. Click **Accounts > Add New Account**.
3. Enter the desired **Account Name**.

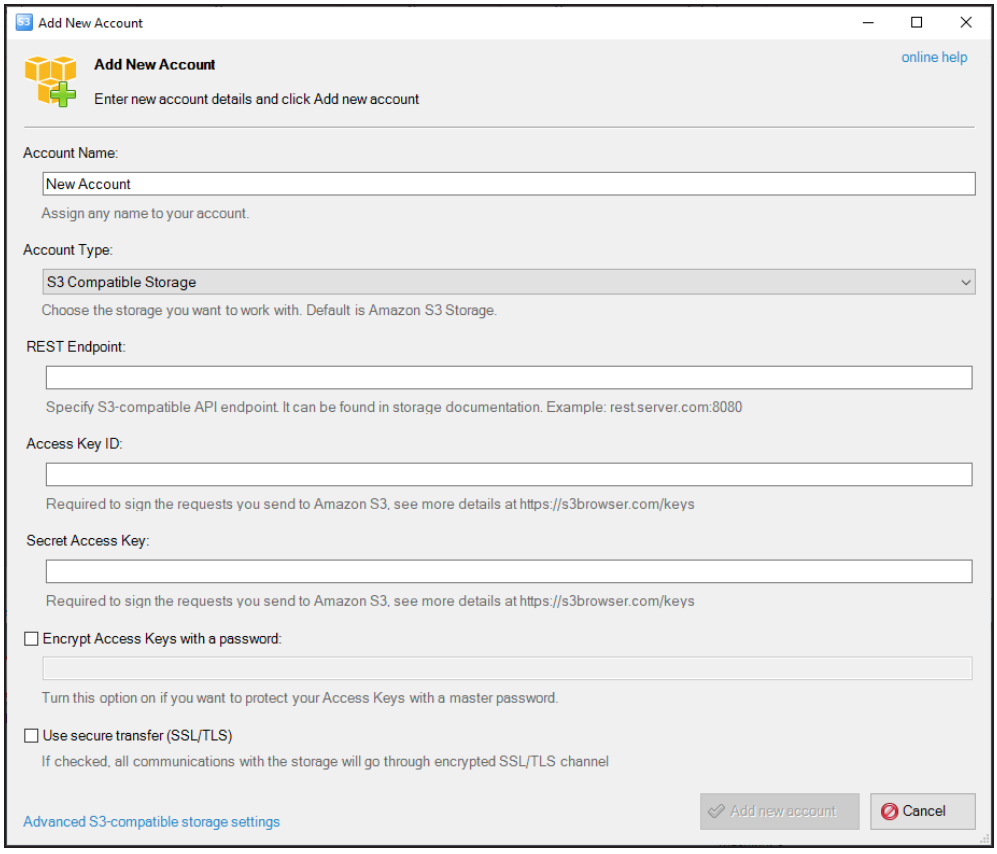


Figure 41 The Add New Account wizard.

4. Using the **Account Type** drop-down menu, select **S3 Compatible Storage**.

5. Enter the IPv4 address of the BlackPearl Storage Manager or Object Manager VM node as the **REST Endpoint**.
6. Enter the **Access Key ID** and the **Secret Access Key** of an IAM user configured in the Object Manager.
7. Clear the **Use secure transfer (SSL/TLS)** check box.
8. Click **Advanced S3-compatible storage settings**.

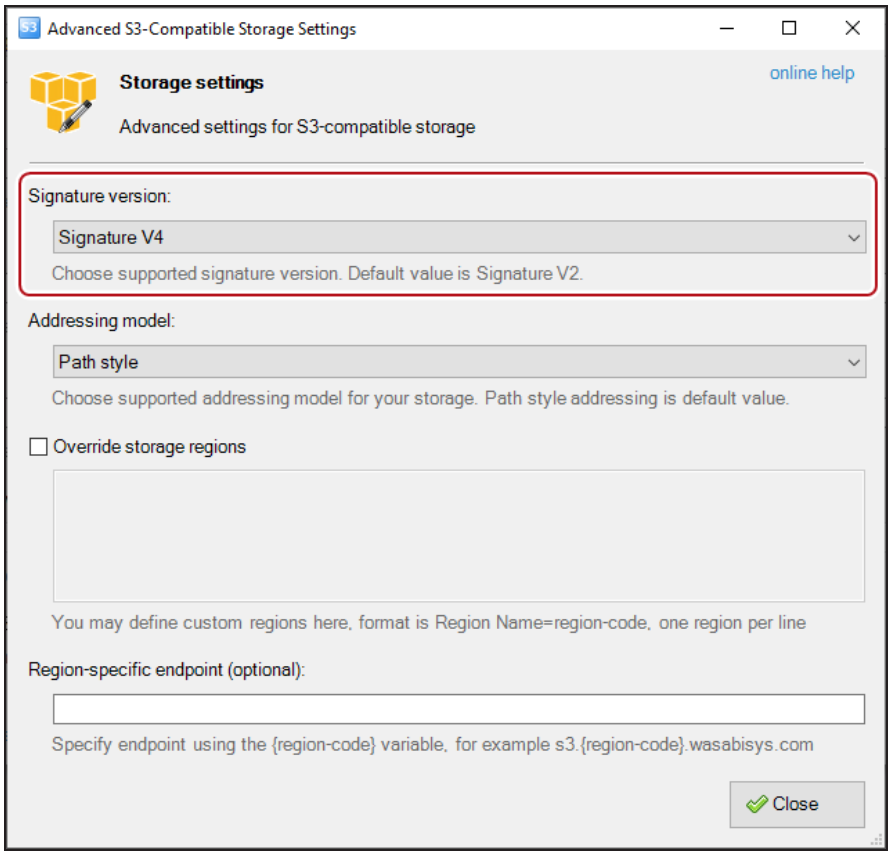


Figure 42 The Advanced S3-Compatible Storage Settings screen.

9. Using the **Signature Version** drop-down menu, select **Signature V4** and click **Close**.

Note: The Object Manager application also support AWS V4a signatures.

10. Click **Add new account**. The S3 Browser retrieves the list of buckets configured on the Object Manager sphere (see View Object Manager Bucket Details on page 145.)

Configure Cyberduck Object Storage Browser

Here is how to configure Cyberduck object storage browser:

1. Download and install the Cyberduck profile for third party S3 (HTTPS) connections.

   The profile can be downloaded at:

   https://profiles.cyberduck.io/Spectra%20S3%20(HTTPS).cyberduckprofile

Note: Use the Cyberduck user documentation for help installing the profile.

2. Launch the Cyberduck software.
3. Click **Open Connection**.

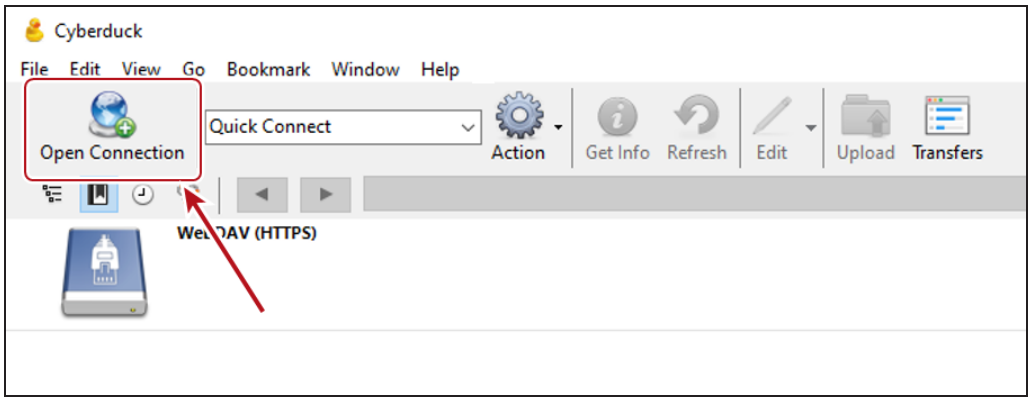


Figure 43 The Cyberduck Object Storage Browser home screen.

4. Using the drop-down menu, select **S3(HTTPS)**.
5. Using the **Server** entry field, enter the IP address of the BlackPearl Storage Manager or Object Manager VM node.

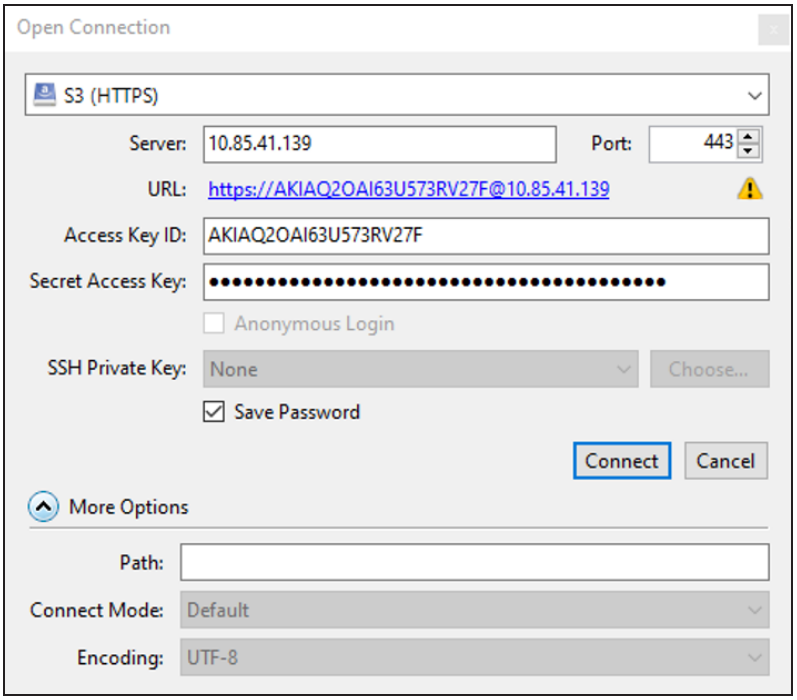


Figure 44 The Open Connection screen.

6. Enter the **Access Key ID** and the **Secret Access Key** of an IAM user configured in the Object Manager.
7. Click **Connect**.

Configure Mountain Duck Storage Browser

1. Launch the Mountain Duck application.
2. Click **Open Connection**.
3. Using the drop-down menu, select **Amazon S3**.

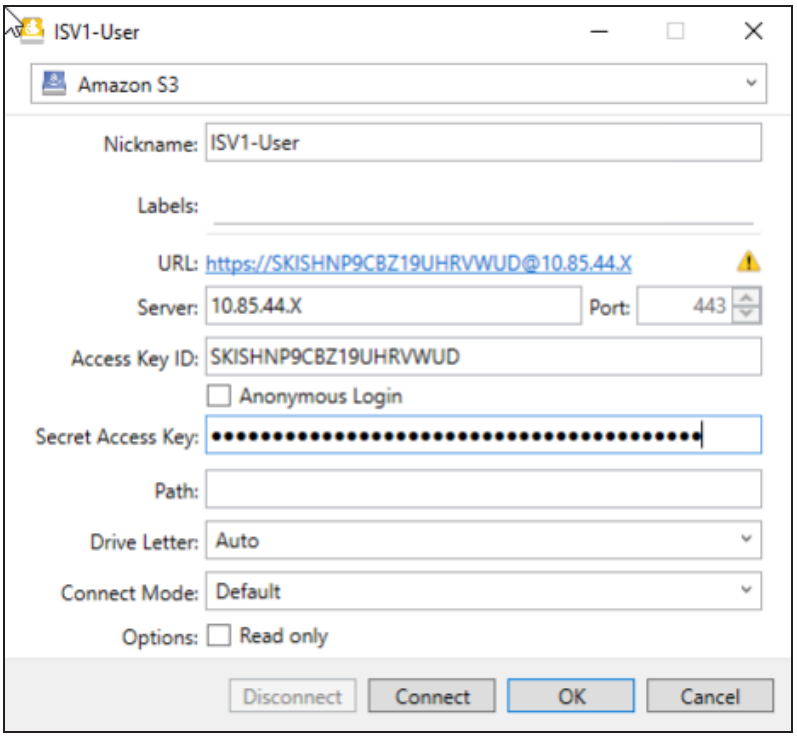


Figure 45 The Mountain Duck connection screen.

4. In the **Server** entry field, enter the IP address of the BlackPearl Storage Manager or Object Manager VM node.
5. Enter the **Access Key ID** and the **Secret Access Key** of an IAM user configured in the Object Manager.
6. Click **Connect**.

Chapter 4 - Configuring Users & Permissions

This chapter describes the configuration and managing user accounts in the Spectra Logic Object Manager. This chapter includes information about Object Manager sphere administrator accounts, IAM accounts, and IAM groups, as well as AWS access key management.

Configure & Manage Sphere Administrator - Cloud Control

Object Manager sphere administrator accounts have full control over the entire sphere, with full access to configure and change all system settings. Use the information in this section to create, edit, or delete a sphere administrator when using a cloud controlled Object Manager application.

Note: The Object Manager relies on the AWS Cognito server to manage sphere administrators. As a result, it is also possible to make sphere administrator level changes via the AWS management console.

Create a Sphere Administrator

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **Administrators** (**2**).

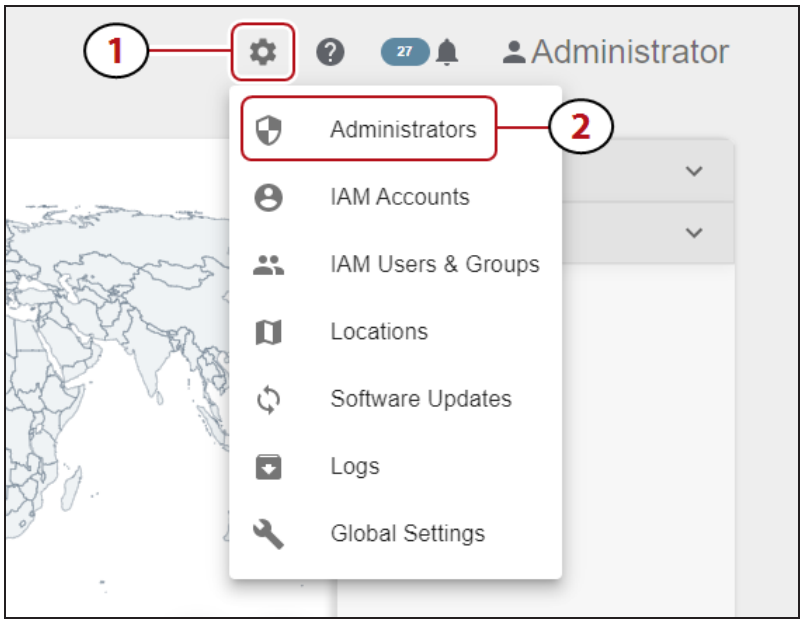


Figure 46 The Dashboard screen - Navigation menu.

2. In the Sphere Administrator pane, click **Create**.

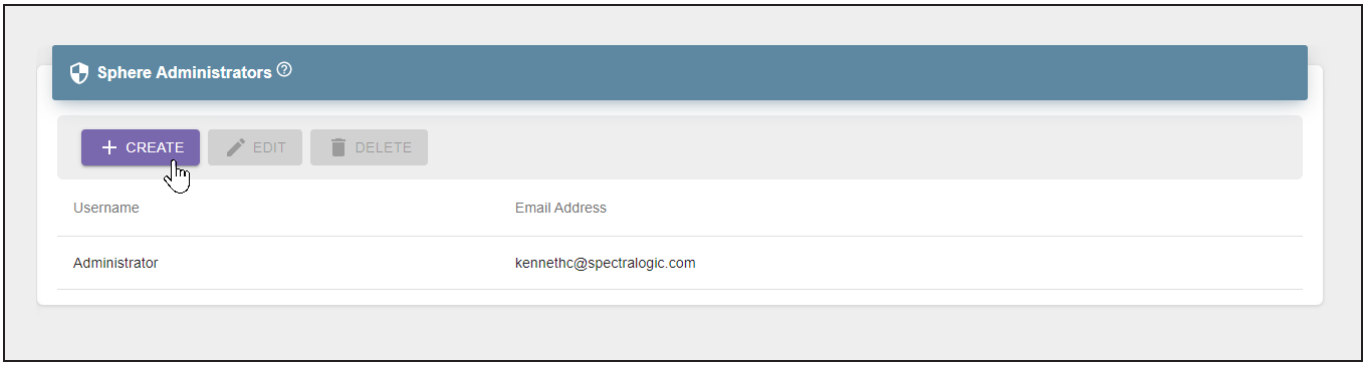


Figure 47 The Sphere Administrators pane.

3. Enter the desired **Username**.

   Spectra Logic suggests using the same naming convention as your corporate email for Object Manager sphere administrator names.

   For example, if associate Jane Smith uses the email address janes@yourcompany.com, use "janes" for the user name.

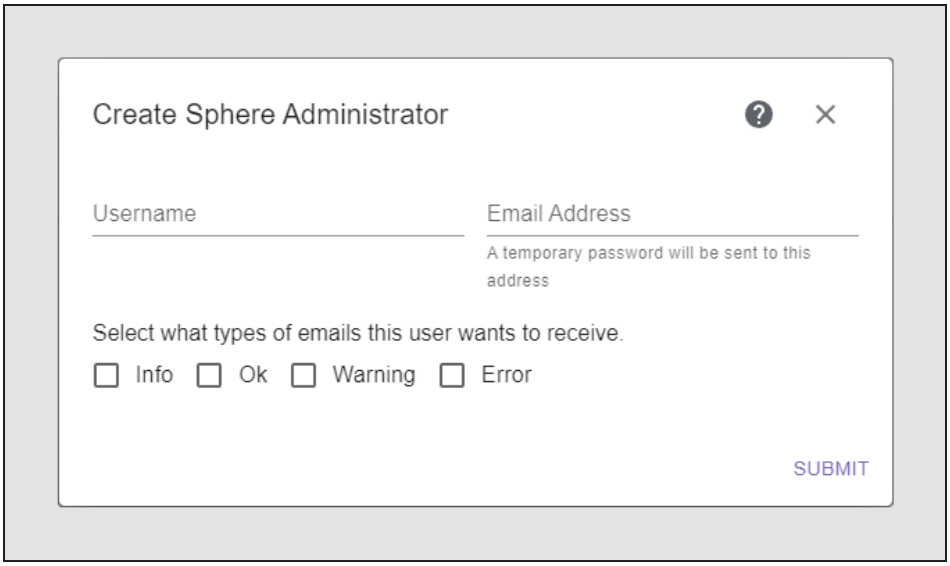


Figure 48 The Create Sphere Administrator screen.

4. Enter the **Email Address** for the sphere administrator. Emails sent to this address include system events and the temporary password for the account.

5. Select the type(s) of emails that the sphere administrator receives. The Object Manager emails the administrator when an event of the selected type occurs.

Setting	Description
Info	An expected event occurred such as a job starting or completing successfully.
OK	A component of the Object Manager sphere reports an OK status.
Warning	Notifies the user of a failure that may adversely impact the Object Manager.
Error	Notifies the user of a failure that caused significant adverse impact to the Object Manager.

6. Click **Submit**.

   A default password is emailed to the address entered in Step 4

Change a Sphere Administrator Password

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **Administrators** (**2**).

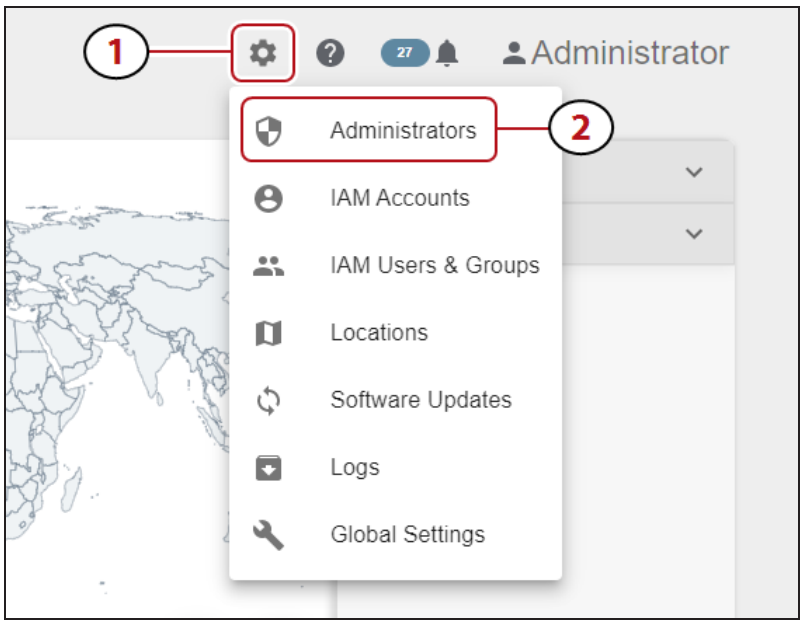


Figure 49 The Dashboard screen - Navigation menu.

2. Under the **Sphere Administrator** banner, (**1**) Select the row of the sphere administrator to edit, and (**2**) click **Edit**.

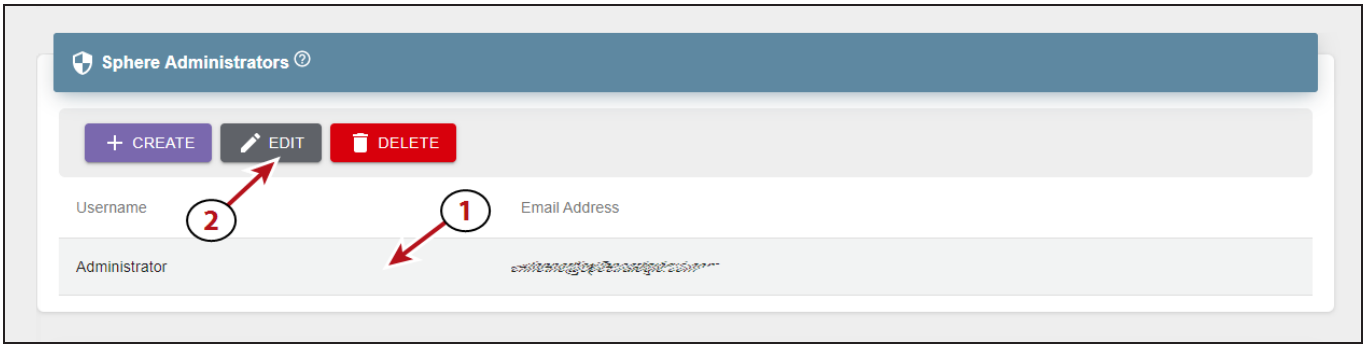


Figure 50 The Sphere Administrators pane.

3. Select **Set new password** and click **Next**.

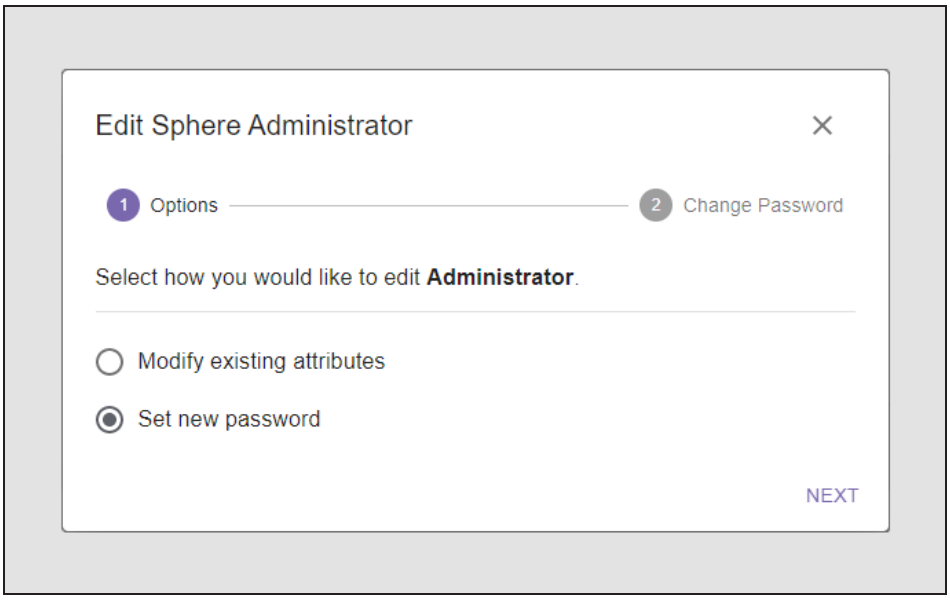


Figure 51 The Edit Sphere Administrator - Options screen.

4. Enter the desired **New Password**, then **Confirm New Password** and click **Submit**.

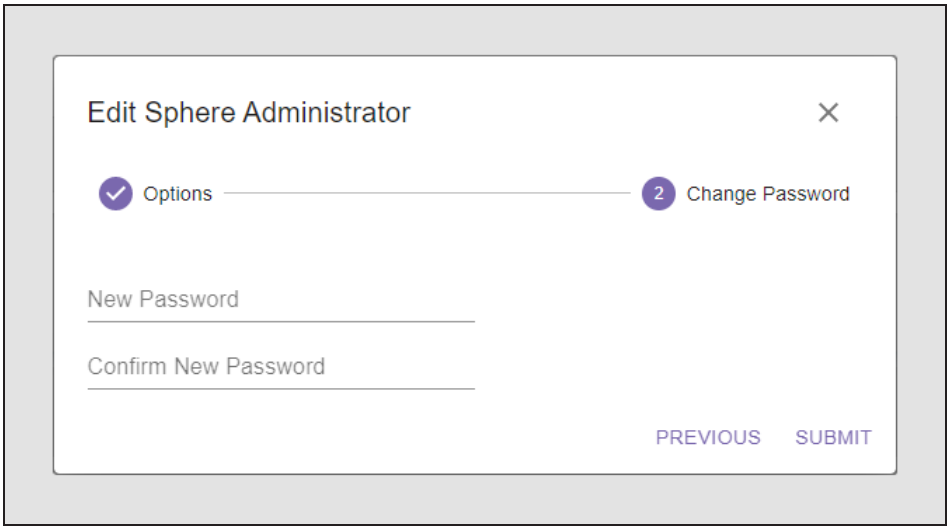


Figure 52 The Edit Sphere Administrator - Change Password screen.

Edit Sphere Administrator Attributes

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **Administrators** (**2**).

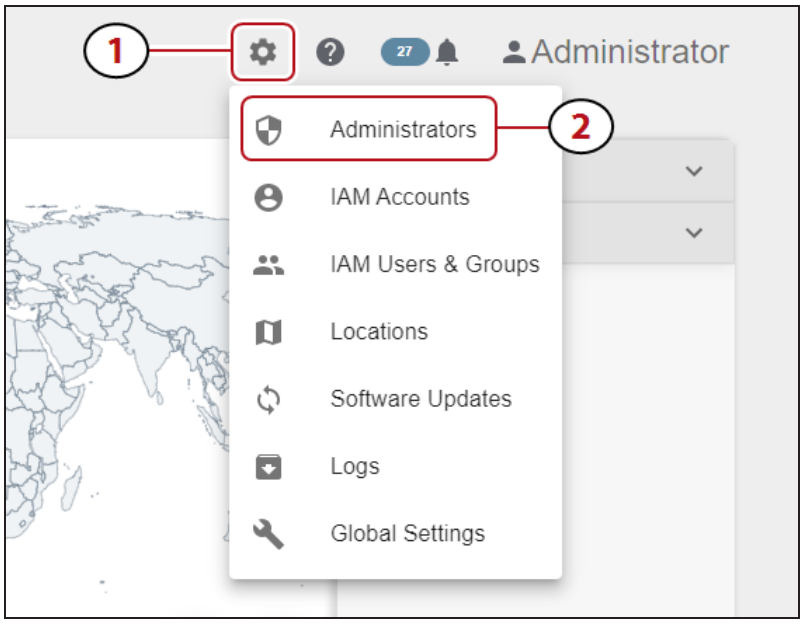


Figure 53 The Dashboard screen - Navigation menu.

2. Under the **Sphere Administrator** banner, (**1**) Select the row of the sphere administrator to edit, and (**2**) click **Edit**.

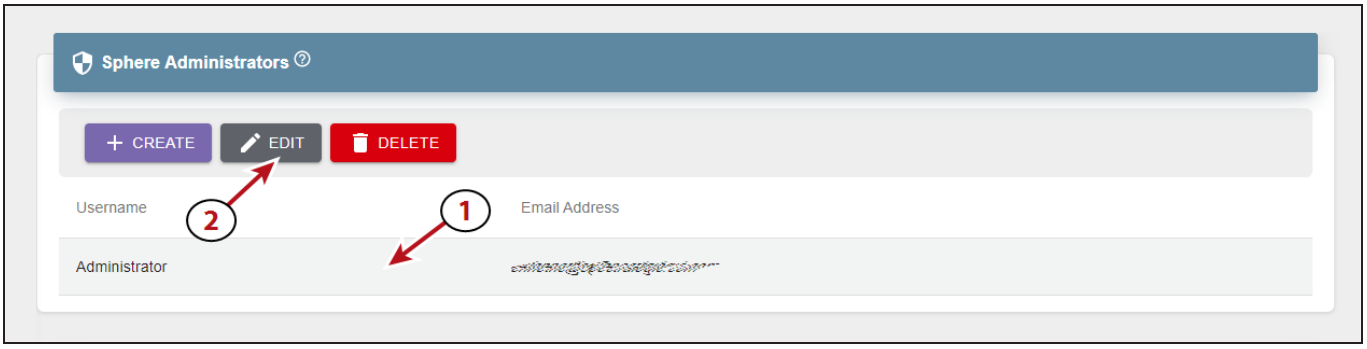


Figure 54 The Sphere Administrators pane.

3. Select **Modify existing attributes** and click **Next**.

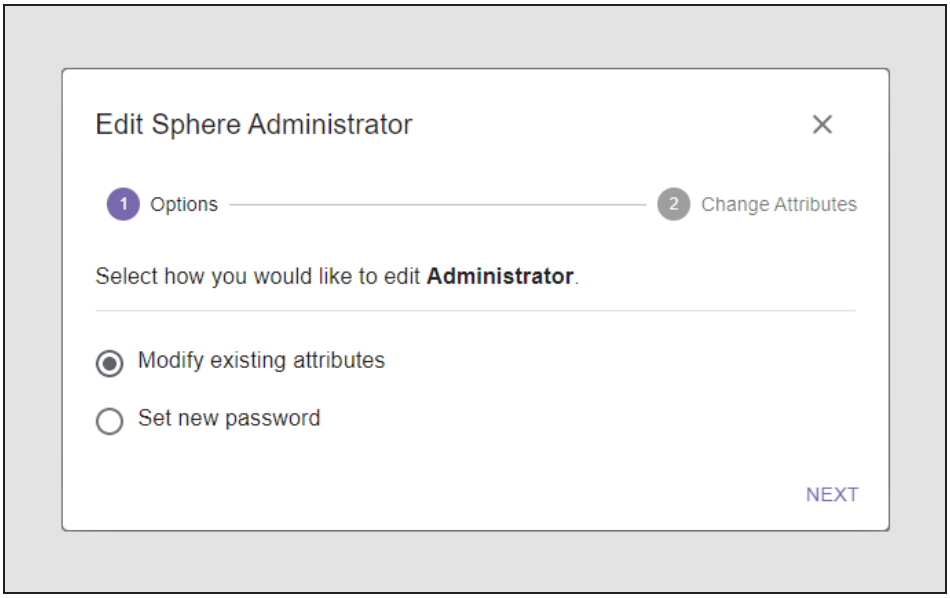


Figure 55 The Edit Sphere Administrator - Options screen.

4. Change the **Email Address** or the types of email the sphere administrator receives, and click **Submit**. See Step 5 for a description of email types.

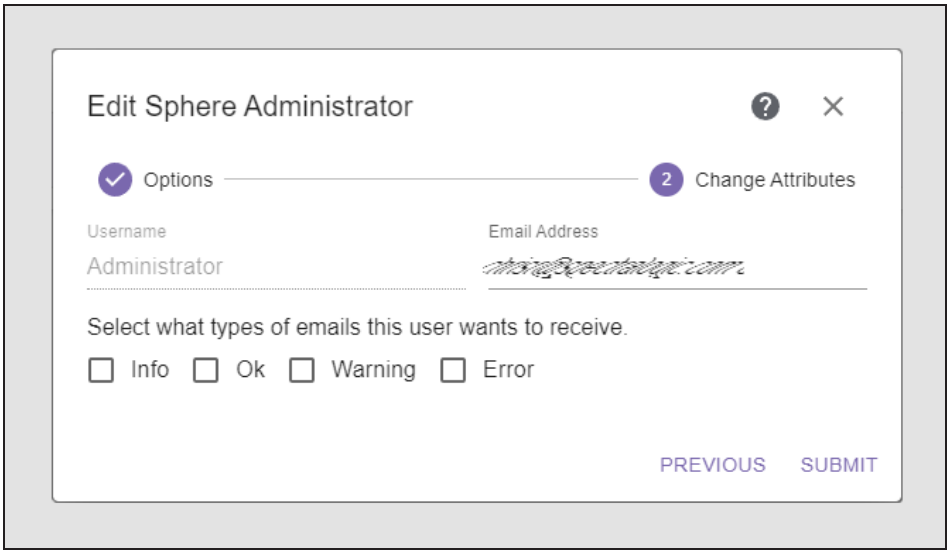


Figure 56 The Edit Sphere Administrator - Change Attributes screen.

Delete a Sphere Administrator

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **Administrators** (**2**).

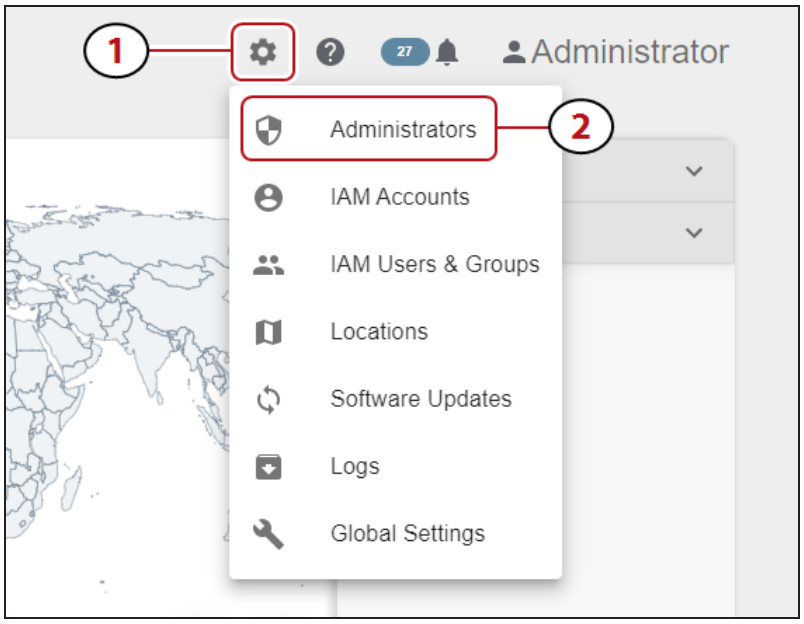


Figure 57 The Dashboard screen - Navigation menu.

2. Under the **Sphere Administrator** banner, (**1**) Select the row of the sphere administrator to delete, and (**2**) click **Delete**.

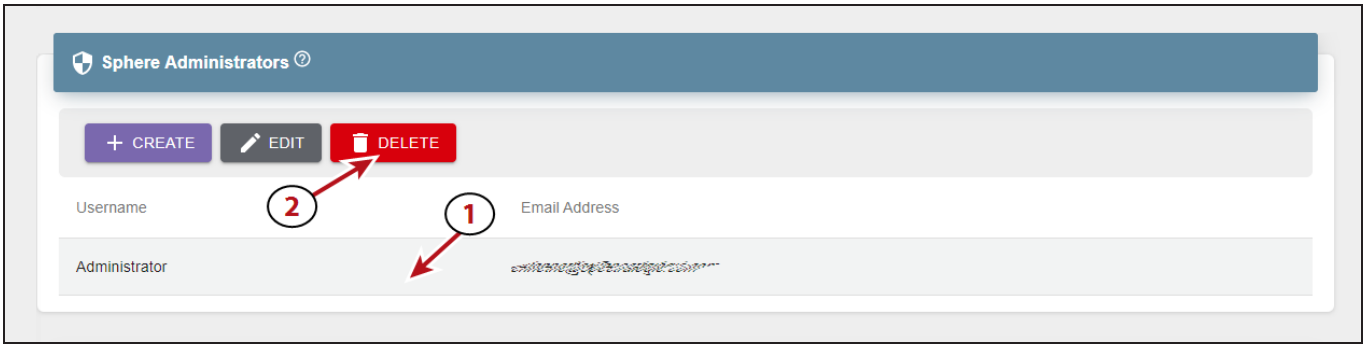


Figure 58 The Sphere Administrators pane.

3. Click **Delete** to permanently delete the sphere administrator.

CONFIGURE & MANAGE OBJECT MANAGER ADMINISTRATOR - LOCAL CONTROL

Object Manager administrator account has full access to configure and change all system settings. The Object Manager application administrator in a local control configuration is created and managed using the BlackPearl Storage Manager user interface. The instructions in this section assume familiarity with the BlackPearl Storage Manager and administrator login credentials.

Use the information in this section to create, edit, or delete a sphere administrator when using a local controlled Object Manager application.

Create a Object Manager Administrator

1. From the menu bar, select **Configuration > Users.** The Users screen displays.

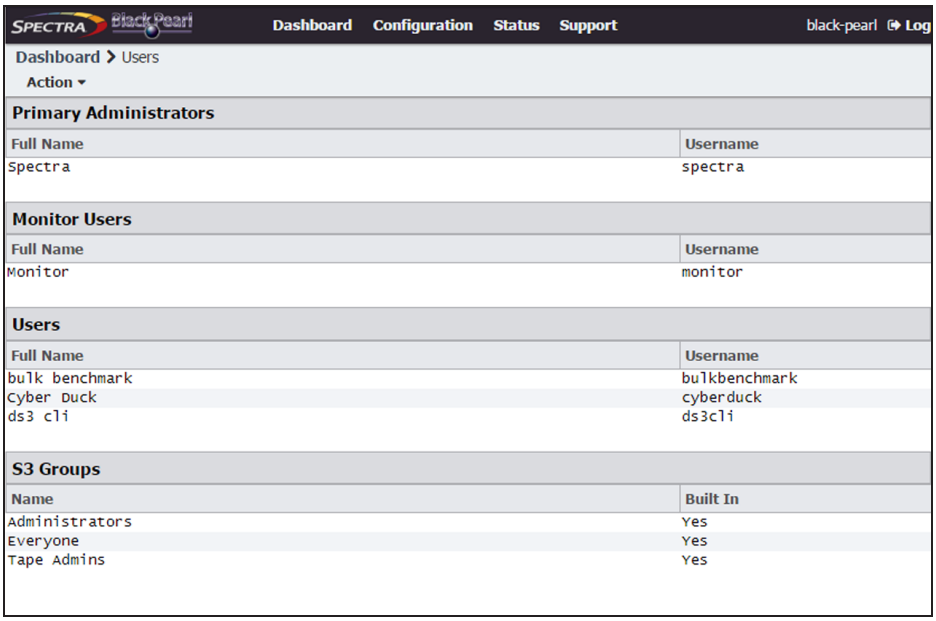


Figure 59 The Users screen.

2. Select **Action > New** from the menu bar. The New User dialog box displays.

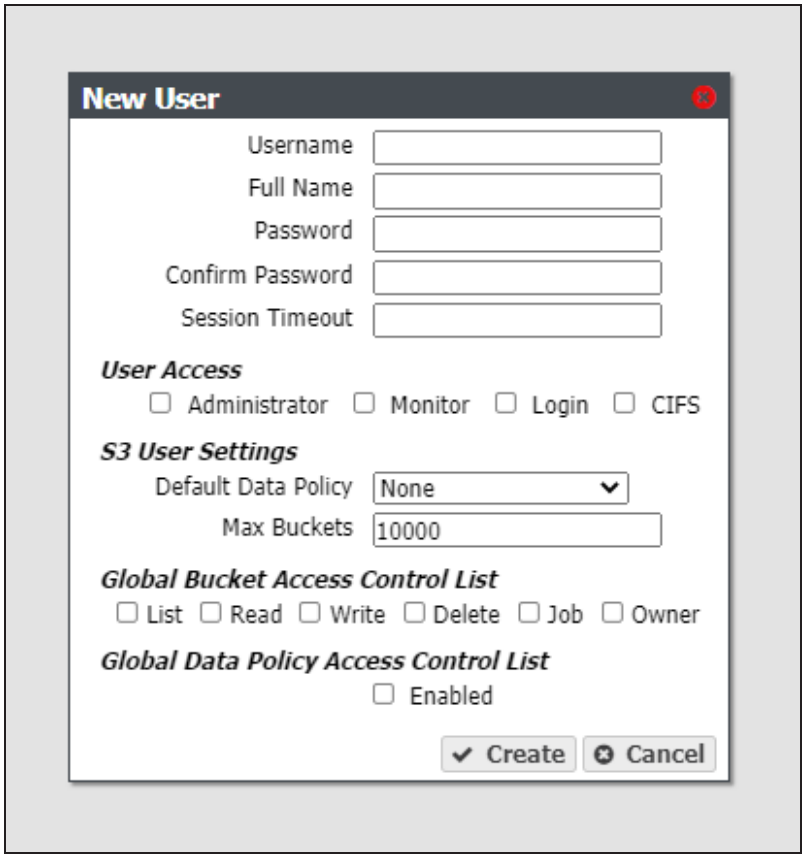


Figure 60 The New User dialog box.

3. Enter the desired **Username** for the user. The Username cannot contain capital letters or spaces and is limited to 16 characters. The Username is used to identify the user in the Object Manager environment.
4. Enter the user's **Full Name**.
5. Enter and confirm the desired **Password** for the user.
6. If desired, enter the value for the **Session Timeout** in minutes. This value cannot exceed 999 minutes.
7. Select Administrator and Login **User Access** permissions.
8. From the drop-down list, select a **Default Data Policy** for the user. If specified, the BlackPearl Storage Manager uses the selected data policy for all buckets created by the user, unless a different policy is specified during bucket creation.
9. Enter a value for the **Max Buckets** the user is allowed to create. The default value of 10000 is pre-entered.

10. Select or clear options for the **Global Bucket Access Control List**. These options give or deny permission for the user being created to perform the action described in the table below, for all buckets present on the BlackPearl Storage Manager, as well as any buckets created at a future date.

Name	Description
List	The user can see the bucket and can list the objects in a bucket.
Read	The user can get objects and create GET jobs.
Write	The user can put objects and create PUT jobs.
Delete	The user can delete objects, but cannot delete the bucket.
Job	The user can modify or cancel jobs created by other users. The user can also see the details of jobs created by other users. **Note:** All users can view all jobs, but by default, only the initiator of the job can see the full details of a job.
Owner	The user receives full access to all buckets, including all permissions listed above.

11. If desired, under **Global Data Policy Access Control List**, select the check box to allow the user access to any data policy created on the BlackPearl Storage Manager.

12. Click **Create** to create the new user. The BlackPearl Storage Manager generates a unique S3 Access ID and Secret Key for the user.

Change a Object Manager Administrator Password

1. From the right side of the menu bar, select ***Current User*> User Profile**. The User Profile screen displays.
2. Select **Action >Edit**. The Edit User Screen displays.

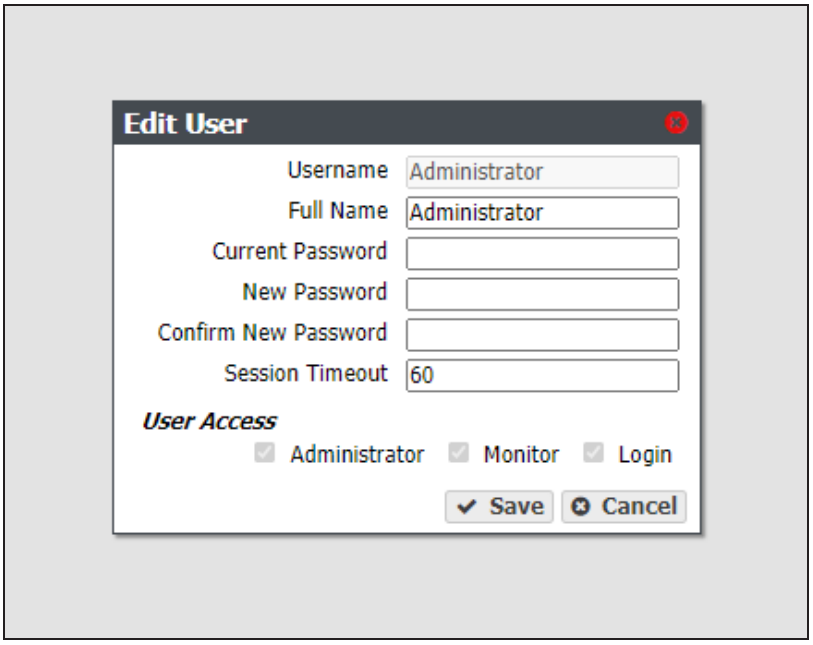


Figure 61 The Edit User dialog box.

3. If desired, edit the user's **Full Name**.
4. If you are changing the password, enter the desired **New Password**, then **Confirm New Password**.

Note: The new password does not take effect until after you log out of the BlackPearl user interface.

5. If desired, edit the value for the **Session Timeout** in minutes. This value cannot exceed 999 minutes.
6. Click **Save**.

Delete a Object Manager Administrator

1. From the menu bar, select **Configuration > Users**. The Users screen displays a list of all configured users and S3 groups.
2. Select the user you want to delete, and then select **Action > Delete**. A confirmation window displays.
3. Click **Delete** to delete the user.

CONFIGURE & MANAGE IAM ACCOUNTS

Identity and Access Management (IAM) allows you to control access to resources by assigning permissions to users and groups that allow or deny access to a resource.

Note: When using IAM accounts, Spectra Logic recommends you carefully consider the security requirements associated with IAM accounts and IAM policies. See the following for more information.

https://aws.amazon.com/blogs/security/category/security-identity-compliance/aws-identity-and-access-management-iam/

Add an IAM Account

By default, an IAM account is created when the Object Manager is configured and associated with the sphere. If you have additional IAM accounts and want the Object Manager to access resources associated with other accounts, you can add them as IAM accounts in the Object Manager.

There are two types of IAM accounts, AWS and Local. Use the sections below to add an IAM account:

- **Add an AWS IAM Account on the next page**
- **Add a Local IAM Account on page 117**

Add an AWS IAM Account

Use the section below to add an AWS IAM account.

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Accounts** (**2**).

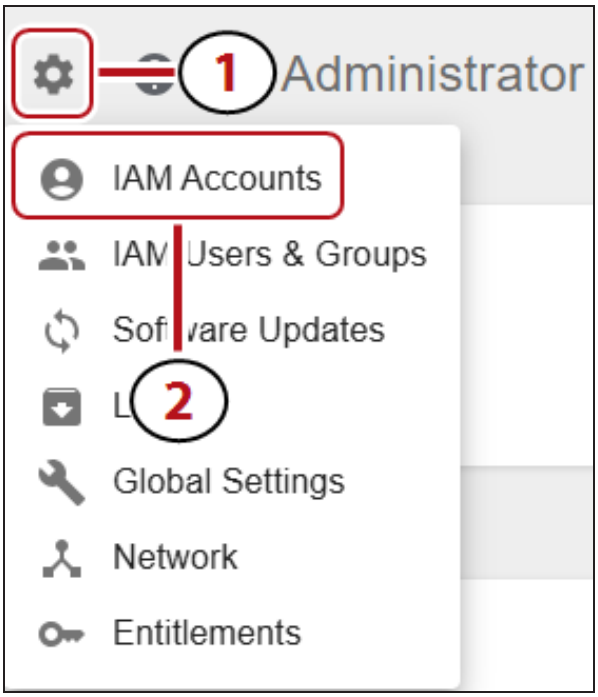


Figure 62 The Dashboard screen - Navigation menu.

2. Under the **IAM Accounts** banner, click **Add**.

Figure 63 The IAM Accounts pane.

3. Select **AWS** if necessary.

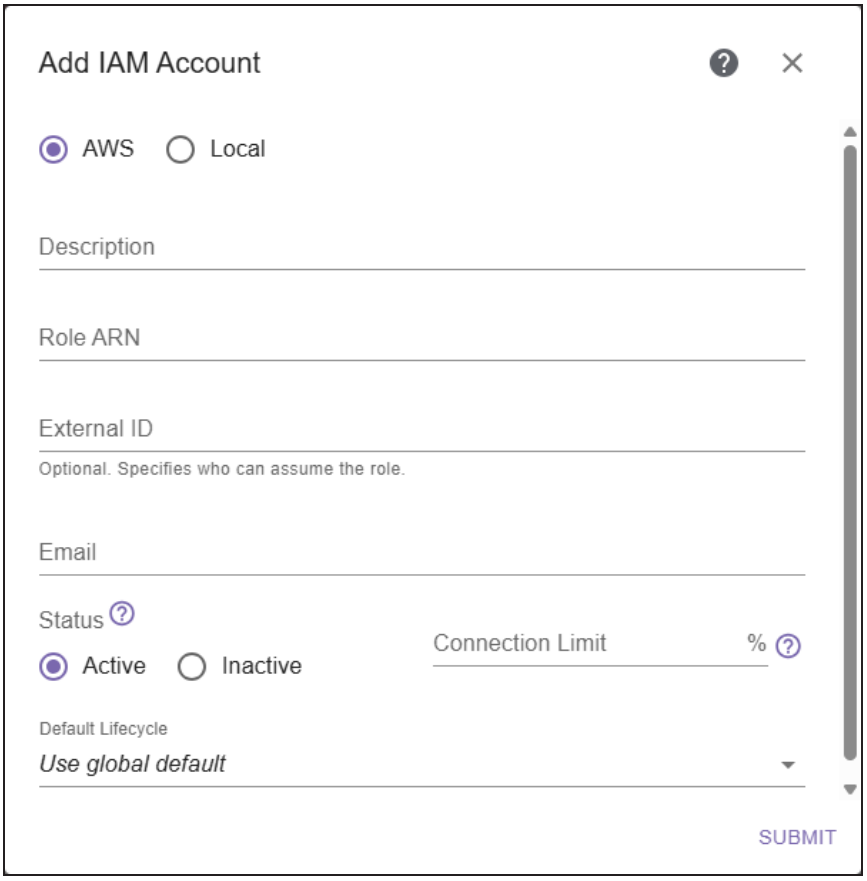


Figure 64 The Add IAM Account screen.

4. If desired, enter a **Description** for the IAM account.
5. Enter the **Role ARN**. The Role ARN is an IAM role that specifies what a user is allowed to do and is used by a user in one AWS account to assume a role in a different AWS account. The Role ARN can be found in the Role page of the AWS account to be added to the Object Manager sphere.

   You must specify the AWS resource using the following format:

   `arn:partition:service:region:account:resource`

Parameter	Description
partition	Identifies the partition containing the resource. For standard AWS regions, the partition is **aws**. For resources in other partitions, use **aws-*partitionname***.
service	Identifies the AWS product. When configuring an AWS user in the Object Manager, use the service name is **iam**.

Parameter	Description
region	This parameter is not used when configuring an AWS user in the Object Manager and must be left blank.
account	The full AWS account ID for the AWS account with no hyphens. This can be found on the My Account screen in the AWS management console. **Note:** You cannot use an AWS account ID alias when configuring an AWS user in the Object Manager.
resource	The name of the specific resource.

6. If desired, enter an **External ID**. The external ID is associated with the IAM role entered in Step 5 and is configured when a role is created in an AWS account. The External ID is required to assume the role created in Step 5. In the AWS management interface, the External ID can be found on the Roles section of the IAM screen, in the **Trusted relationships** tab.
7. Enter the **Email** address of the owner of the AWS account. This email address can be found on the AWS Dashboard and is listed as the **Management Account Email Address**.
8. If desired, set **Status** to Inactive. Inactive accounts cannot access the Object Manager sphere and all access keys for this account are marked as inactive.
9. If desired, set a **Connection Limit** for the IAM account. This setting limits the number of connections that can be used by the IAM account as a percentage of total system connections.

Note: An empty value is treated as 100%.

10. Use the drop-down menu to select a **Default Lifecycle**.
11. Click **Submit**.

Add a Local IAM Account

Use the section below to add a local IAM account.

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Accounts** (**2**).

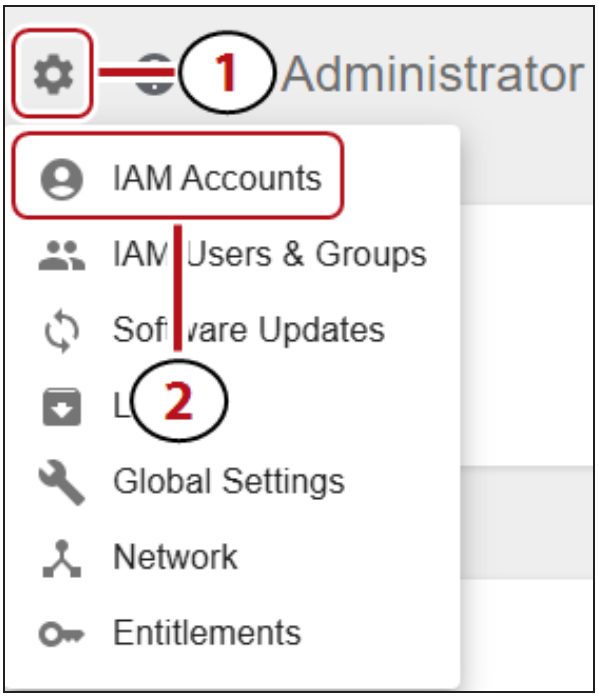


Figure 65 The Dashboard screen - Navigation menu.

2. Under the **IAM Accounts** banner, click **Add**.

Figure 66 The IAM Accounts pane.

3. Select **Local**.

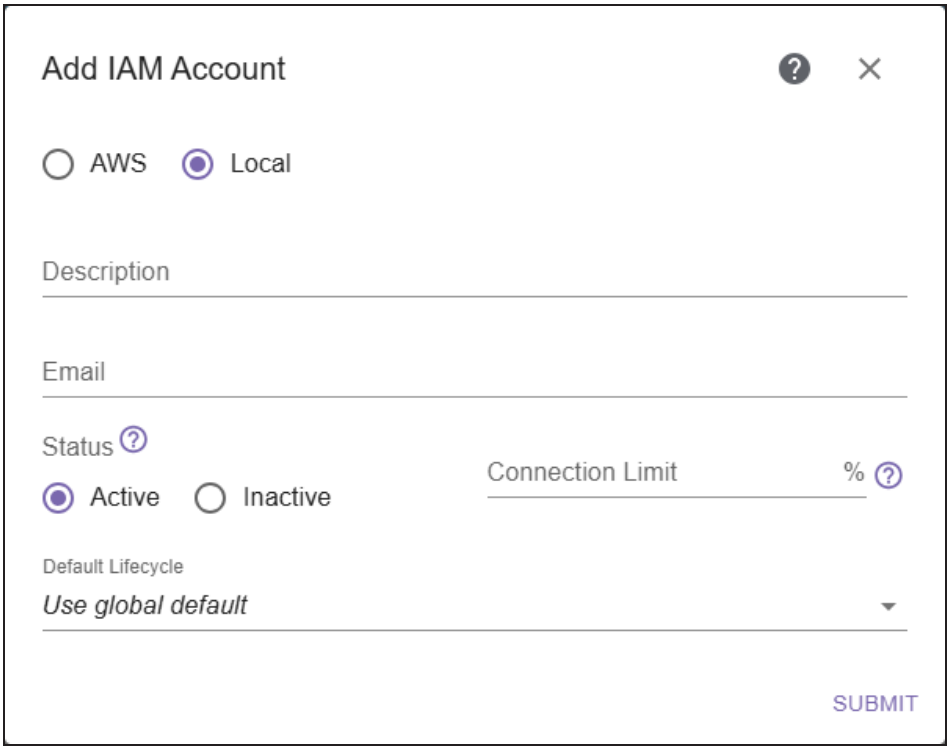


Figure 67 The Add IAM Account screen.

4. If desired, enter a **Description** for the IAM account.
5. Enter the **Email** address of the owner of the account.
6. If desired, set **Status** to Inactive. Inactive accounts cannot access the Object Manager sphere.
7. If desired, set a **Connection Limit** for the IAM account. This setting limits the number of connections that can be used by the IAM account as a percentage of total system connections.

Note: An empty value is treated as 100%.

8. Use the drop-down menu to select a **Default Lifecycle**.
9. Click **Submit**.

View IAM Account Details

After creating an IAM account, you can look at the details of the IAM account.

Here is how to view IAM account details:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Accounts** (**2**).

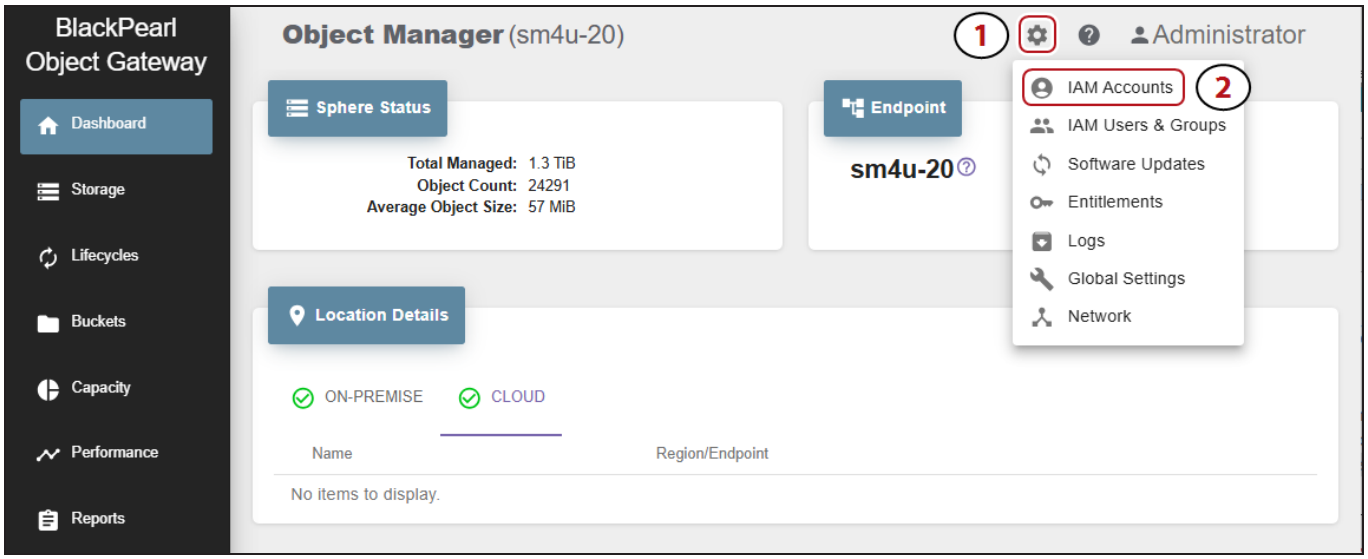


Figure 68 The Dashboard screen - Navigation menu.

2. Under the **IAM Accounts** banner, (**1**) select the row of the IAM account to view, and (**2**) click the **View Details** symbol.

Figure 69 The IAM Accounts pane.

3. The Properties window displays the configured settings for the selected IAM account.

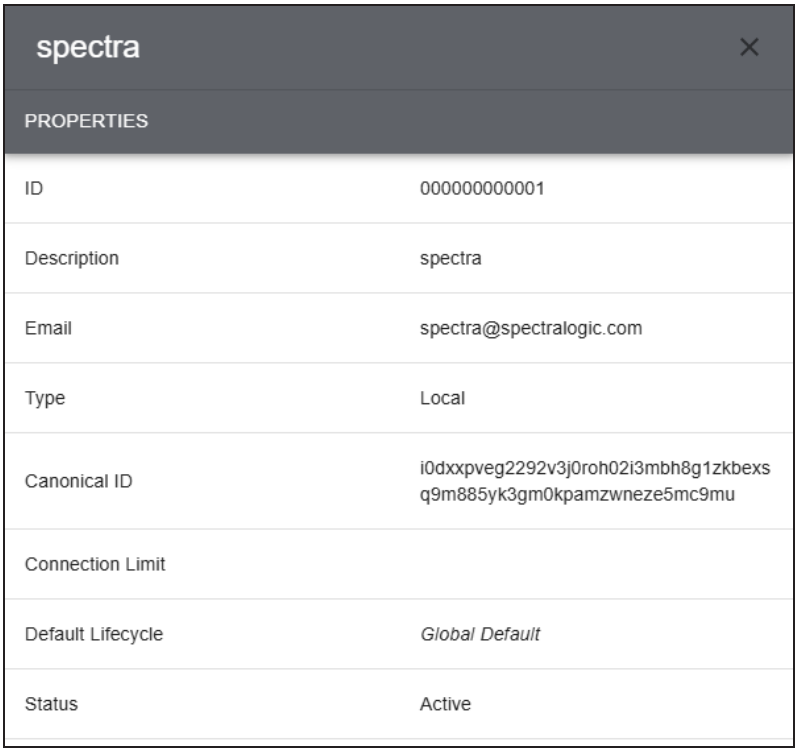


Figure 70 The IAM Accounts Properties window.

Edit an IAM Account

When editing an IAM account, only the email address and description can be changed.

Here is how to edit an IAM account:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Accounts** (**2**).

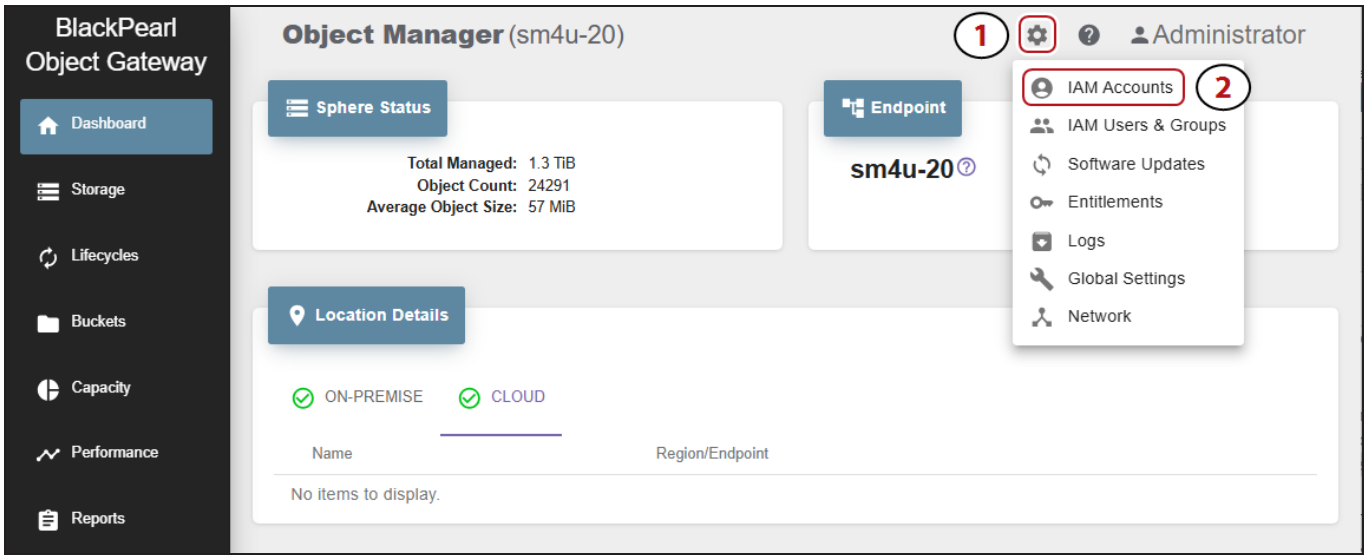


Figure 71 The Dashboard screen - Navigation menu. Editing Note - Leaving this image alone if you don't like the zoomed in look of the above.

2. Under the **IAM Accounts** banner, (**1**) select the row of the IAM account to edit, and (**2**) click **Edit**.

Figure 72 The IAM Accounts pane.

3. Change the **Email** address, **Description**, and **Status** as desired and click **Submit**.

Delete an IAM Account Association

If desired, you can delete an IAM account that is associated with the Object Manager sphere. You cannot delete an account association if that IAM account in being used by the Object Manager sphere.

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Accounts** (**2**).

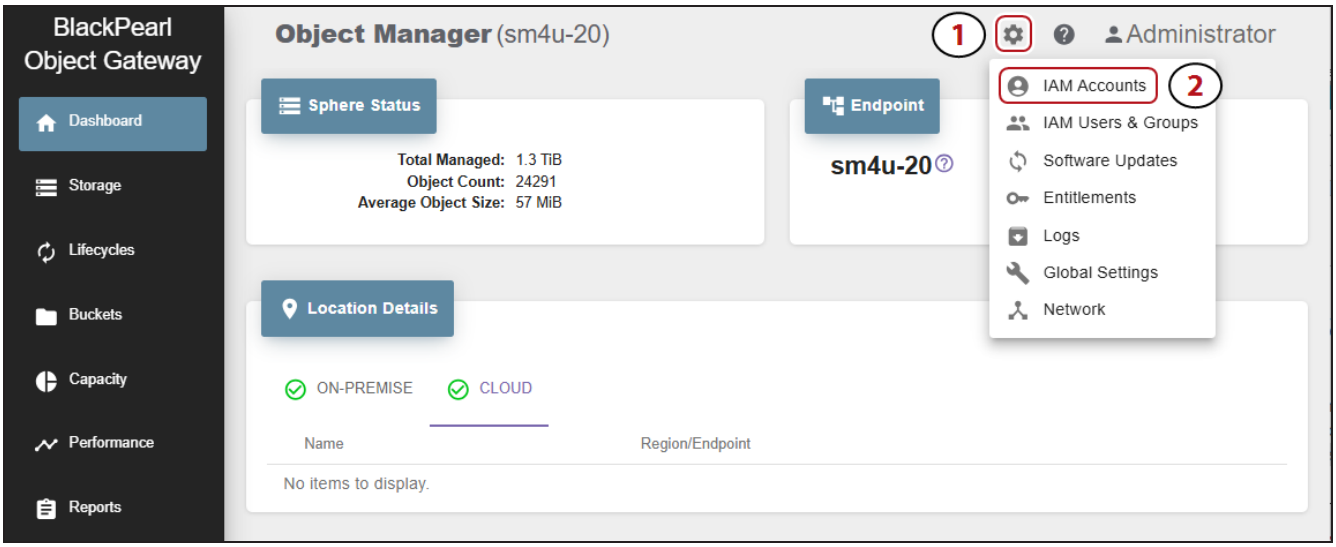


Figure 73 The Dashboard screen - Navigation menu.

2. Under the **IAM Accounts** banner, (**1**) select the row of the IAM account to delete, and (**2**) click **Delete**.

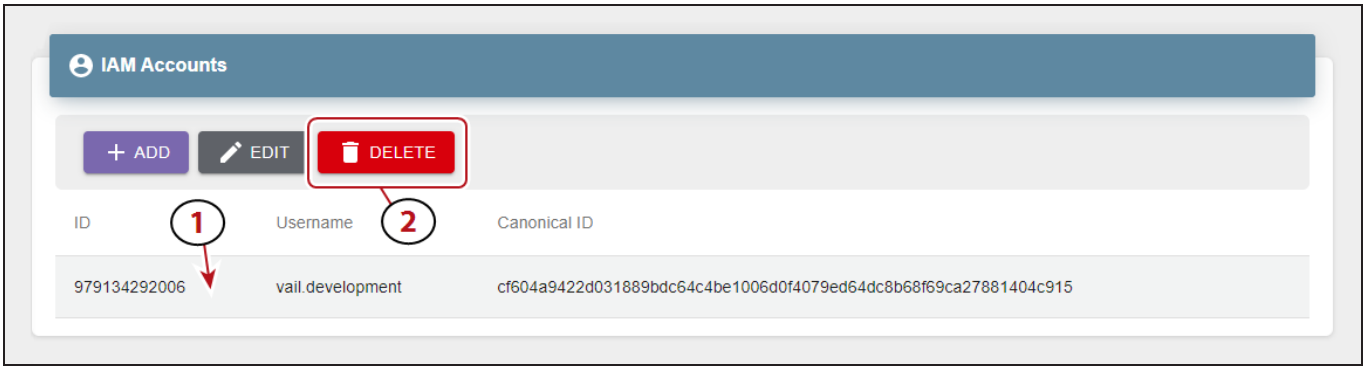


Figure 74 The IAM Accounts pane.

3. Click **Delete** to delete the IAM account association with the Object Manager.

Note: The IAM account itself is not deleted.

CONFIGURE & MANAGE IAM USERS AND GROUPS

Create an IAM User

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Users & Groups** (**2**).

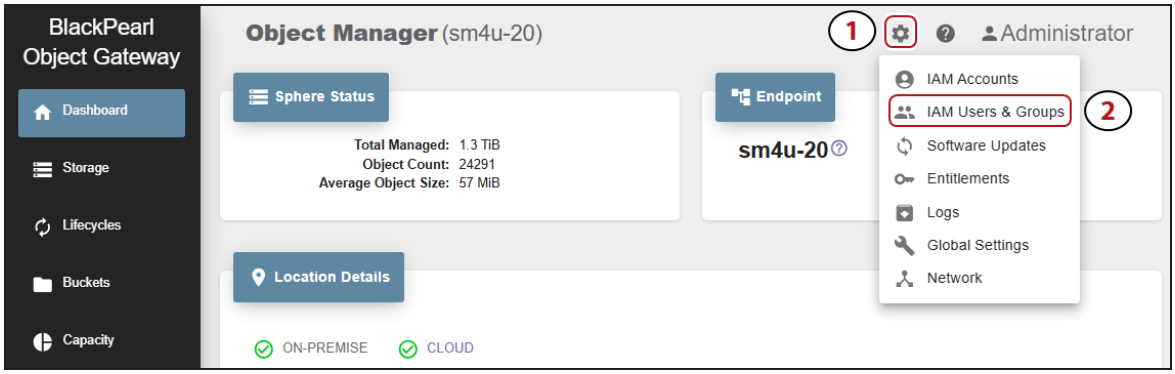


Figure 75 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, click **Create**.
3. Enter the **Username** for the new IAM user. The username cannot exceed 64 characters.

Figure 76 The Create IAM User screen.

4. Click **Submit**.

Note: The username is converted to use all lower-case letters.

View IAM User Details

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Users & Groups** (**2**).

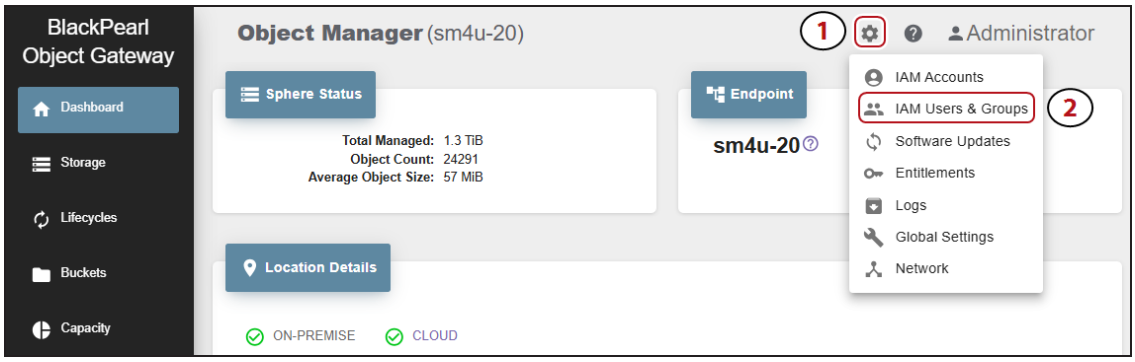


Figure 77 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to view details and click the **View Details** icon on the right end of the row.

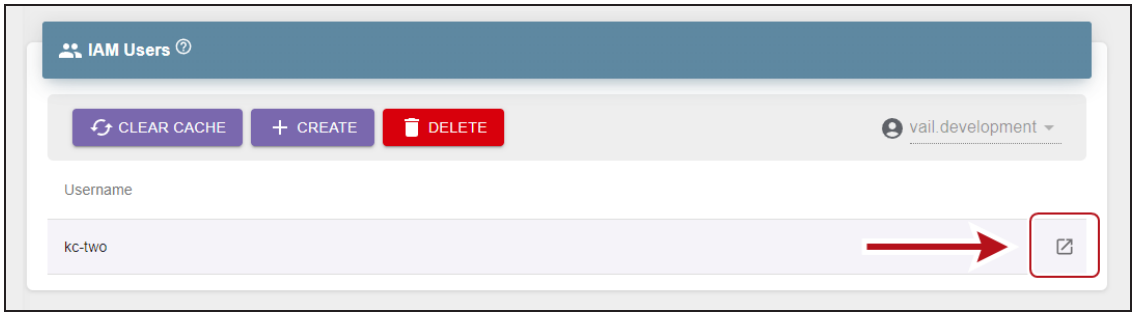


Figure 78 The IAM Users banner - View Details button.

3. The IAM user details screen displays showing the **Properties**, **IAM Groups**, and **Access Keys** for the user.

Add an IAM User to an IAM Group

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (1) and select **IAM Users & Groups** (2).

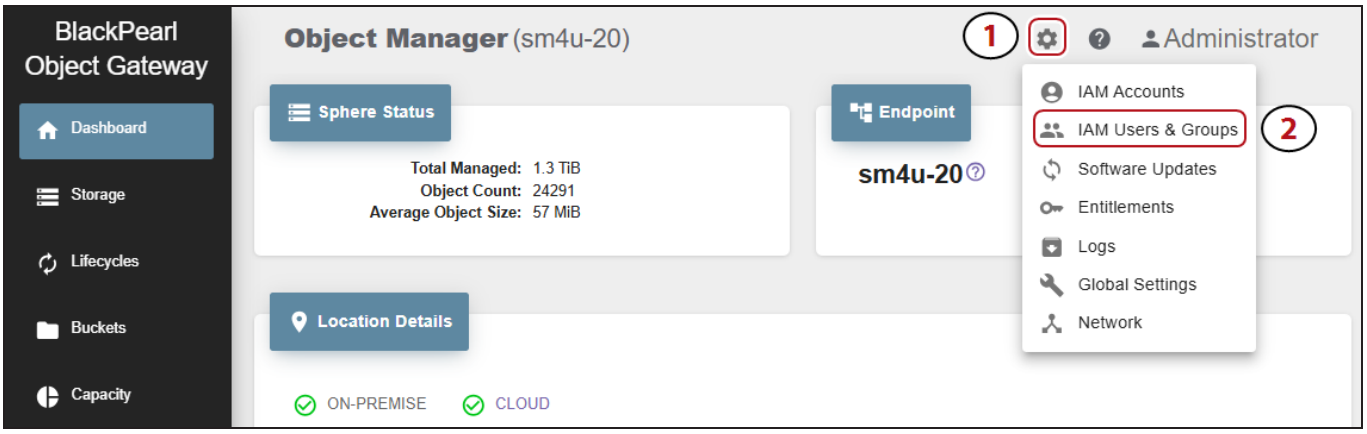


Figure 79 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to add to an IAM group, and click the **View Details** icon on the right end of the row.

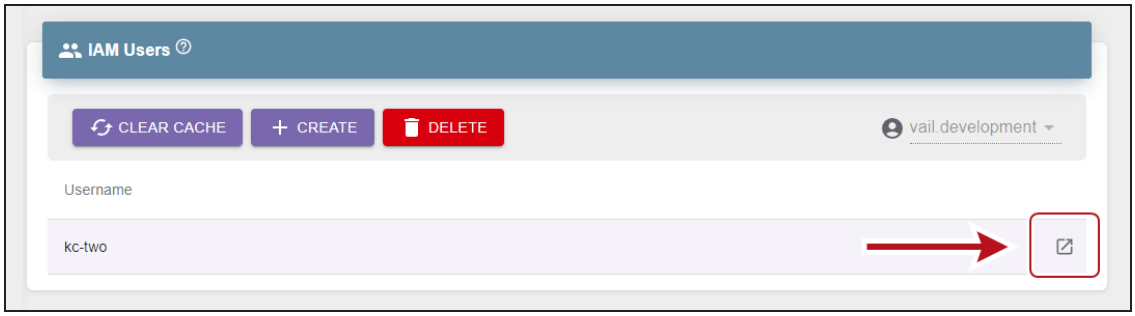


Figure 80 The IAM Users banner - View Details button.

3. Click **IAM Groups**.
4. Use the **Select Group** drop-down menu to select a previously created IAM group.
5. Click **Submit** to confirm adding the user to the IAM group.

Remove an IAM User from an IAM Group

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Users & Groups** (**2**).

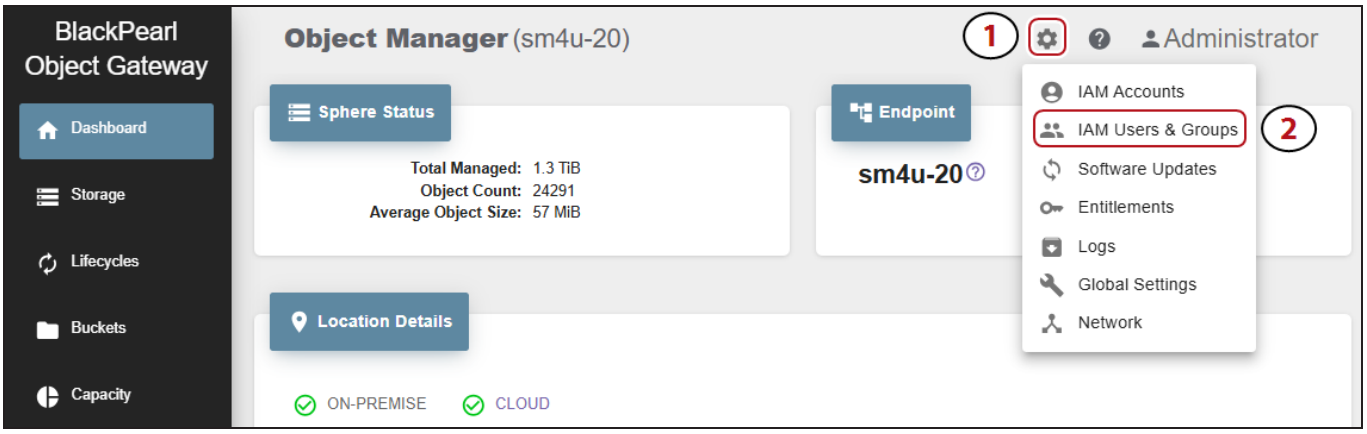


Figure 81 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to remove from an IAM group, and click the **View Details** icon on the right end of the row.

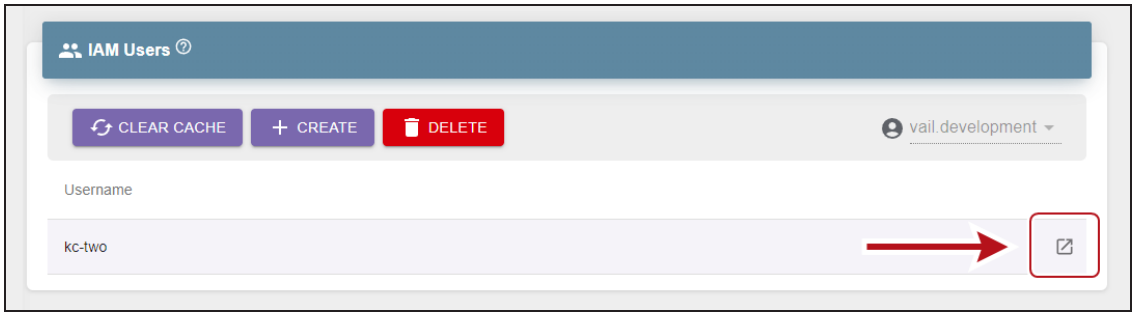


Figure 82 The IAM Users banner - View Details button.

3. Click **IAM Groups**.
4. **Select** the row of the group, then click **Remove**.

Delete an IAM User

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Users & Groups** (**2**).

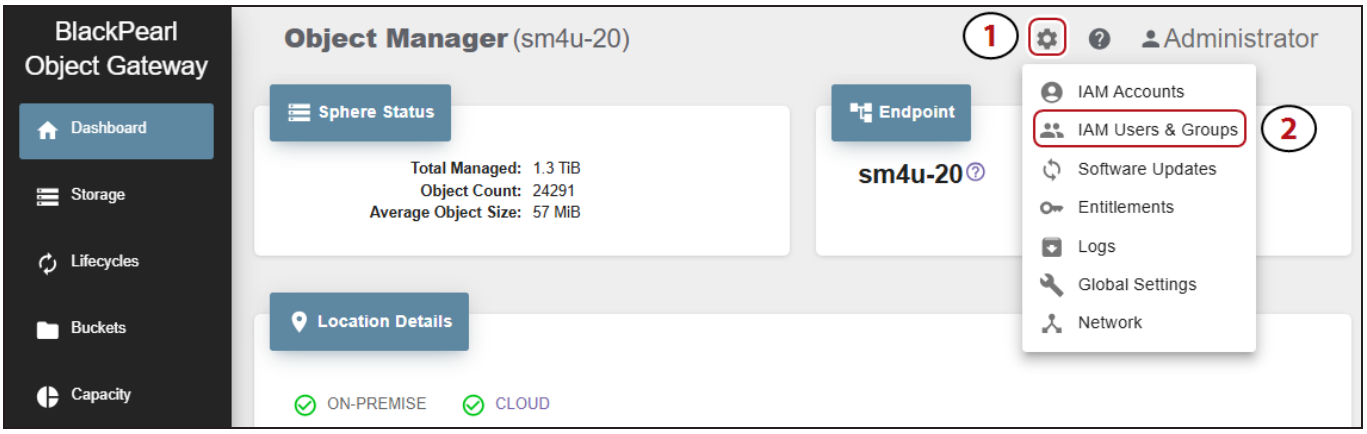


Figure 83 The Dashboard screen - Navigation menu.

2. Under the **IAM Users**banner, select the row of the user to delete, and click **Delete**.
3. Click **Delete** to confirm deleting the IAM user.

Note: When an IAM user is deleted, the AWS access key assigned to the user is also deleted.

Create an IAM Group

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Users & Groups** (**2**).

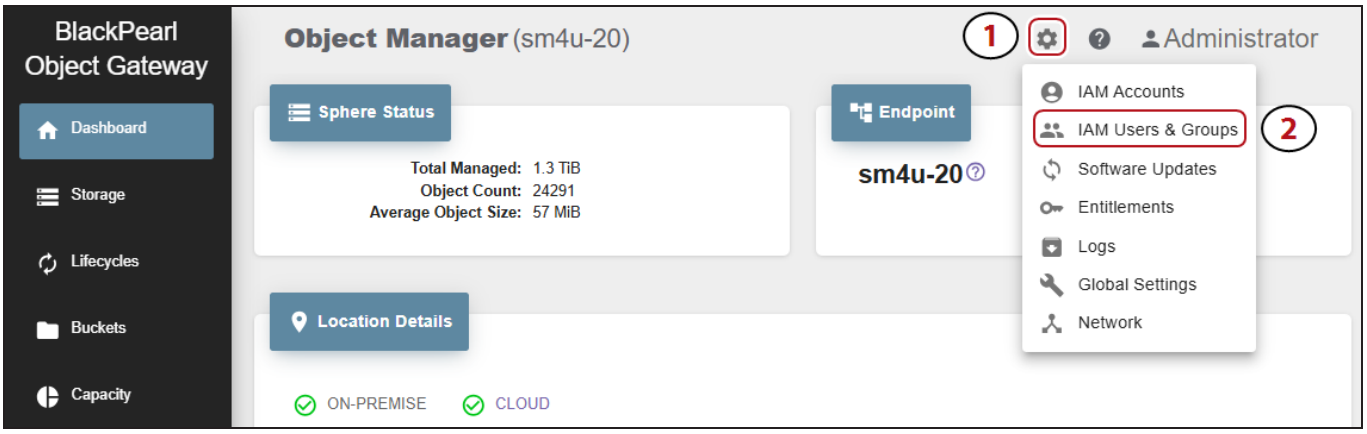


Figure 84 The Dashboard screen - Navigation menu.

2. Under the **IAM Groups** banner, click **Create**.
3. Enter the **Name** for the new IAM Group.
4. Click **Submit**.

Delete an IAM Group

1. In the upper right corner of the Object Manager user interface, click the **gear icon** (**1**) and select **IAM Users & Groups** (**2**).

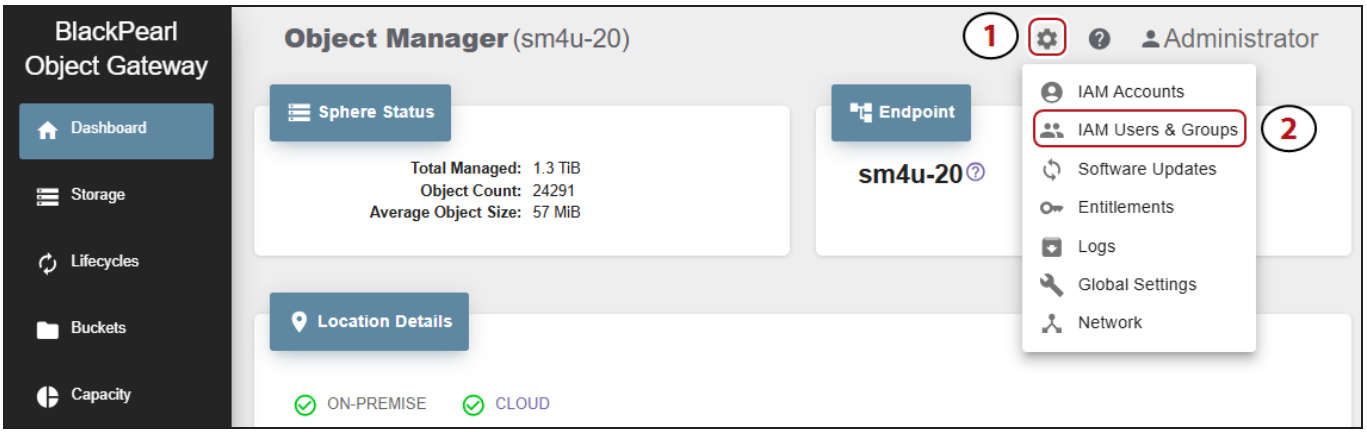


Figure 85 The Dashboard screen - Navigation menu.

2. Under the **IAM Groups** banner, (**1**) select the row of the group to delete, and (**2**) click **Delete**.
3. Click **Delete** to confirm deleting the IAM group.

Create an IAM Group Policy

1. On the IAM Users and Groups screen and under the IAM Groups banner, click **Show Details** on the desired IAM group.

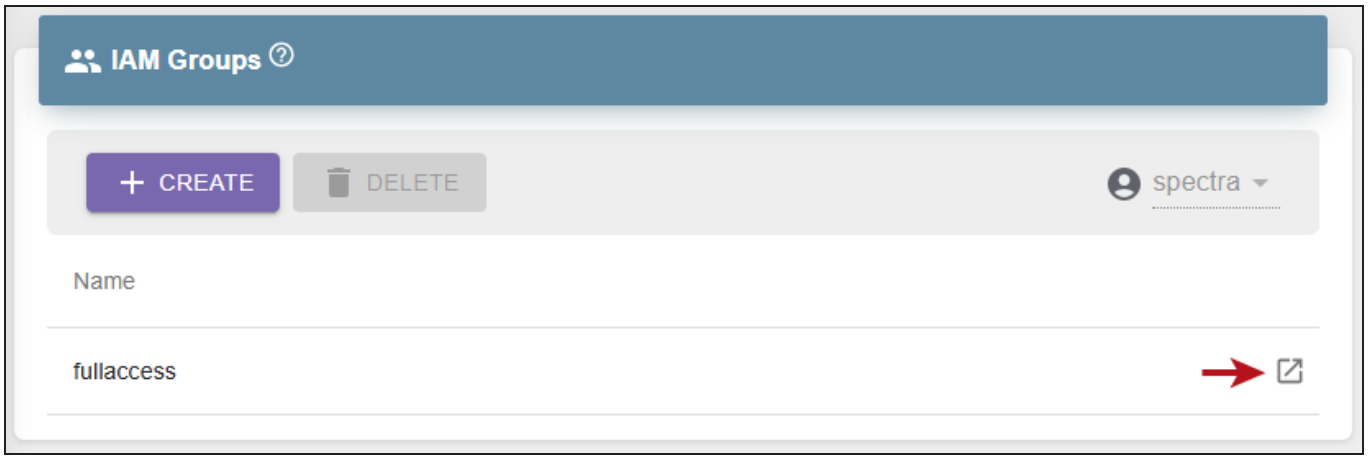


Figure 86 The IAM Users and Groups screen - IAM Groups.

2. On the IAM group details window, select the **Policies** tab at the top, then click **Create**.
3. Enter a **Policy Name** and enter the desired policy.
4. Click **Submit**.

Edit an IAM Group Policy

1. On the IAM Users and Groups screen and under the IAM Groups banner, click **Show Details** on the desired IAM group.

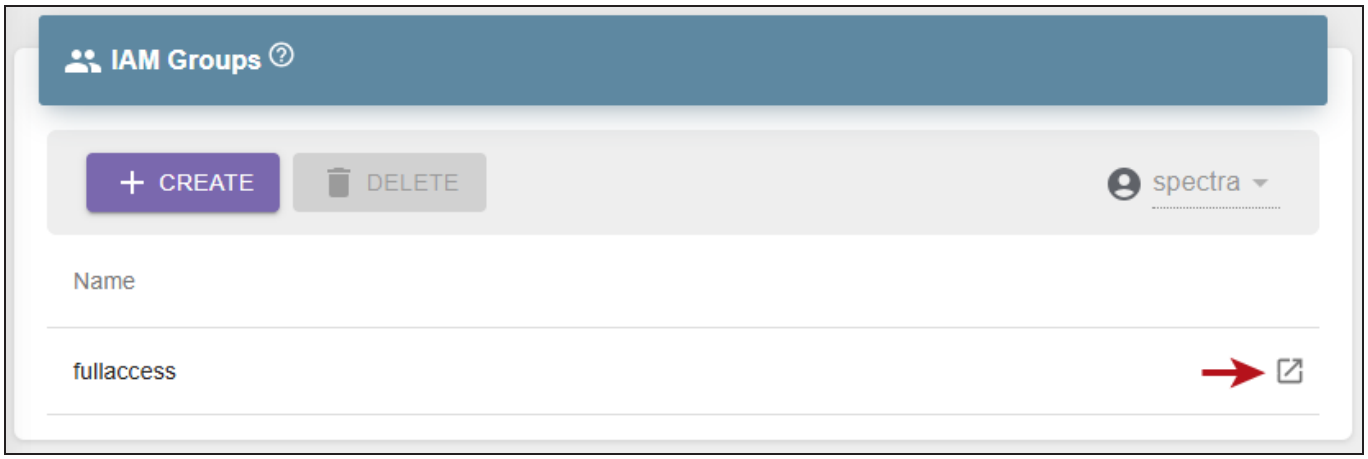


Figure 87 The IAM Users and Groups screen - IAM Groups.

2. On the IAM group details window, select the **Policies** tab at the top.
3. Select the desired policy, then click **Edit**.
4. Edit the policy as required, then click **Submit**.

Delete an IAM Group Policy

1. On the IAM Users and Groups screen and under the IAM Groups banner, click **Show Details** on the desired IAM group.

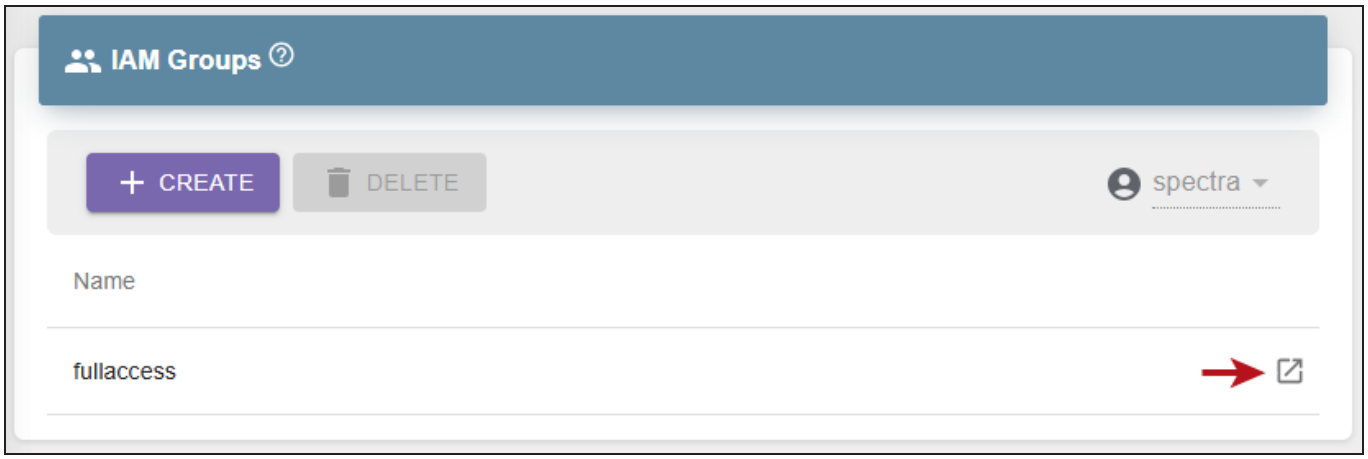


Figure 88 The IAM Users and Groups screen - IAM Groups.

2. On the IAM group details window, select the **Policies** tab at the top.
3. Select the desired policy, then click **Delete**.

AWS Access Key Management

Create an Access Key

If desired, you can create a new AWS access key for use by an IAM user.

1. In the upper right corner of the management console, click the **gear icon** and select **IAM Users & Groups**.

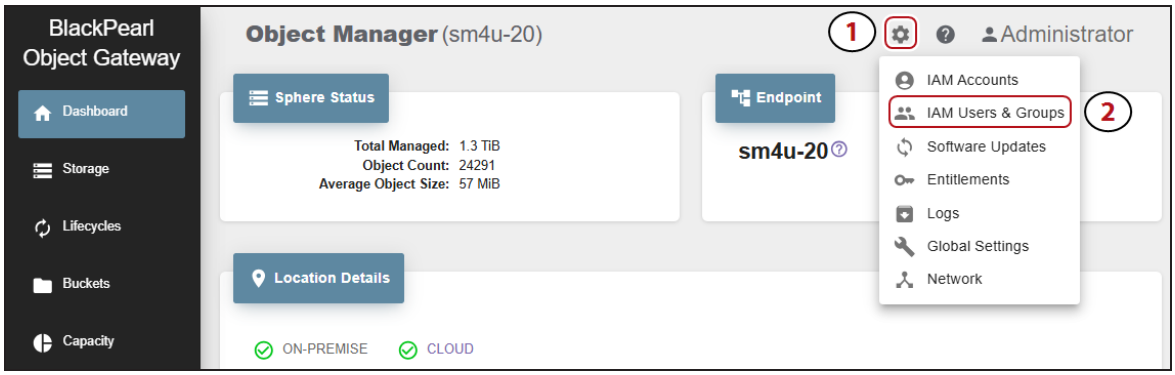


Figure 89 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to create an access key and click the **View Details** icon on the right end of the row.

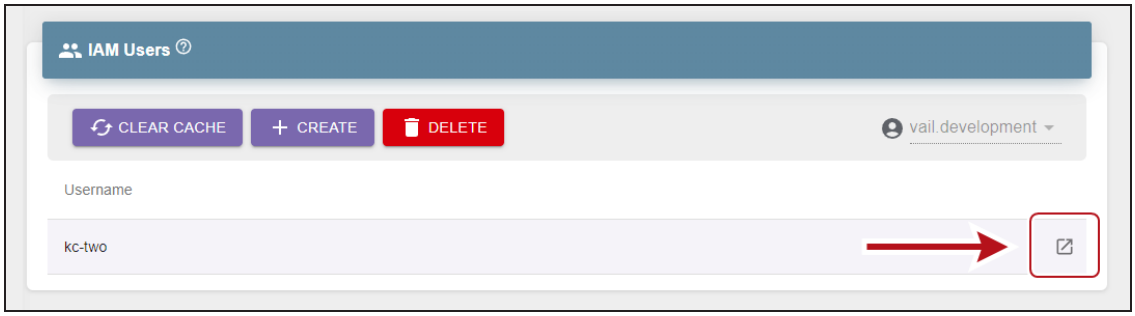


Figure 90 The IAM Users banner - View Details button.

3. Select **Access Keys**.
4. Click **Create**. The new access key displays in the list.

Enable an Access Key

If desired, you can enable a previously disabled AWS access key.

Note: New key(s) created through the Object Manager user interface are automatically enabled.

1. In the upper right corner of the management console, click the **gear icon** and select **IAM Users & Groups**.

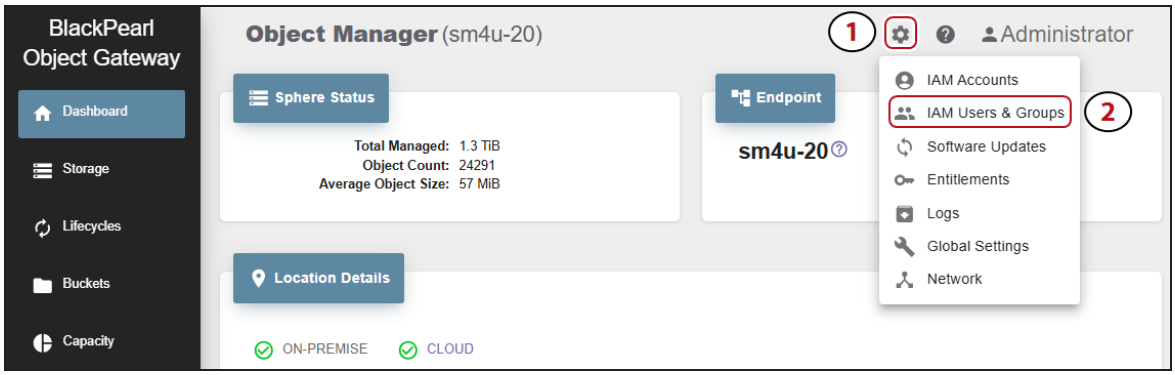


Figure 91 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to enable an access key and click the **View Details** icon on the right end of the row.

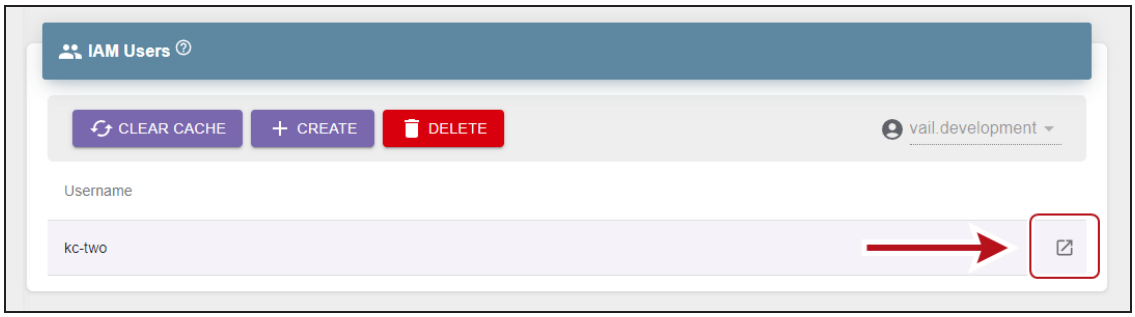


Figure 92 The IAM Users banner - View Details button.

3. Select **Access Keys**.
4. Select the row of the access key you want to enable and click **Enable**.
5. On the confirmation screen, click **Enable**.

Disable an Access Key

If desired, you can disable an access key. The access key is no longer able to be used with the Object Manager, and is also disabled in the user's AWS account.

Note: The AWS access key can be re-enabled at a later date.

Here is how to disable a user access key:

1. In the upper right corner of the management console, click the **gear icon** and select **IAM Users & Groups**.

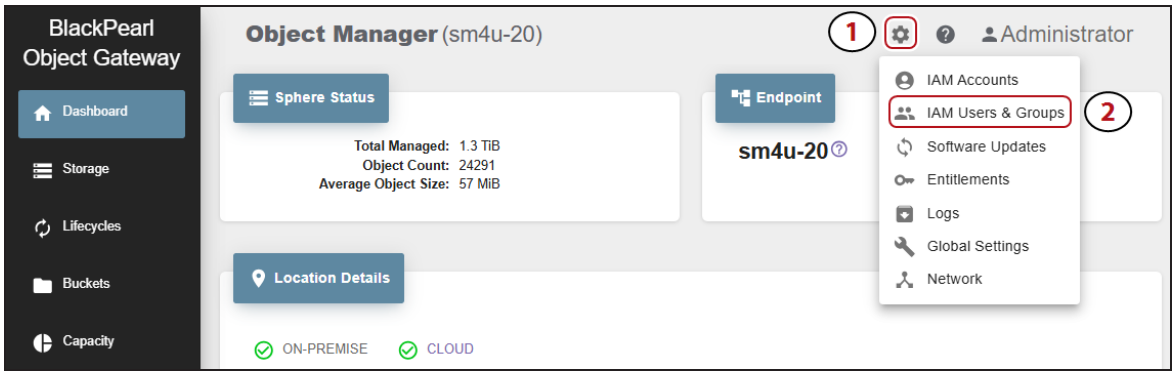


Figure 93 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to disable an access key and click the **View Details** icon on the right end of the row.

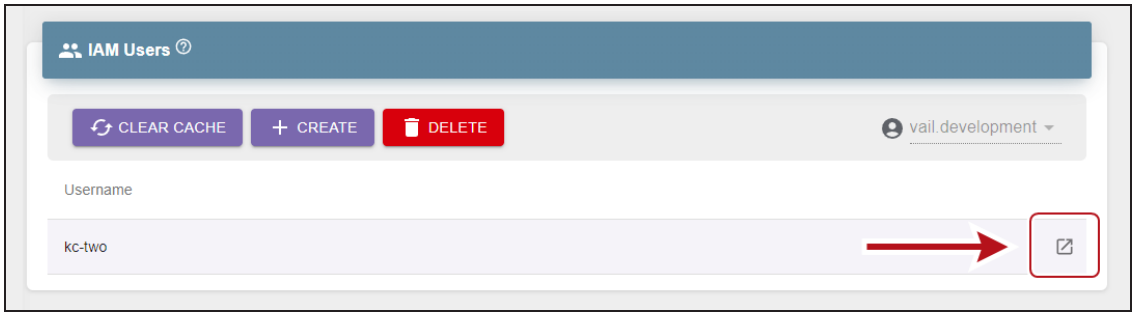


Figure 94 The IAM Users banner - View Details button.

3. Select **Access Keys**.

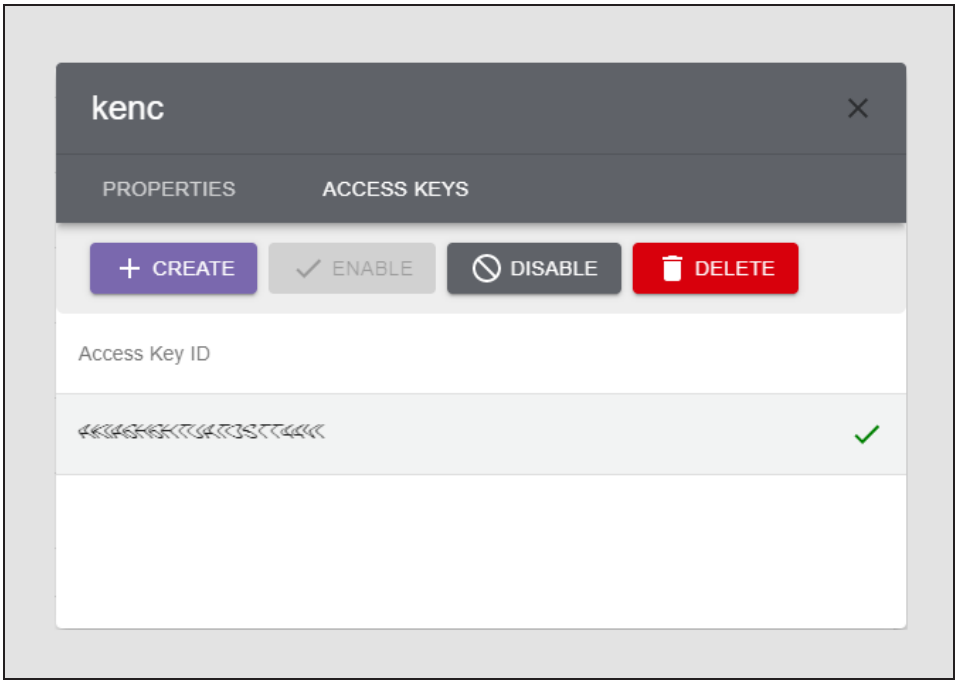


Figure 95 The User Properties - Access Keys screen.

4. Select the row of the key you want to disable and click **Disable**.
5. On the confirmation screen, click **Disable**.

Delete an Access Key

If desired, you can delete an AWS access key for an IAM user. This is helpful if the AWS access key credentials are compromised, or if required by your company security policy.

Here is how to delete an AWS access key:

1. In the upper right corner of the management console, click the **gear icon** and select **IAM Users & Groups**.

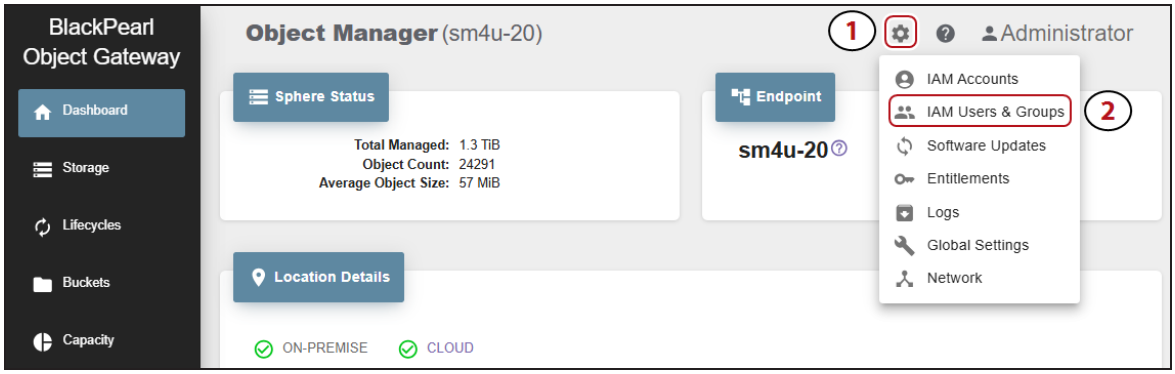


Figure 96 The Dashboard screen - Navigation menu.

2. Under the **IAM Users** banner, locate the row of the user for which you want to delete an access key and click the **View Details** icon on the right end of the row.

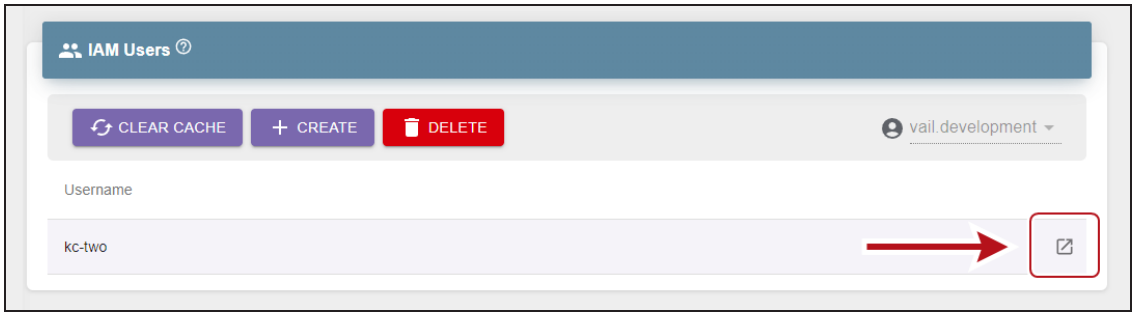


Figure 97 The IAM Users banner - View Details button.

3. Select **Access Keys**.
4. Select the row of the key you want to delete and click **Delete**.
5. Click **Delete** to confirm deleting the access key. The key is deleted from the IAM user account in the Object Manager, and deleted from the associated AWS account.

Chapter 5 - Using Object Manager

This chapter describes using the Object Manager.

VIEW CAPACITY INFORMATION

The Capacity page allows you to see data capacity information for the Object Manager sphere endpoints, each configured location, and cloud storage.

Note: Capacity values for BlackPearl storage display zeros until data is written to the storage.

In the Object Manager user interface taskbar, click **Capacity**.

The Capacity screen is separated into three sections:

- The **Sphere Endpoint Physical Capacity** pane displays the combined total of all configured BlackPearl, Object Manager VM node, and cloud storage endpoints.

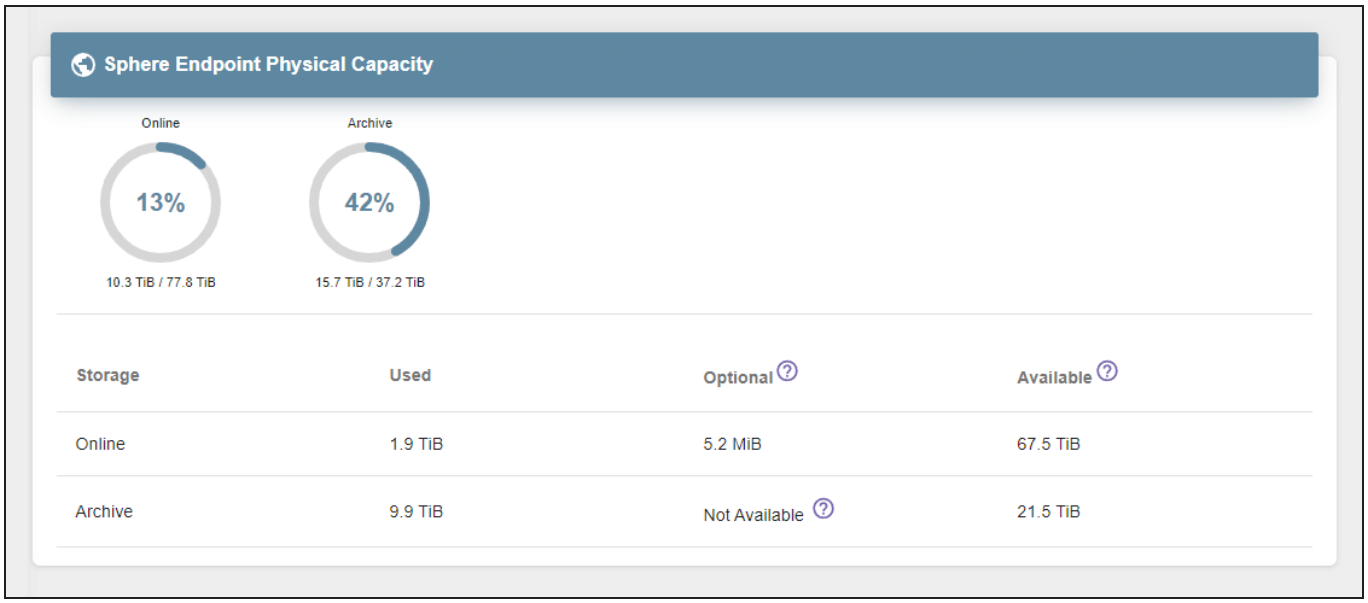


Figure 98 The Sphere Endpoint Physical Capacity pane.

Field	Description
Storage	The type of storage.
Used	The amount of space used for each storage type.
Optional	The amount of space used by the optional clones. There is a delay before this field is populated after creating storage.
Available	The available space used for each storage type. **Note:** Available capacity does not account for capacity used by file system overhead.

- The **Location Capacity** pane displays data capacity information for each configured location. Buttons in the top left of the pane allow you to view information for each location.

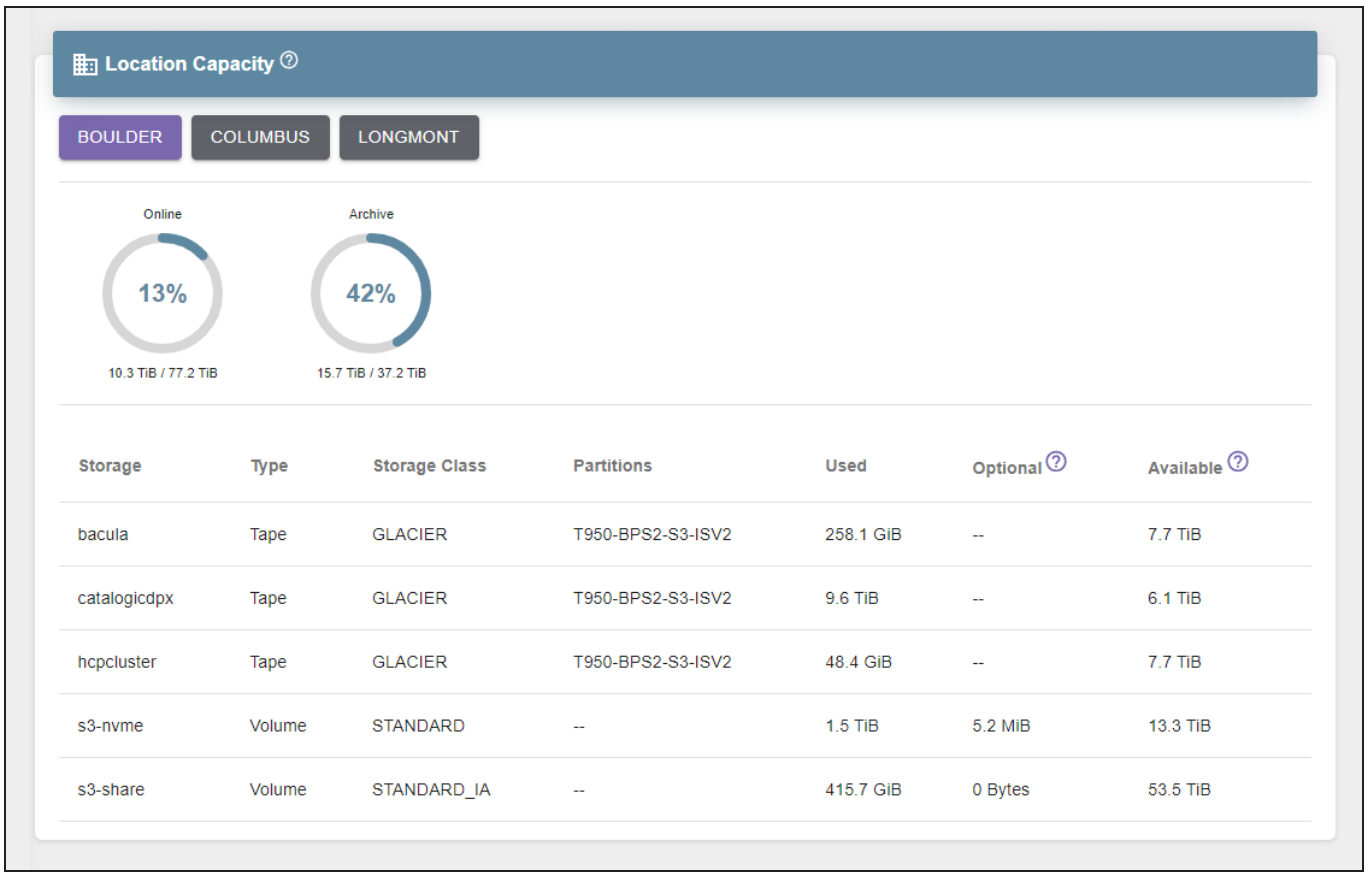


Figure 99 The Location Capacity pane.

Field	Description
Storage	The name of the location.
Type	The type of storage used for each location. **Tape**- Storage on tape media on a BlackPearl system. **Volume** - Storage on disk volume storage on a BlackPearl system.
Storage Class	The storage class used by the storage location.
Partitions	The BlackPearl data partition(s) that are used for storage.
Used	The amount of space used for each location.
Optional	The amount of space used for optional object clones.
Available	The available space used for each location. BlackPearl storage is over-provisioned, and may be used by multiple storage endpoints. **Note:** Available capacity does not account for capacity used by file system overhead.

- The **Cloud Capacity** pane displays aggregated data capacity information for each type of storage class used by cloud endpoints.

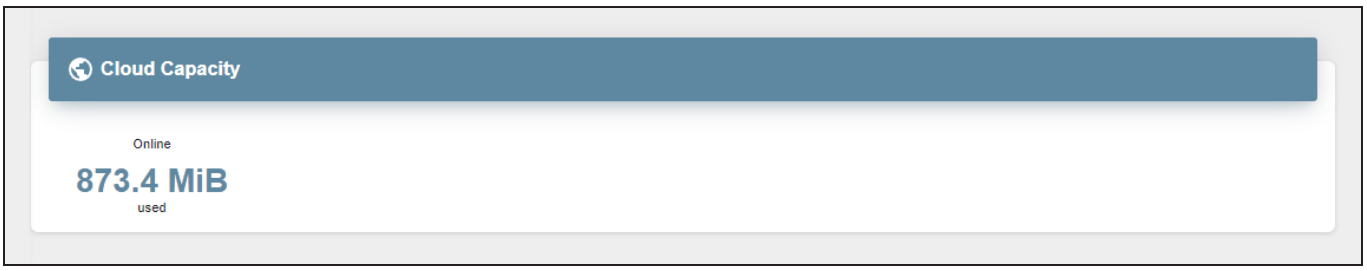


Figure 100 The Cloud Capacity pane.

VIEW PERFORMANCE METRICS

The Performance page displays data transfer and operation performance for the Object Manager sphere and all configured endpoints. The performance graphs display information in five minute or one day intervals.

In the Object Manager user interface taskbar, click **Performance**.

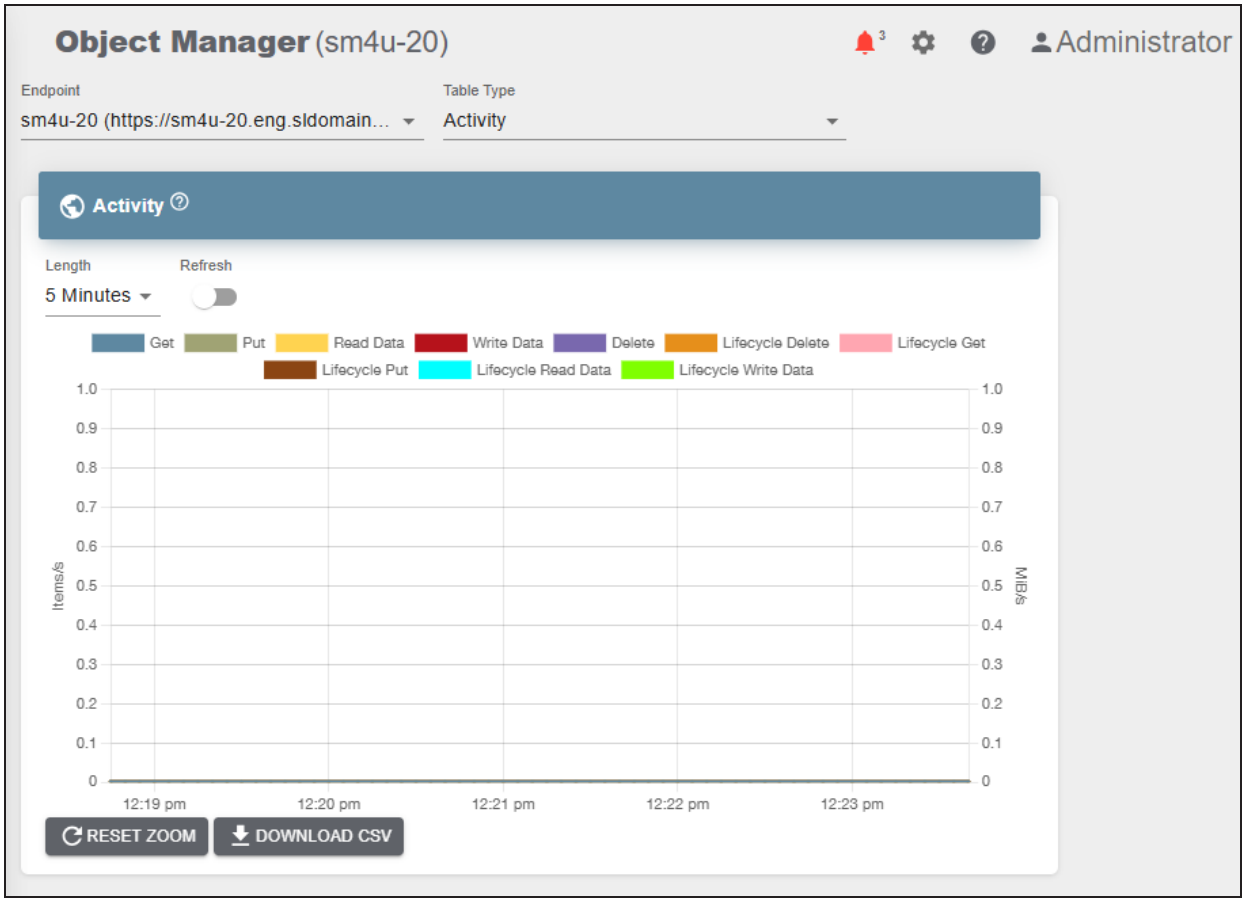


Figure 101 The Performance screen.

- Use the **Endpoint** drop-down menu to select an endpoint for any graph on the Performance screen.
- Use the **Graph Type** drop-down menu to select which graph to display.
- Use the **Length** drop-down menu to select between intervals of five minutes or one day.
- **Click the name** of a graph category to hide or reveal that line in the graph.
- Toggle the **Refresh** slider to refresh the display.

- To display the exact time and performance information, **mouseover** any point on a graph.

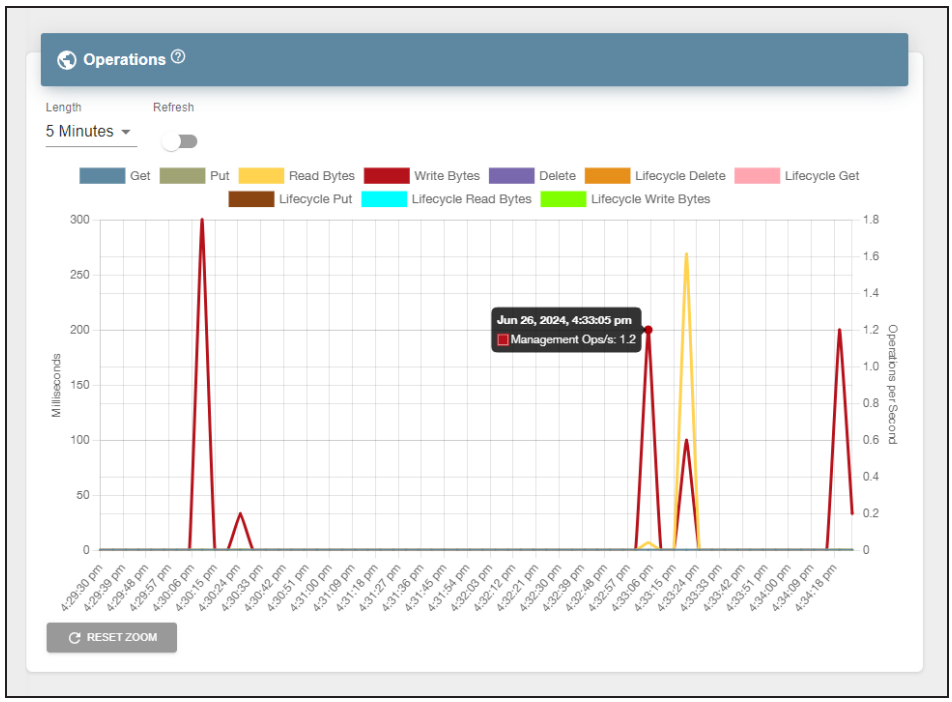


Figure 102 The Operations graph - mouseover.

VIEW OBJECT MANAGER BUCKET DETAILS

The buckets detail screen displays information about the selected Object Manager bucket, including bucket properties, ACLs, and policy.

Here is how to view the details of a Object Manager bucket:

1. In the Object Manager user interface taskbar, click **Buckets**.
2. Under the **Buckets** banner, select a bucket row, then click the **View Details** icon on the right side of the pane.

Note: If you click the bucket name instead of the bucket row, the Bucket Contents pane displays. See View Object Manager Bucket Contents on page 149.

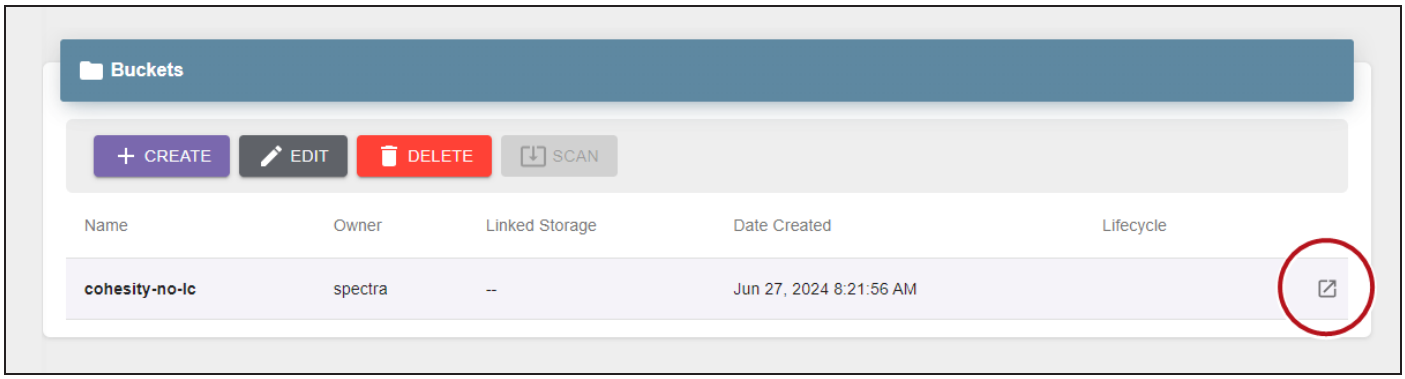


Figure 103 The Buckets pane.

3. Click **Properties**, **Usage**, **ACLs**, or **Policy** to view the current Object Manager bucket settings.

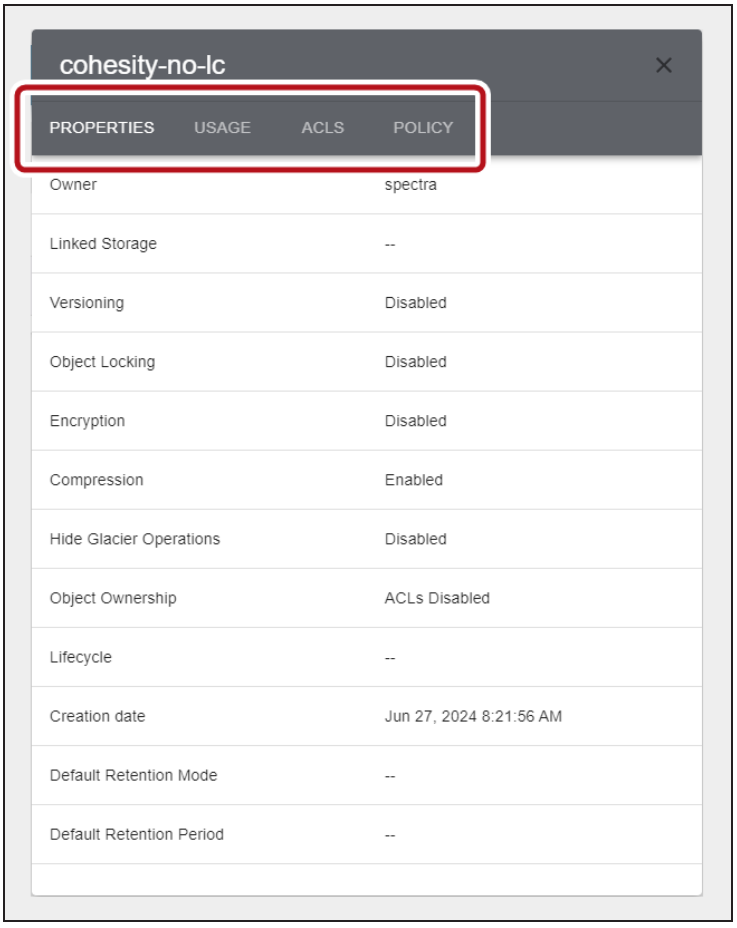


Figure 104 The Bucket Details - Properties screen.

- If you click **Properties**...

Field	Description
Owner	The AWS Canonical ID of the Object Manager bucket owner. By default the Object Manager sphere administrator is the bucket owner.
Linked Storage	The name of the bucket on the BlackPearl system or AWS cloud storage location to which the Object Manager bucket is linked, if applicable.
Versioning	Indicates if versioning is enabled or disabled for the Object Manager bucket.
Object Locking	Indicates if object locking is enabled or disabled for the Object Manager bucket.
Encryption	Indicates if encryption is enabled or disabled for the Object Manager bucket
Compression	Indicates if compression is enabled or disabled for the Object Manager bucket.

Field	Description
Hide Glacier Operations	Indicates if hiding glacier operations is enabled or disabled for the Object Manager bucket.
Object Ownership	Indicates the type of object ownership configured for the bucket
Lifecycle	The lifecycle associated with the Object Manager bucket.
Creation Date	The date the Object Manager bucket was created.
Default Retention Mode	Indicates if default retention mode is enabled or disabled for the Object Manager bucket
Default Retention Period	The retention time period configured for the bucket.

- If you click **Usage**...

Field	Description
Number of Objects	The number of objects currently in the bucket.
Total Size of Objects	The current size of all objects in the bucket, in GiB.
Average Object Size	The current average size of the objects in the bucket, in GiB.

- If you click **ACLS**....

Field	Description
Block Public ACLs	Indicates if the Object Manager bucket blocks public ACLs.
Ignore Public ACLs	Indicates if the Object Manager bucket allows public ACLs.
AWS Canonical ID	The ID of a users configured with ACL permissions for the Object Manager bucket.
Permissions	The ACL permission level for the user.

- If you click **Policy**...

Field	Description
Block Public Policy	Indicates if the Object Manager bucket blocks or allows public policies.
Restrict Public Buckets	Indicates if the Object Manager bucket blocks or allows public buckets.
Policy	The AWS policy information entered when the bucket was created displays.

4. Click the **X** in the upper-right corner to close the window.

VIEW OBJECT MANAGER BUCKET CONTENTS

The buckets contents screen displays all objects in a Object Manager bucket. If versioning is enabled for the bucket, other versions of the current object can also be viewed.

Here is how to view the contents of a Object Manager bucket:

1. In the Object Manager user interface taskbar, click **Buckets**.

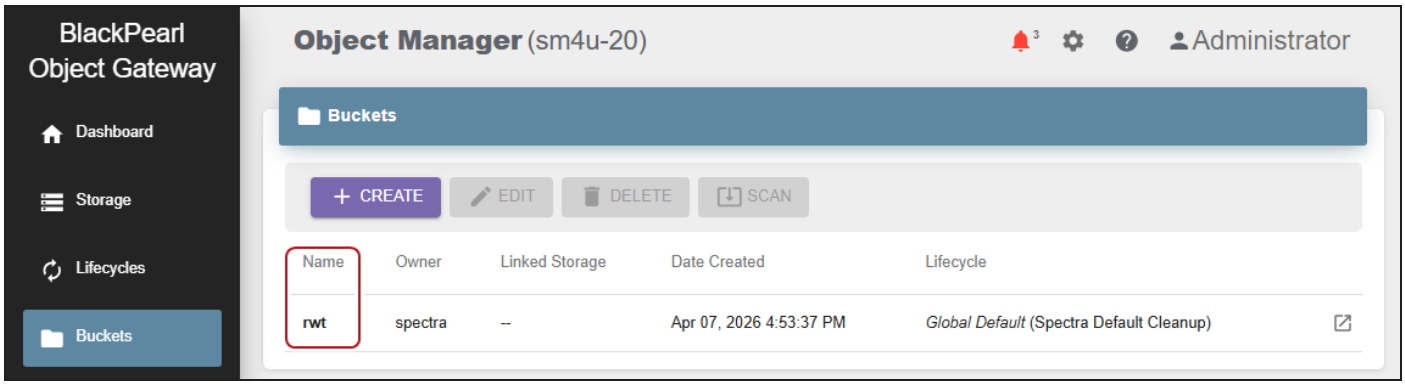


Figure 105 The Buckets screen.

2. Under the **Buckets** banner, click a ***bucket name***.

Note: You must click the name directly. Clicking the row of the bucket does not display the bucket contents screen.

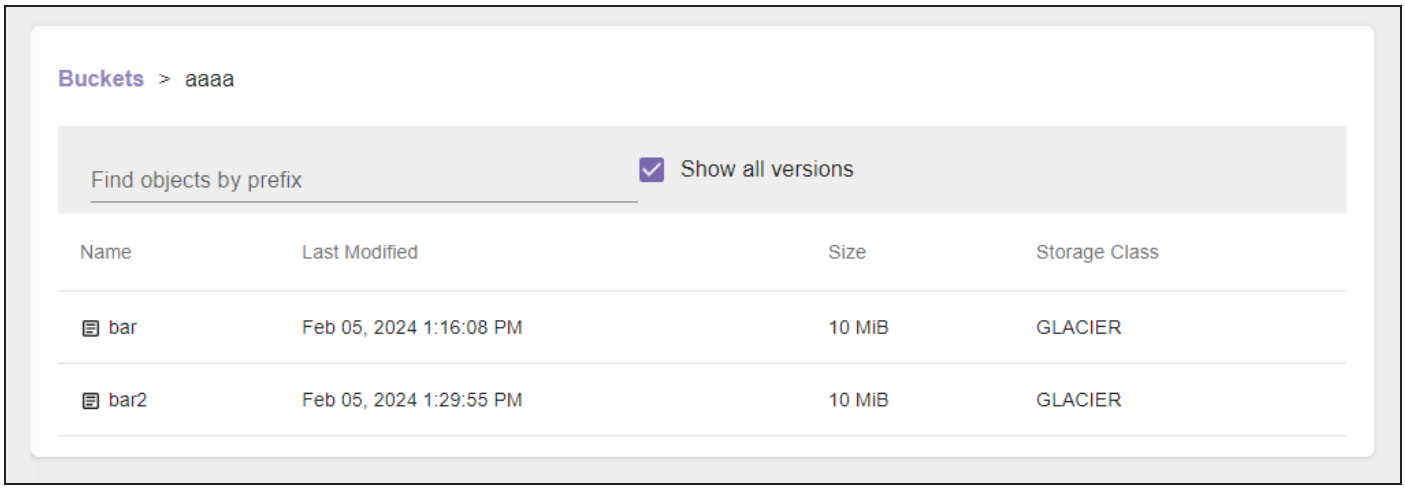


Figure 106 The Bucket Contents screen.

- Use the **Find objects by prefix** entry field to filter objects.
- Click **Show All Versions** to display every object version in the Object Manager bucket. The Last Modified field displays the day and time the object was uploaded.

Note: This option only displays if the bucket is configured for versioning.

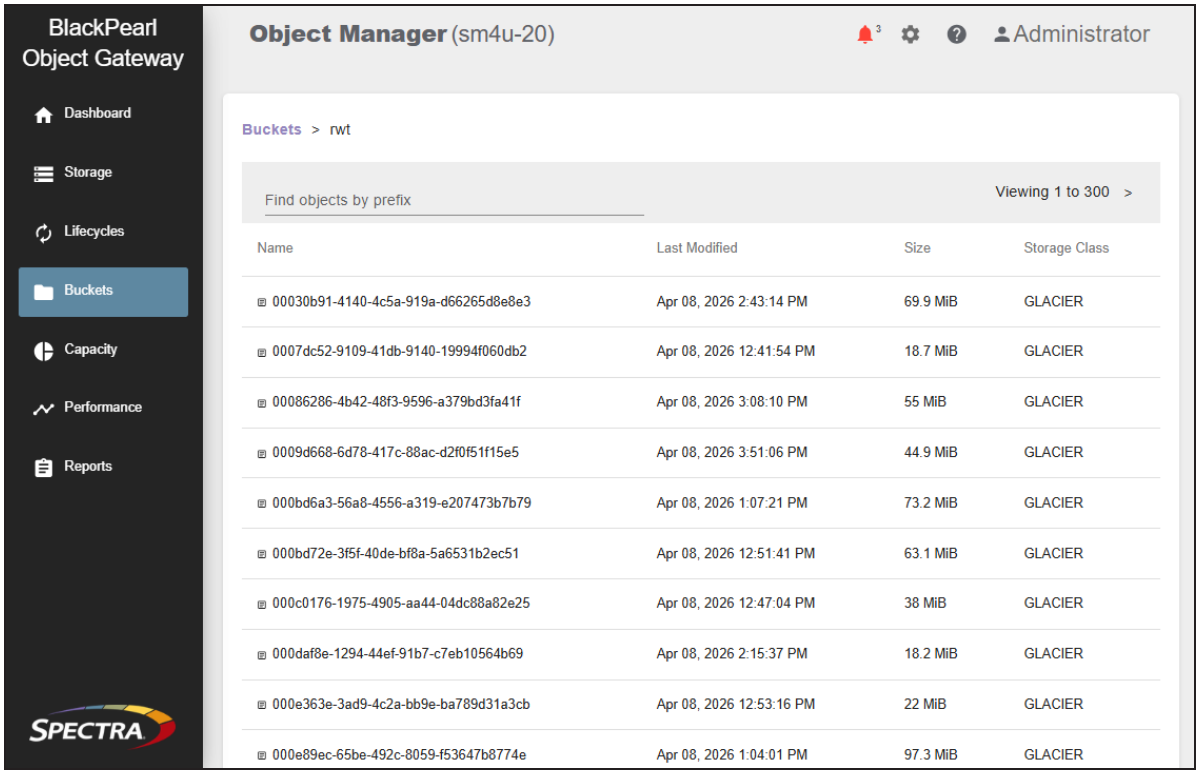


Figure 107 The Bucket Contents - Show All Versions screen.

3. Click **Buckets** in the upper-left corner of the pane to return to the Buckets screen.

View Object Details

On the Bucket Details screen, **click the row** of an object to view its details. By default, the **Properties** pane displays.

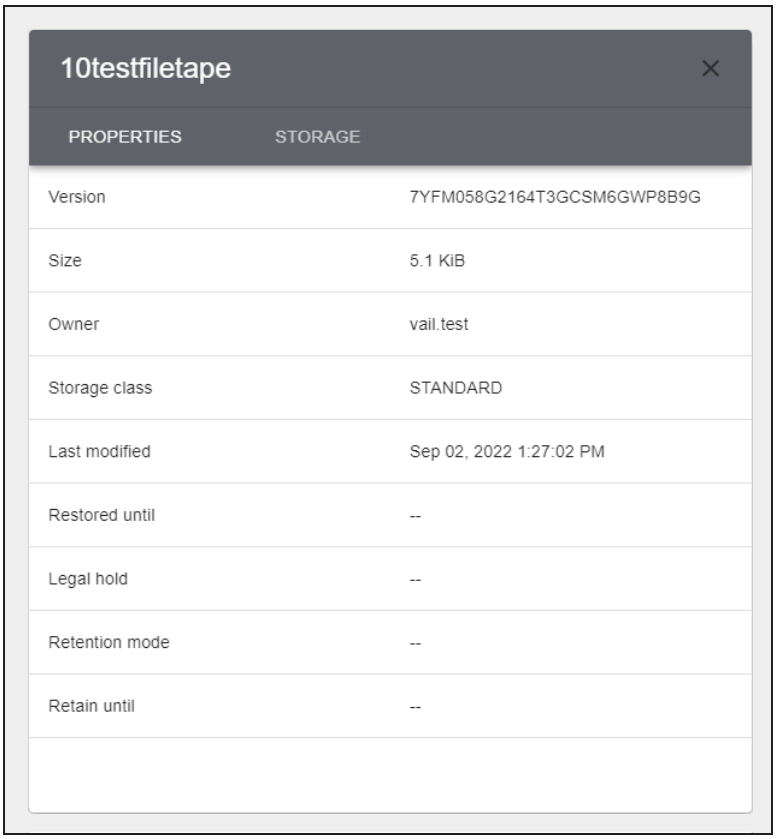


Figure 108 The Object Details - Properties screen.

Field	Description
Version	The UUID for the current version of the object.
Size	The object size on the storage target.
Owner	The AWS account name of the owner of the object.
Storage Class	The current storage class for the object. **Note:** The existence of a GLACIER clone does not necessarily cause the storage class of the object to change to GLACIER. If a non-GLACIER clone exists, (such as objects originally written to STANDARD storage) the object has a STANDARD storage class. This is true even if the STANDARD clone is optional.
Last Modified	The last modified date of the object.
Restored Until	The timestamp of when the object expires.

Field	Description
Legal Hold	Indicates if the object has a legal hold.
Retention Mode	Indicates the retention mode.
Retain Until	The duration that the object is retained by a legal hold.

Click **Storage** to display the current storage information for the object.

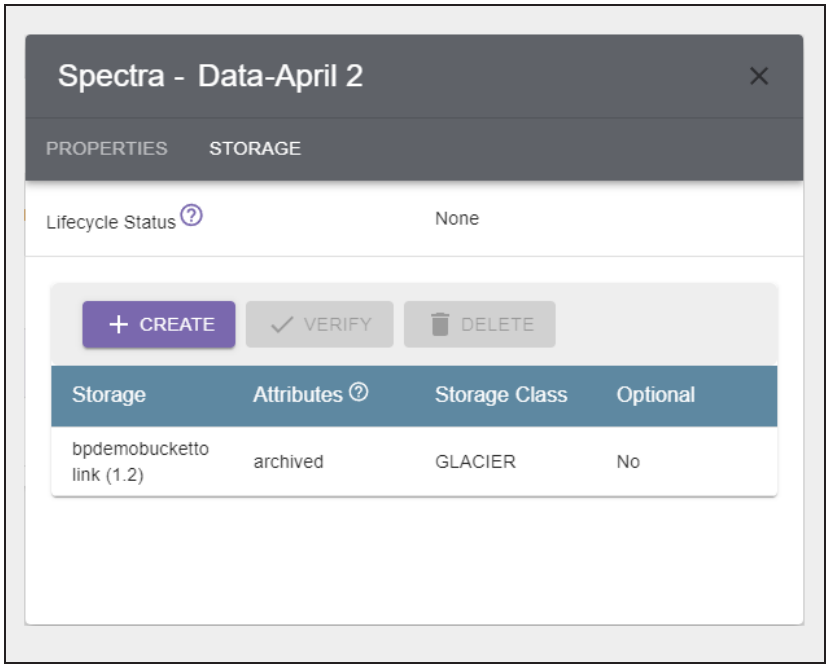


Figure 109 The Object Details - Storage screen.

Field	Description
Lifecycle Status	Indicates what Lifecycle-based changes are scheduled for the object.
Storage	The name of the storage endpoint where the object is stored. If the object is 256 bytes or less after compression, it is stored in the application database and not on a storage endpoint. The storage field is blank when the object is stored in the database. **Note:** If the object is stored in the database but the Lifecycle targets a linked bucket storage endpoint, the application clones the object to the storage endpoint to ensure the contents of linked buckets are synchronized.
Attributes	**Archived** - The object is archived and must be restored in order to be accessed. **Restored** - The object is restored can be accessed.

Field	Description
Storage Class	The current storage class for the object. See Storage Classes on page 257 for information on each storage class. **Note:** The existence of a GLACIER clone does not necessarily cause the storage class of the object to change to GLACIER. If a non-GLACIER clone exists, (such as objects originally written to STANDARD storage) the object has a STANDARD storage class. This is true even if the STANDARD clone is optional.
Optional	If yes, the clone is deleted when space is required.

ADD STORAGE TO AN OBJECT

If desired, you can add storage to an object in an Object Manager bucket. You can only add storage to an object if the object does not exist on all storage targets. You cannot add the same storage to an object multiple times.

Here is how to add storage to an object using the Object Manager user interface:

1. In the Object Manager user interface taskbar, click **Buckets**.

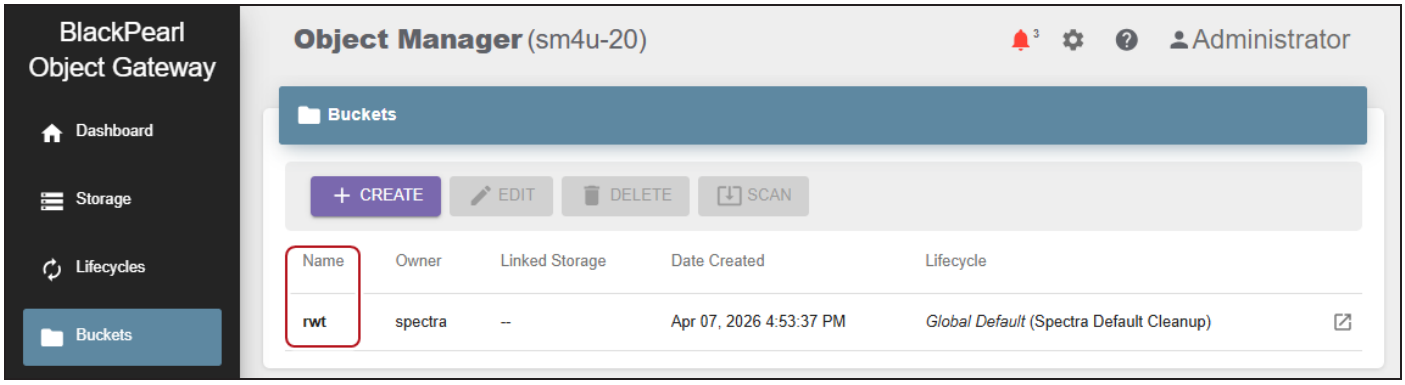


Figure 110 The Buckets screen.

2. Under the **Buckets** banner, click a **bucket name**.

Note: You must click the name directly. Clicking the row of the bucket does not display the bucket contents screen.

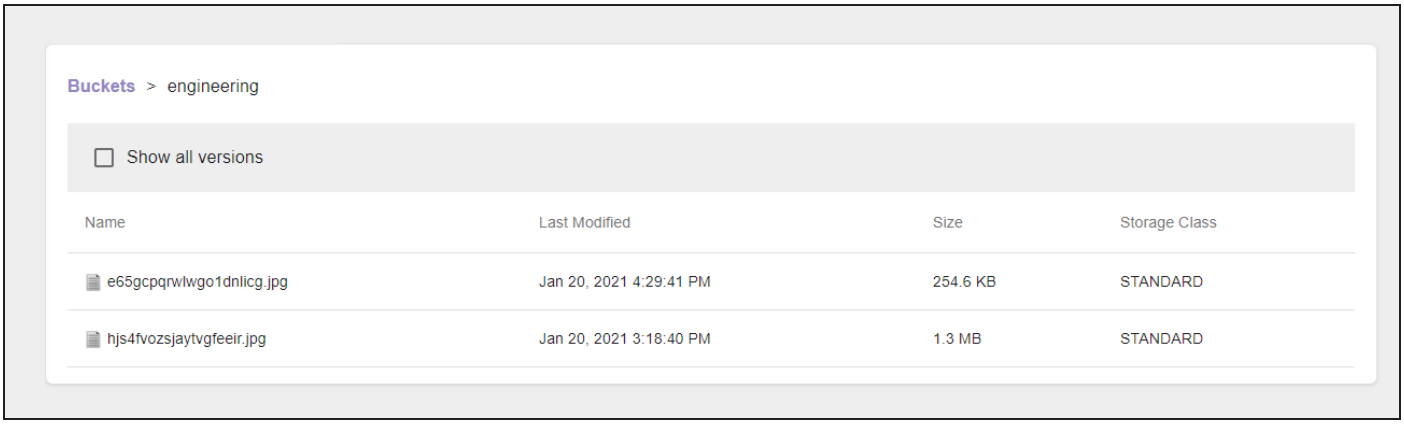


Figure 111 The Bucket Contents screen.

3. If necessary, click **Show All Versions** to display every object version in the Object Manager bucket. The Last Modified field displays the day and time the object was uploaded.

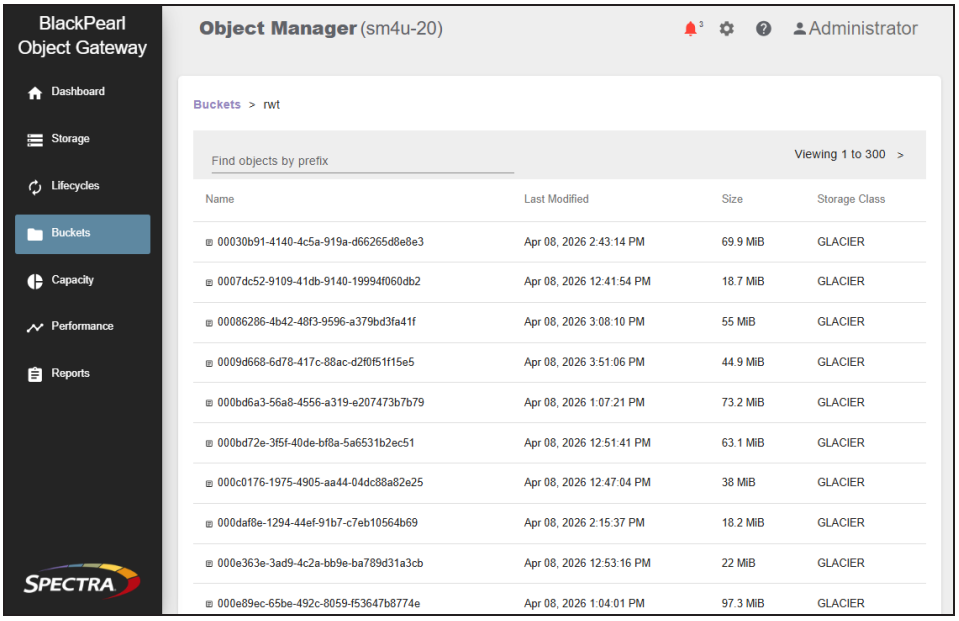


Figure 112 The Bucket Contents - Show All Versions screen.

4. **Click** the row of the object you want to clone. The Object Properties window displays.
5. Click the **Storage** tab.

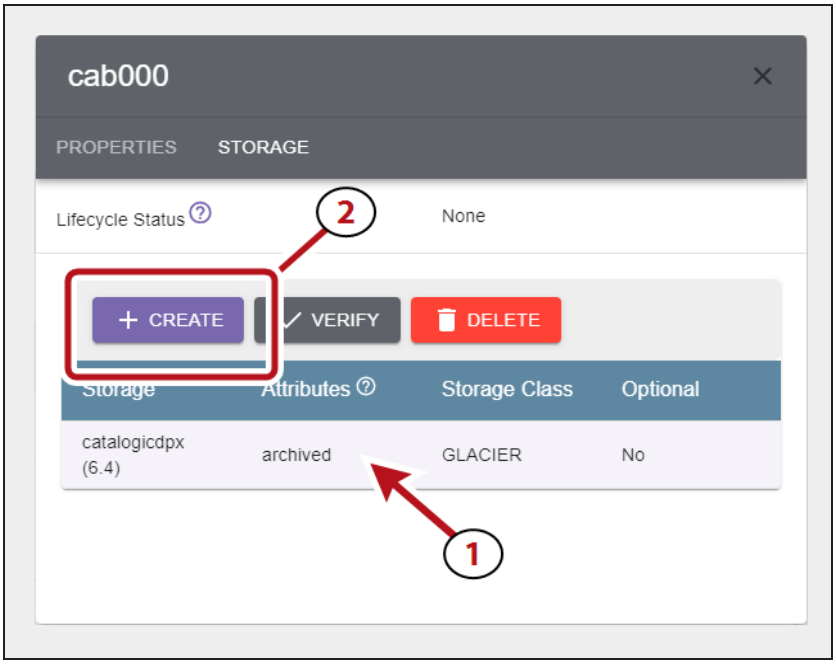


Figure 113 The Object Details - Storage screen.

6. Select the row of the object (**1**), and click **Create** (**2**).

7. Using the **Select Storage** drop-down menu, select the storage to add to the object.

Figure 114 The Add Storage screen.

8. Click **Submit** on the confirmation screen to create an object clone.

VERIFY STORAGE FOR AN OBJECT

Here is how to verify storage of an object in the Object Manager user interface:

1. In the Object Manager user interface taskbar, click **Buckets**.

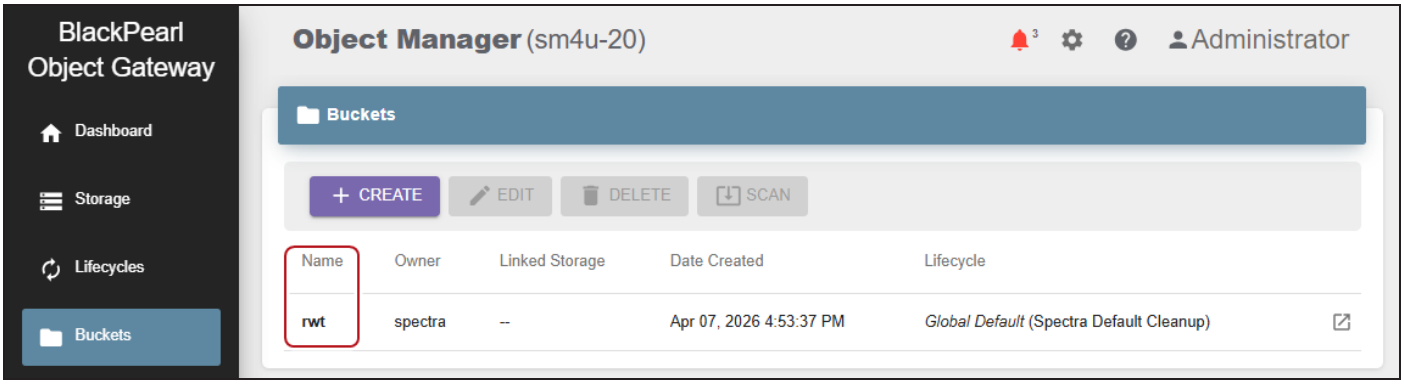


Figure 115 The Buckets screen.

2. Under the **Buckets** banner, click a **bucket name**.

Note: You must click the name directly. Clicking the row of the bucket does not display the bucket contents screen.

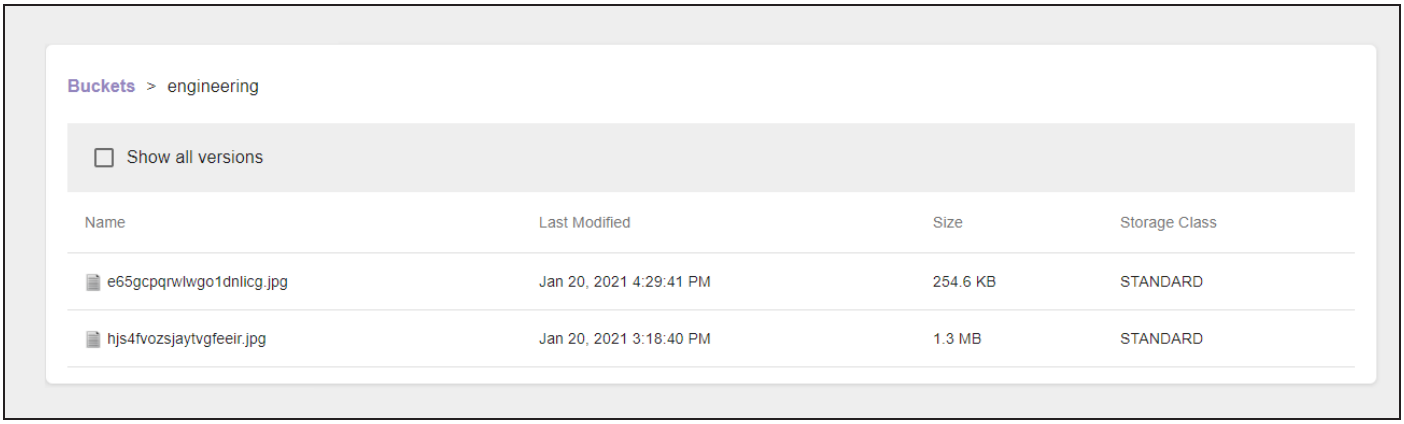


Figure 116 The Bucket Contents screen.

3. If necessary, click **Show All Versions** to display every object version in the Object Manager bucket. The Last Modified field displays the day and time the object was uploaded.

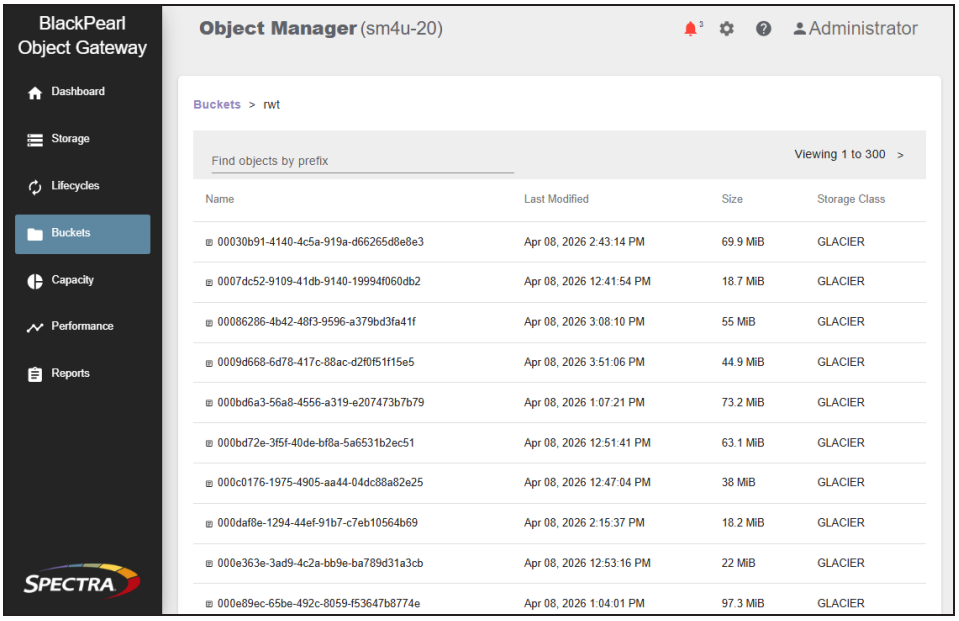


Figure 117 The Bucket Contents - Show All Versions screen.

4. **Click** the row of the clone for which you want to verify storage. The Object Properties window displays.
5. Click **Storage**.

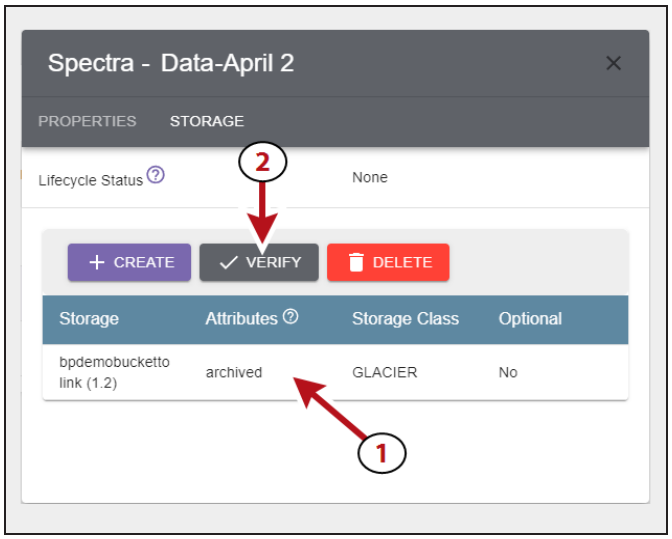


Figure 118 The Object Details - Storage screen.

6. Select the row of the storage (**1**), and click **Verify** (**2**).
7. Click **Submit** on the confirmation screen to verify the storage.

REMOVE STORAGE FROM AN OBJECT

IF desired, you can remove storage that is assigned to an object in a Object Manager bucket. You can only remove storage if the object is added to storage elsewhere in the Object Manager sphere. If there is only one storage added to an object, it cannot be removed.

Here is how to remove storage from an object clone using the Object Manager user interface:

1. In the Object Manager user interface taskbar, click **Buckets**.

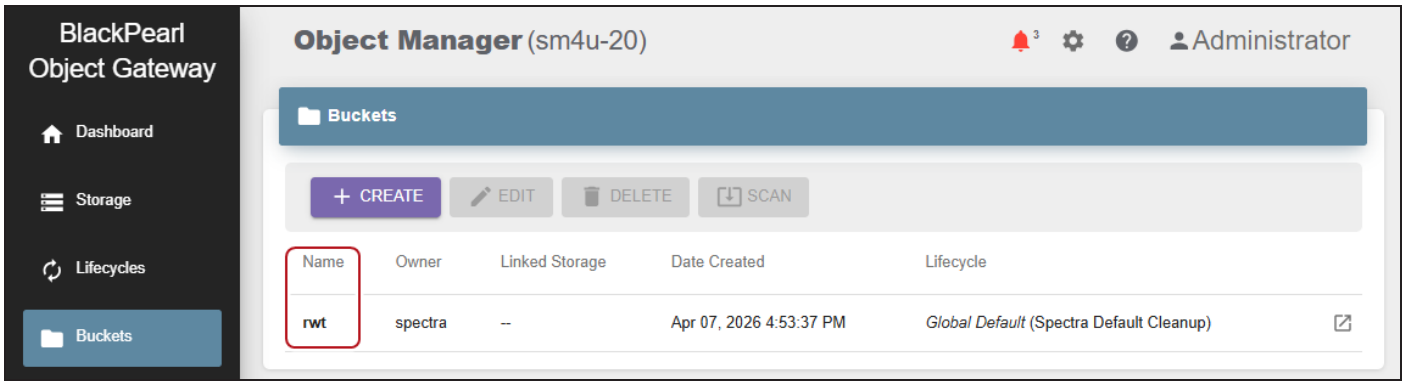


Figure 119 The Buckets screen.

2. Under the **Buckets** banner, click a **bucket name**.

Note: You must click the name directly. Clicking the row of the bucket does not display the bucket contents screen.

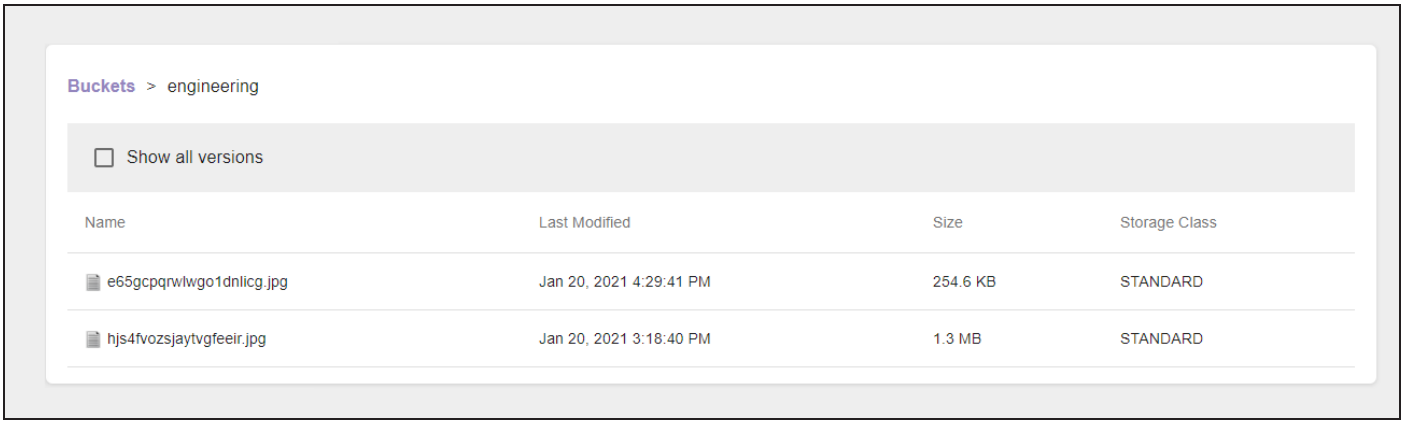


Figure 120 The Bucket Contents screen.

3. If necessary, click **Show All Versions** to display every object version in the Object Manager bucket. The Last Modified field displays the day and time the object was uploaded.

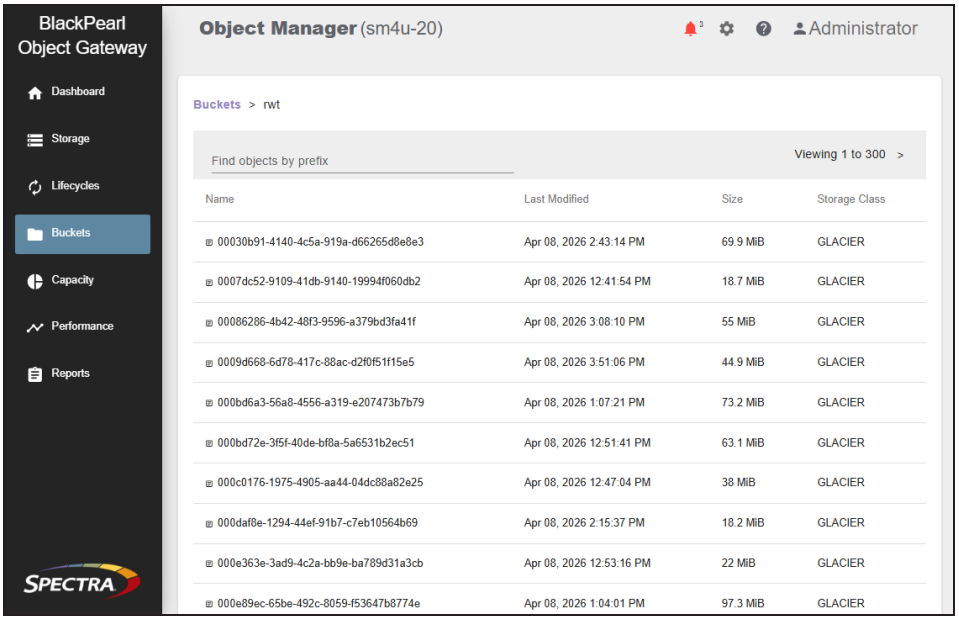


Figure 121 The Bucket Contents - Show All Versions screen.

4. **Click** the row of the object for which you want to remove storage. The Object Properties window displays.
5. Click **Storage**.

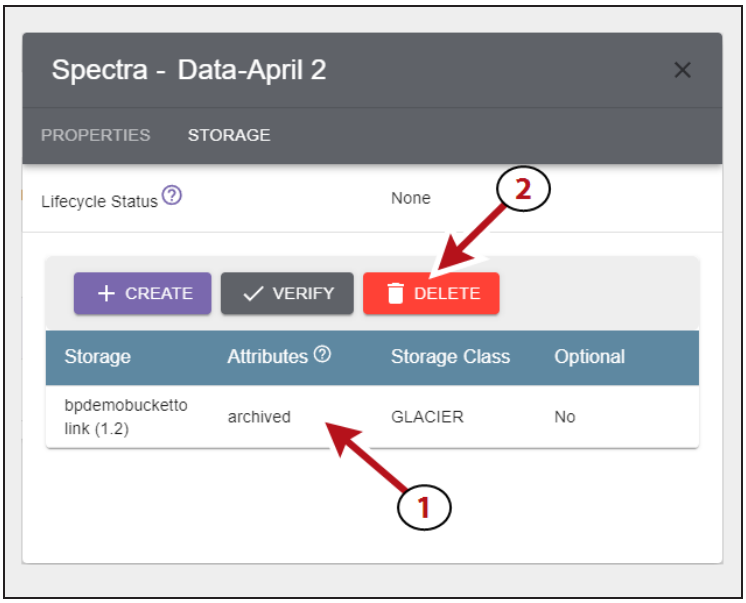


Figure 122 The Object Details - Storage screen.

6. Select the row of the storage (**1**), and click **Delete** (**2**).
7. Click **Delete** on the confirmation screen to remove the storage from the object.

EDIT GLOBAL SETTINGS

If desired, you can edit the global settings of the Object Manager to enable a diagnostic monitor or to change the nightly processing time used by the application.

Change Lifecycle Rule Nightly Processing Time

IMPORTANT The Object Manager application restarts after changing the nightly processing time. Any data transfer operations fail when the application restarts. Internal operations, such as Lifecycles, automatically restart. External operations must be manually restarted.

Here is how to change the nightly processing time:

1. Discontinue storage operations. The Object Manager application restarts after changing the nightly processing time.
2. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Global Settings**.
3. Under the **Global Settings** banner, click **Edit**.

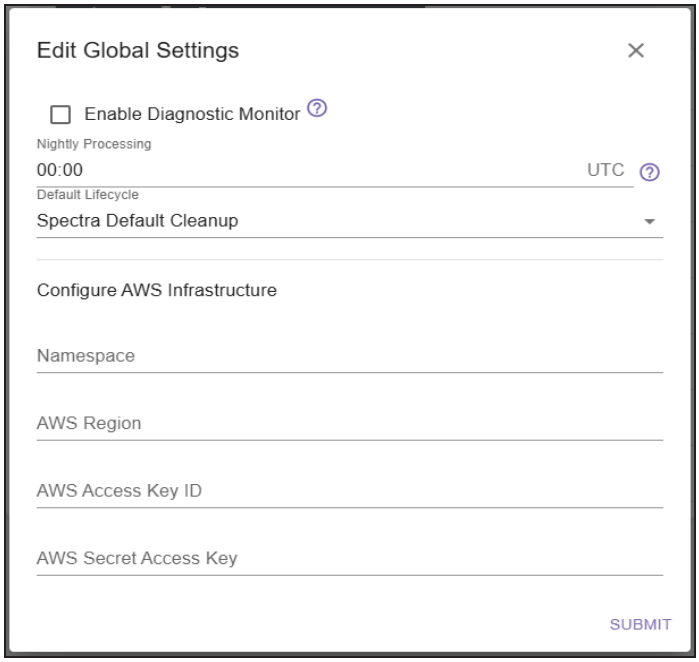


Figure 123 The Edit Global Settings screen.

4. Enter the new UTC time for **Nightly Processing**.

Note: Changing this value does not affect any actions that are already scheduled.

5. Click **Submit**.

Set Default Lifecycle

The default lifecycle on the BlackPearl Object Manager automatically applies to buckets unless otherwise specified during bucket creation. Here is how to change the default Lifecycle:

1. In the upper right corner of the BlackPearl Object Manager, click the **gear icon** and select **Global Settings**.
2. Under the **Global Settings** banner, click **Edit**.

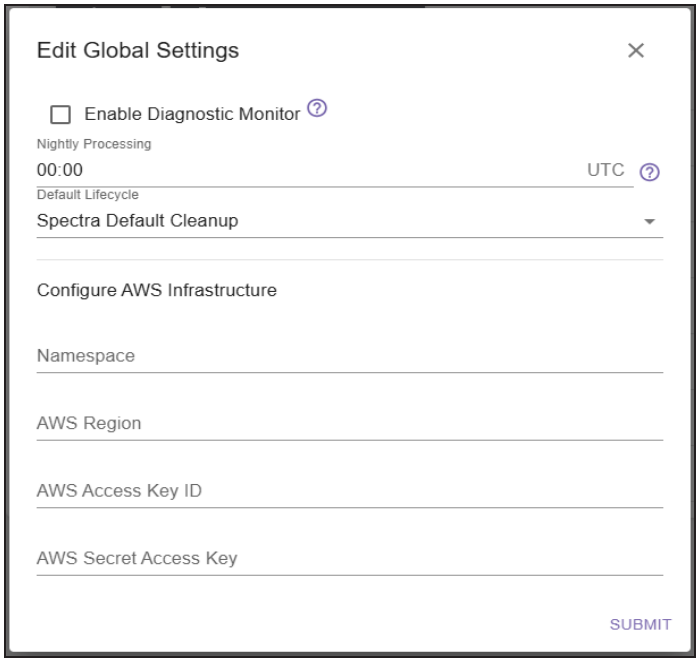


Figure 124 The Edit Global Settings screen.

3. Use the **Default Lifecycle** drop-down menu to select a previously created lifecycle, then click **Submit**.

Enable Diagnostic Monitor

The diagnostic monitor allows the Object Manager to send diagnostic data to Spectra Logic.

Note: Contact Spectra Logic Technical Support before enabling the diagnostic monitor.

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Global Settings**.
2. Under the **Global Settings** banner, click **Edit**.

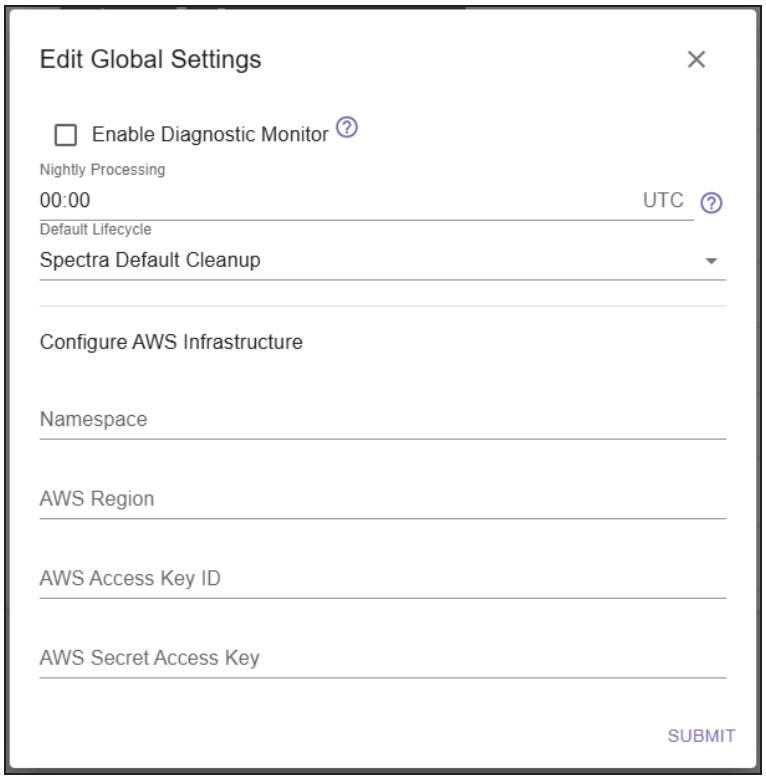


Figure 125 The Edit Global Settings screen.

3. Select **Enable Diagnostic Monitor**, then click **Submit**.

Configure AWS Infrastructure

For a local-control Object Manager sphere, configuring the AWS infrastructure settings is required in order to access AWS S3 buckets and to add IAM accounts in to the Object Manager application. Editing these settings assumes familiarity with your AWS environment.

Note: In a cloud-control Object Manager sphere, these settings are pre-populated and cannot be changed.

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Global Settings**.
2. Under the **Global Settings** banner, click **Edit**.

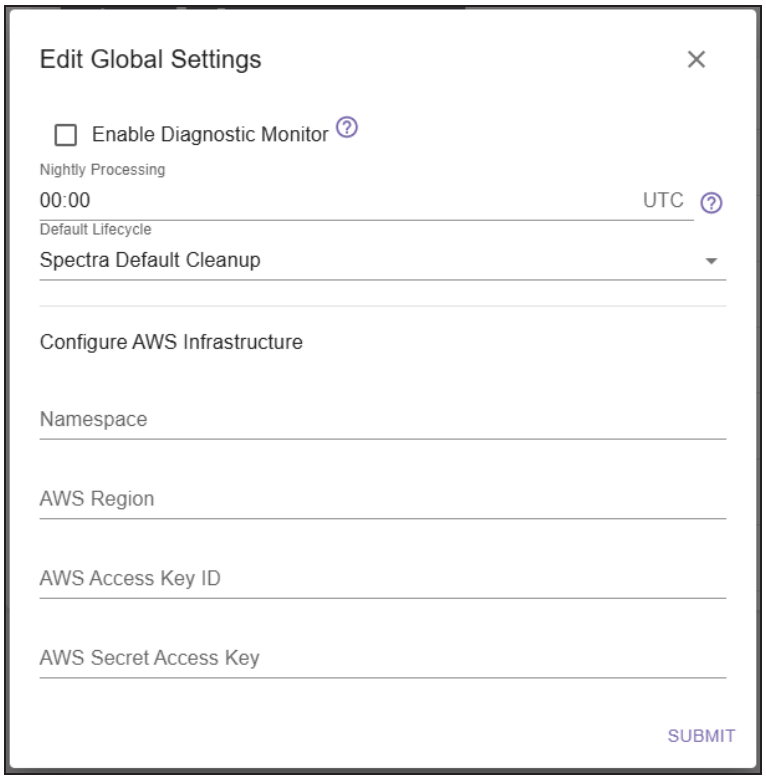


Figure 126 The Edit Global Settings screen.

3. Enter information for the **Namespace**, **AWS Region**, and **AWS Access** credentials.
4. Click **Submit**.

USING PROXY CONNECTIONS

If desired, you can configure the Object Manager to use a proxy server to connect with external servers.

Configure Proxy Connection

Here is how to configure a proxy connection:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Network**.
2. Under the **Proxy Servers** banner, click **Create**.

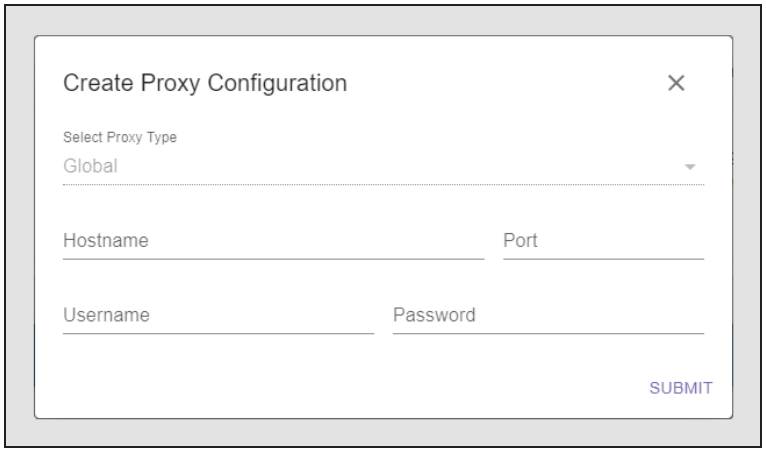


Figure 127 The Create Proxy Configuration screen.

Note: You can only configure a Global proxy type. The **Select Proxy Type** drop-down menu is grayed-out and not functional.

3. Enter the **Hostname** for the proxy server to use for external connections.
4. Enter the **Port** of the proxy server.
5. Enter the **Username** and **Password** to use when connecting through the proxy server.
6. Click **Submit**.

Edit Proxy Server

All options available when creating a proxy connection can be changed by editing the connection.

Here is how to edit a previously configured proxy configuration:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Network**.
2. Under the **Proxy Servers** banner, select the proxy connection and click **Edit**.
3. Update the proxy information as required, and click **Save**.

Delete Proxy Server

Here is how to delete a previously configured proxy configuration:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Network**.
2. Under the **Proxy Servers** banner, select the proxy connection and click **Delete**.
3. Update the proxy information as required, and click **Save**.

EDIT A OBJECT MANAGER BUCKET

If desired, you can edit Object Manager buckets to change various settings. You cannot change the bucket name, but all other settings used when creating a bucket are available when editing a Object Manager bucket, including encryption, versioning, access controls, and lifecycle selection.

Note: Prior to Object Manager 3.2.0, you cannot disable versioning if the bucket was initially configured to use versioning AND object locking when it was created. Starting with Object Manager 3.2.0, you are now able to change the versioning setting if the Object Manager bucket was created to use versioning.

Note: If you enable encryption on a bucket that is not currently configured to use encryption, only new data put to the bucket is encrypted. To encrypt existing data, you must use the PUT OBJECT copy command.

Here is how to edit a Object Manager bucket:

1. In the Object Manager user interface taskbar, click **Buckets**.
2. Under the **Buckets** banner, select (**1**) the row of the bucket to edit, and (**2**) click **Edit**.

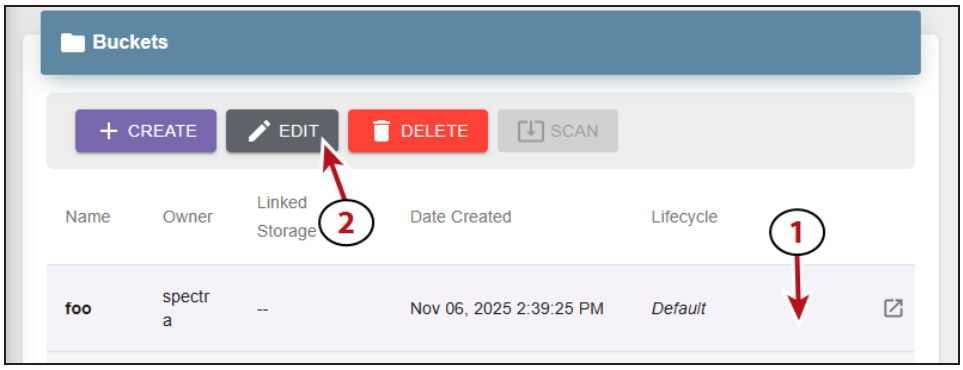


Figure 128 The Buckets pane.

3. Edit the settings on the Parameters screen as desired. See Create a Object Manager Bucket on page 88 for information about each feature on the Parameters screen.

Note: Depending on the options selected when you created the bucket, the screens in this section may be different then what appears in the Object Manager user interface.

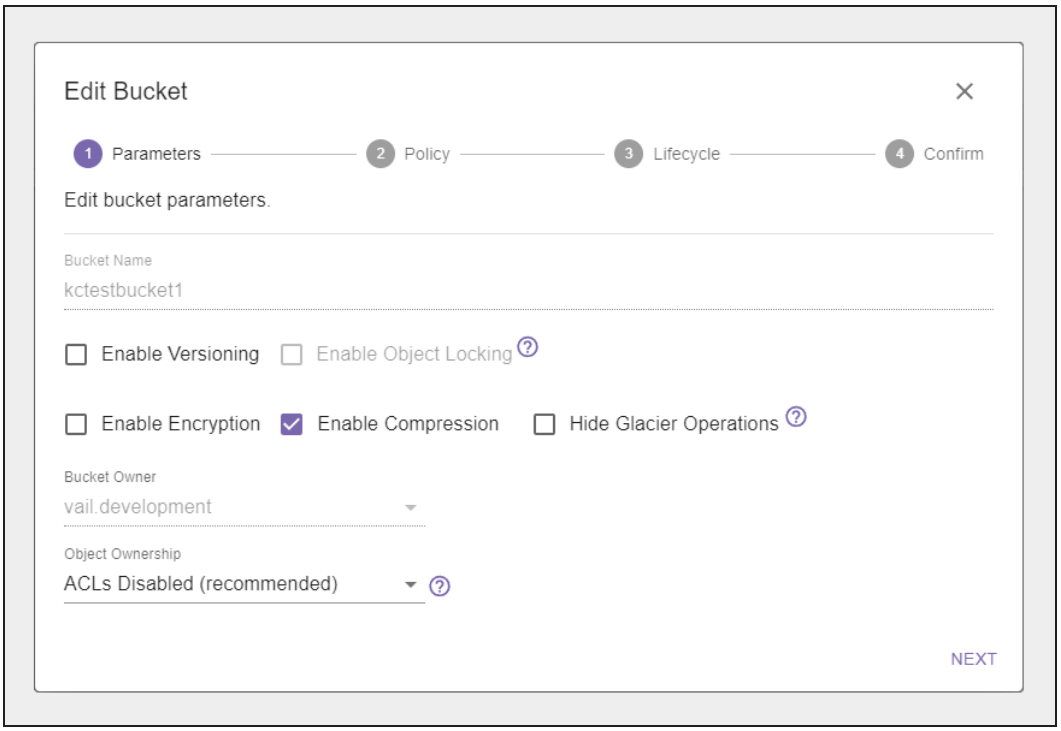


Figure 129 The Edit Bucket - Parameters screen.

Notes:
- You are not able to change the Bucket Name.
- If you disable versioning, any new objects are not versioned, but all previous versioned objects continue to be persisted.

4. Click **Next**. If you selected **Enable Object Locking** continue with Step 5 below. Otherwise, skip to Step 7 on page 169.

5. Edit the settings on the Retention screen as desired. See Create a Object Manager Bucket on page 88 for information about each feature and option on the Retention screen.

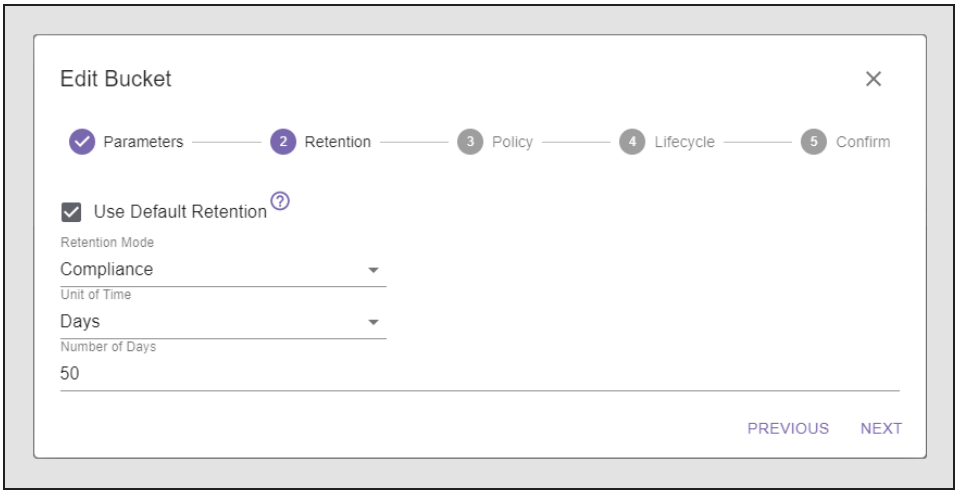


Figure 130 The Edit Bucket - Retention screen.

6. Click **Next**.

7. Edit the settings on the Policy screen as desired. See Create a Object Manager Bucket on page 88 for information about each feature and option on the Policy screen.

Figure 131 The Edit Bucket - Policy screen.

8. Click **Next**. If **Object Ownership** for this bucket is set to **ACL Disabled**, skip to Step 11 on page 170. Otherwise continue to Step 9 on page 170

9. Edit the settings on the Access Control Lists screen as desired. See Create a Object Manager Bucket on page 88 for information about each feature and option on the Access Control List screen.
   - Click **Add ACL** to add a new ACL to the bucket.
   - Click the **trashcan icon** to delete an existing ACL.

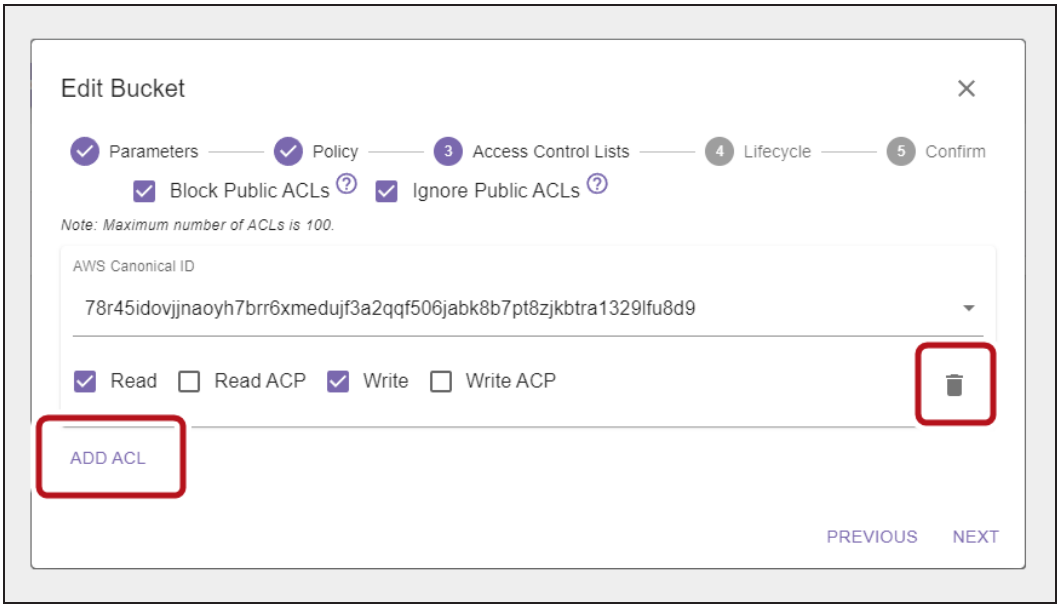


Figure 132 The Edit Bucket - Access Control Lists screen.

10. Click **Next**.

11. If desired, use the **Select Lifecycle** drop-down menu to select a new lifecycle for the bucket, and click **Next**.

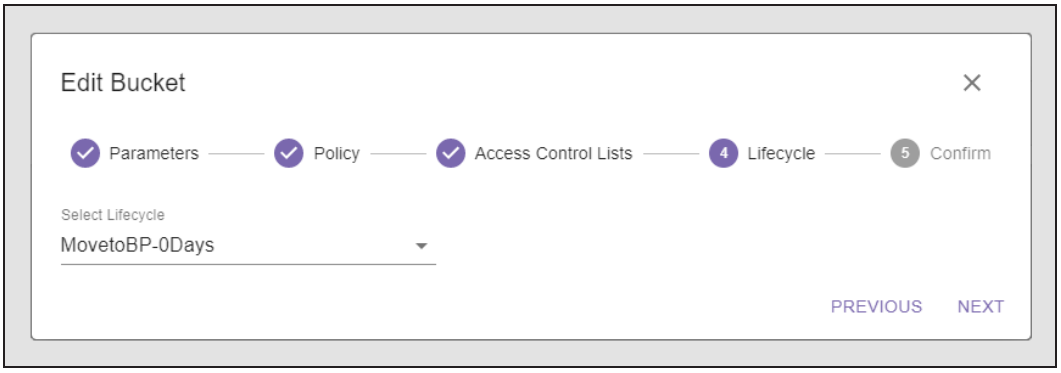


Figure 133 The Edit Bucket - Lifecycle screen.

12. Review the configuration, and click **Submit** to save the changes to the Object Manager bucket.

DELETE A OBJECT MANAGER BUCKET

If desired, you can delete an empty Object Manager bucket. To remove a bucket that contains objects, you must first delete all of the objects.

Here is how to delete a Object Manager bucket:

1. In the Object Manager user interface taskbar, click **Buckets**.
2. Under the **Buckets** banner, (**1**) select the bucket and (**2**) select **Delete**.

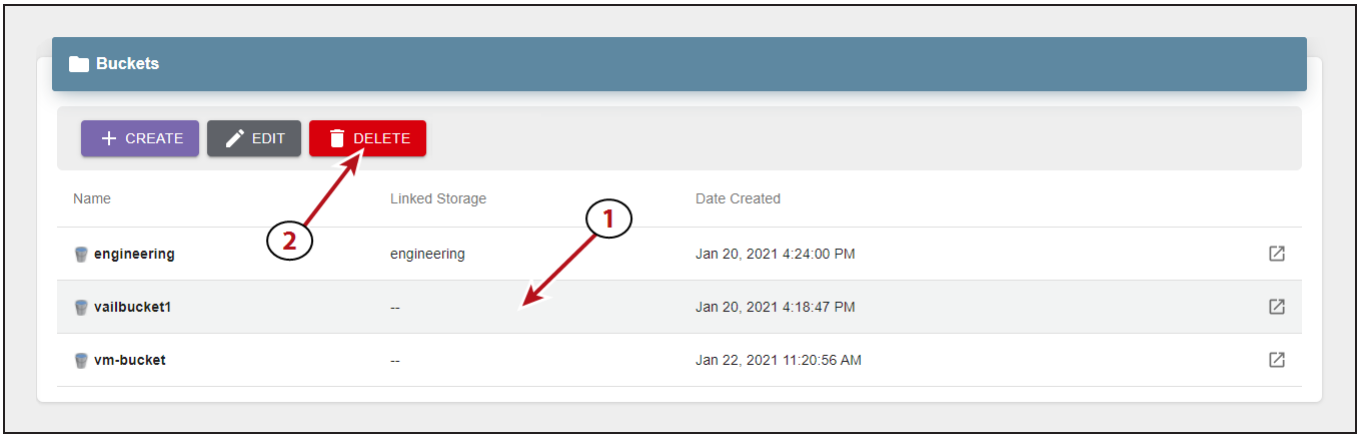


Figure 134 The Buckets pane.

3. On the confirmation screen, click **Delete**.

VIEW STORAGE DETAILS

The storage detail screen displays advanced information about endpoint or cloud storage, as well as data usage information.

Here is how to view the details of storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** or **Cloud Storage** banner, click the **View Details** icon to the far right of the storage for which you want to view details.

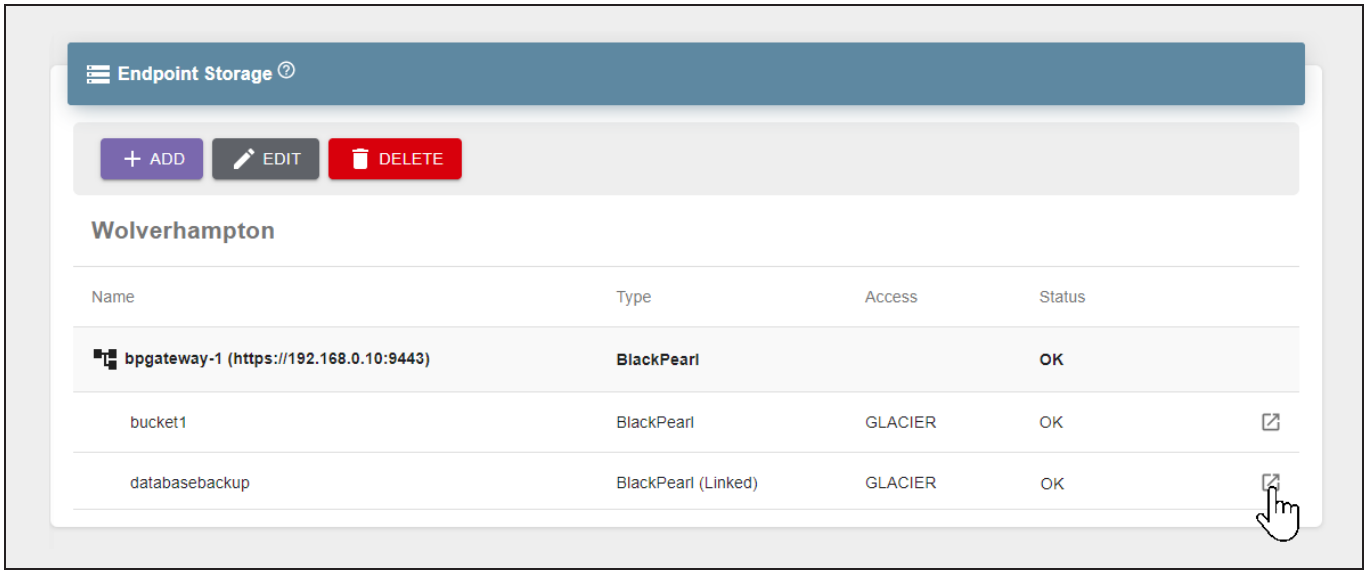


Figure 135 The Endpoint Storage pane.

- If you select **Properties** the following fields display.

  Note: Not all fields listed below display for all storage endpoints. Some of the entries below may not apply to the storage endpoint for which you are viewing detailed information.

Field	Description
ID	The assigned ID of the storage which is used to identify the storage in certain error messages.
Type	The type of storage used on a BlackPearl or cloud storage endpoint.
Export	Indicates if the data in the storage was exported when the storage was created.
Storage Class	The storage class used by the storage endpoint.
Status	The current status of the storage endpoint.

Field	Description
Third-Party Recovery	Indicates if the option to allow third party recovery is enabled or disabled. This option writes additional data per object which allows full objects to be generated from the storage endpoint.
Restore In Place	Indicates if the storage endpoint creates clone data on the same endpoint where an object resides, or a different endpoint.
Disabled	Indicates if the storage is in an enabled or disabled state.
Bucket	The bucket used by the BlackPearl or cloud storage endpoint.
Link to Bucket	The Object Manager bucket linked to the storage endpoint.
Bucket Owner	The owner of the cloud bucket used by the storage endpoint.
Data Path Endpoint	The URL of the data path used by the clod storage endpoint.
Skip TLS Verification	Indicates if the cloud storage endpoint uses or skips TLS verification.
Addressing Style	The method used to address the cloud storage endpoint.
Data Policy	The data policy on the BlackPearl Storage Manager used by the storage endpoint.
Data Partitions	The tape or disk partitions on the BlackPearl Storage Manager used by the storage endpoint.
Caution Threshold	The percentage of used space before the Object Manager application generates a caution system message.
Warning Threshold	The percentage of used space before the Object Manager application generates a warning message.
Optional Data	The maximum percentage of storage available for optional data clones.
Quota	The maximum percentage of storage available for use.

- If you select **Usage**...

  Note: Not all fields listed below display for all storage endpoints. Some of the entries below may not apply to the storage endpoint for which you are viewing detailed information.

Field	Description
Number of clones	The number of clones kept by the storage endpoint for each object.

Field	Description
Total size of clone content	The total size of clones on the storage endpoint.
Total stored size of all clones	The amount of data used by the clones on the storage endpoint. Because clones are compressed before they are written to storage, this value may be different from the original content size.
Total size of optional data	The amount of optional data stored on the storage endpoint. The Object Manager application only uses optional data to improve performance when there is sufficient storage space available. Optional data is automatically deleted when additional space on the storage endpoint is required to store non-optional data. **Note:** This option only displays for Volume storage endpoints.
Average clone size	The average size of all clones on the storage endpoint.

EDIT BLACKPEARL OR OBJECT MANAGER VM ENDPOINT

If desired, you can edit the BlackPearl Storage Manager or Object Manager VM Node endpoint to change the location of the system in the Object Manager sphere, enable debug logging, or adding additional host names that can be used to access the endpoint.

Note: The images below show editing a BlackPearl endpoint. The processes are the same for a Object Manager VM node endpoint.

Change Endpoint Location

Here is how to change the regional location of an endpoint:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** banner select the row of the endpoint and click **Edit**.
3. Using the drop-down menu, select a new **Location** for the endpoint.

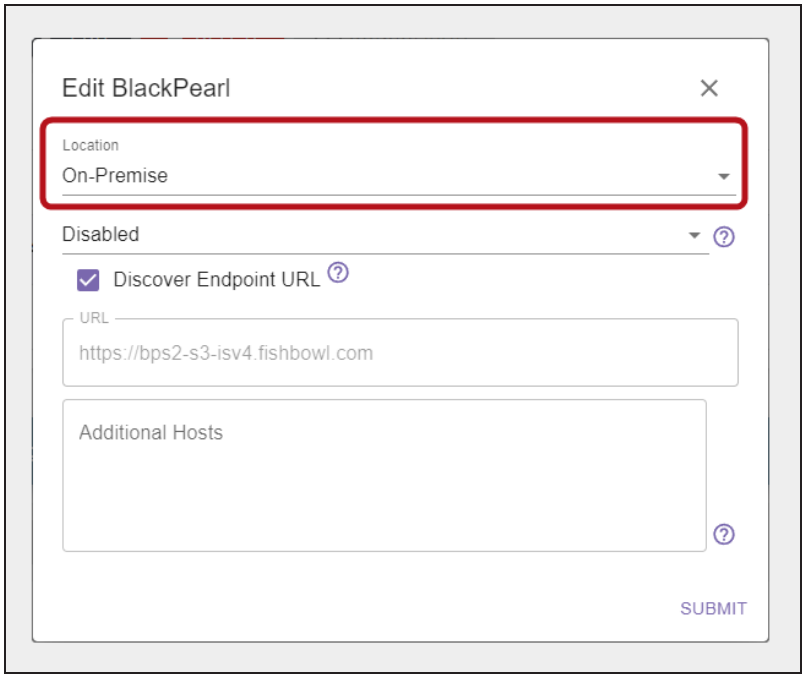


Figure 136 Edit *Endpoint* - Location screen.

4. Click **Submit**.

Add Additional Host Names

Host names are used to access the endpoint. Here is how to add additional host names for the endpoint:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** banner select the row of the endpoint and click **Edit**.
3. In the **Additional Hosts** dialog box, enter the desired host name(s).

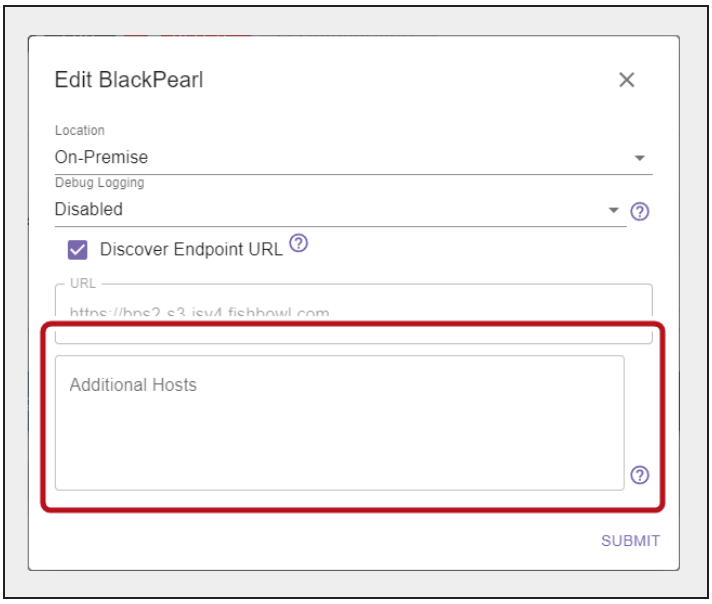


Figure 137 Edit *Endpoint*- Additional Hosts screen.

4. Click **Submit**.

Change Endpoint URL

The URL listed on the Edit *Endpoint* screen is the address that other systems use when communicating with the storage endpoint. Typically this URL is discovered using name recognition sources.

IMPORTANT The Object Manager application restarts after changing the endpoint URL. Any data transfer operations fail when the application restarts. Internal operations, such as Lifecycles, automatically restart. External operations must be manually restarted.

1. Discontinue storage operations. The Object Manager application restarts after changing the endpoint URL.
2. In the Object Manager user interface taskbar, click **Storage**.
3. Under the **Endpoint Storage** banner select the row of the endpoint and click **Edit**.
   - To determine the URL automatically, select **Discover Endpoint URL** checkbox.
   - To set the URL manually, clear the **Discover Endpoint URL** checkbox, enter the **URL** in the entry field.

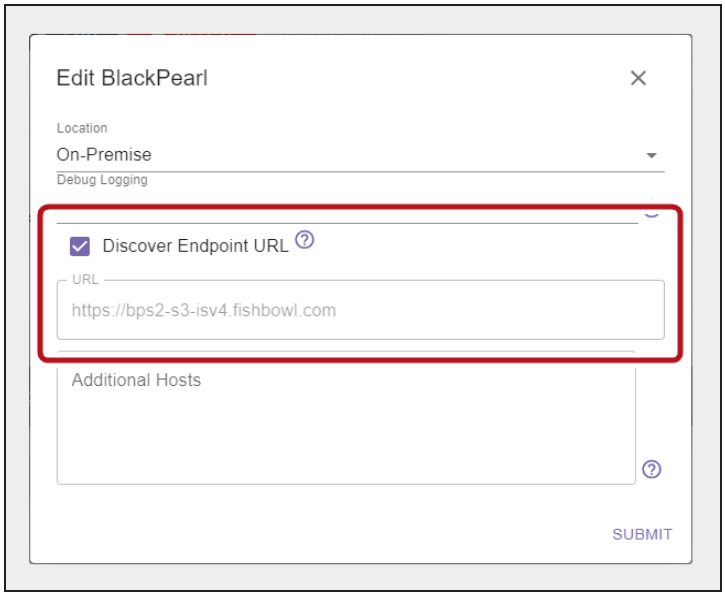


Figure 138 Edit *Endpoint* screen.

4. Click **Submit**.

Configure Debug Logging

The Object Manager allows you to set the level of information included in system logs.

IMPORTANT Contact Spectra Logic Technical Support before modifying this setting.

Here is how to edit the debug logging level for the endpoint:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** banner, (**1**) select the row of the endpoint and (**2**) click **Edit**.
3. Using the drop-down menu, select the **Debug Logging** level.

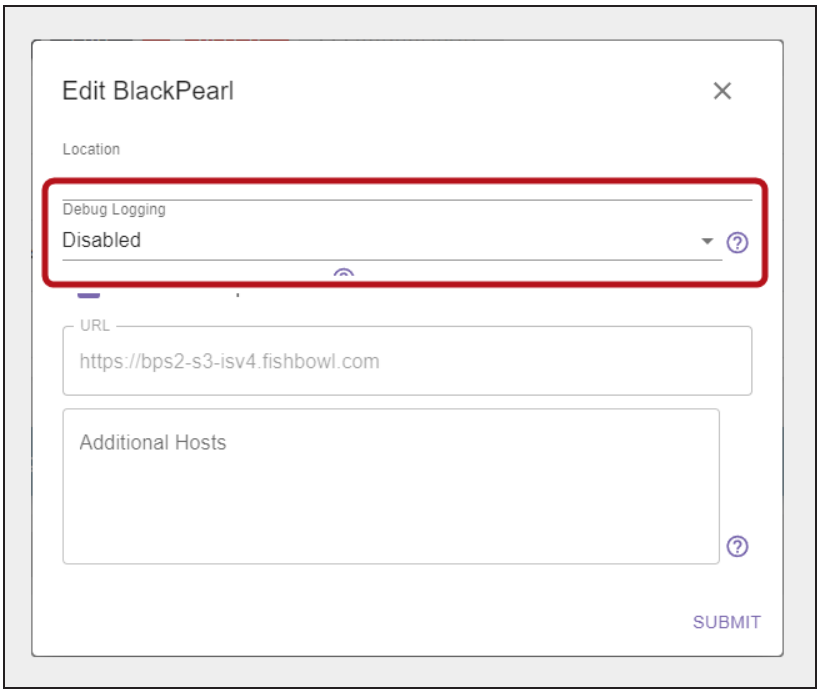


Figure 139 Edit *Endpoint* screen.

4. Click **Submit**.

EDIT STORAGE

If desired, you can edit storage to change various settings. The settings you can change are different for each type of storage.

Use one of the sections below to edit storage.

Edit BlackPearl Bucket Storage

Here is how to edit BlackPearl bucket storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** banner select the row of the storage and click **Edit**.
3. If desired, edit the **Storage Name**, **Storage Class**, and the **Caution** and **Warning** thresholds.

Note: If you are editing a linked bucket, the fields for Caution and Warning Thresholds do not display.

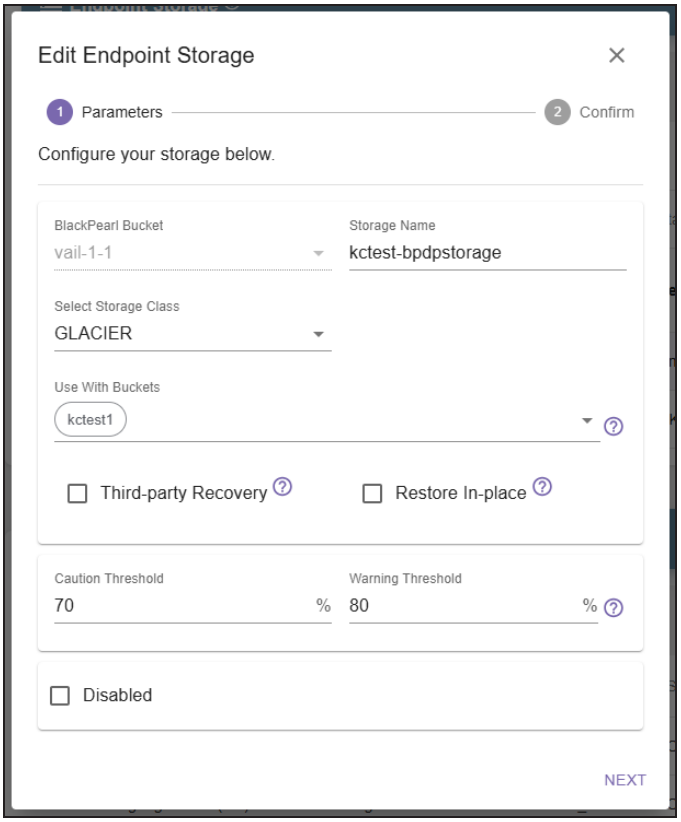


Figure 140 The Edit Endpoint Storage - Parameters - BlackPearl screen.

4. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
5. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and negatively affects performance.

6. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.
7. If desired, select **Disabled**. This sets the endpoint storage to a disabled state. The endpoint storage must be manually enabled before it can be used for data storage operations.
8. Click **Next**.
9. Review the configuration and click **Submit**.

Edit BlackPearl Volume Pool Storage

Here is how to edit BlackPearl volume pool storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** banner select the row of the storage and click **Edit**.
3. If desired, you can change the **Storage Name**, **Storage Class**, **Caution Threshold**, or **Warning Threshold**.

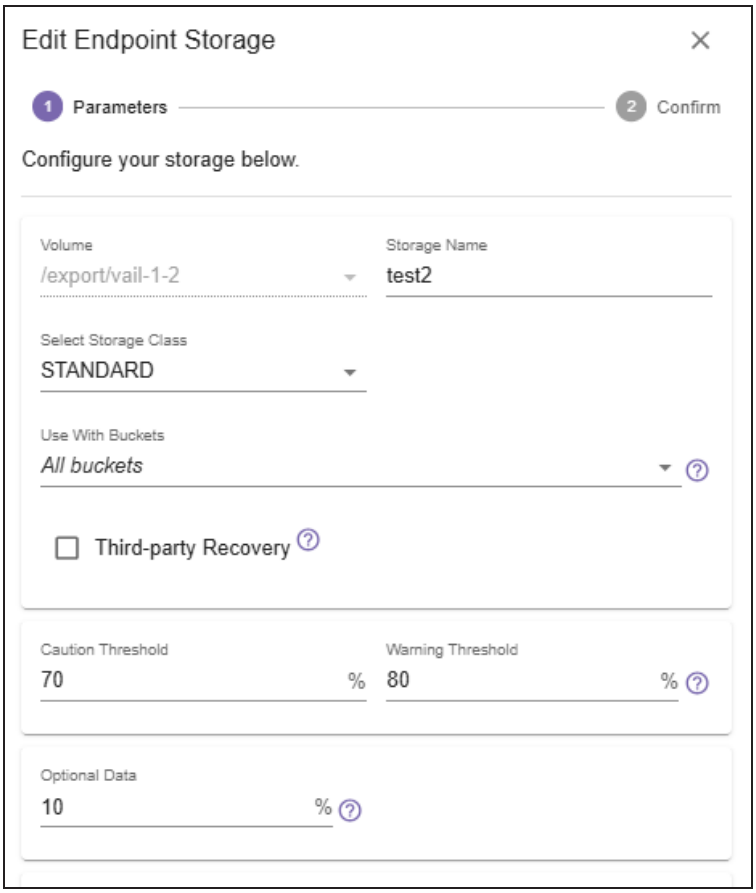


Figure 141 The Edit Endpoint Storage - Parameters screen (partial).

4. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
5. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and negatively affects performance.

6. If desired, you can set the **Optional Data** threshold, which specifies the percentage of storage space to be used for optional clones to speed up data access. Optional clones are deleted as necessary to maintain space used below this percentage. If this field is left blank, no optional clones are stored and object access times are not tracked.
7. If desired, enter a value for a **Quota**, and use the **Units** drop-down menu to select a unit size for the quota value. This setting controls the maximum amount of storage space on the storage pool that is used for the BlackPearl volume pool storage endpoint. When this percentage is reached, no additional data is added to the storage endpoint. If you do not want to use a quota limit, leave the fields blank.
8. If desired, select **Disabled**. This sets the endpoint storage to a disabled state. The endpoint storage must be manually enabled before it can be used for data storage operations.
9. Click **Next**.
10. Review the configuration, and click **Submit** to save the changes to the BlackPearl storage.

Edit Object Manager VM Node Storage

Here is how to edit Object Manager VM node storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** banner, select the row of the storage and click **Edit**.
3. If desired, edit the **Storage Name**.

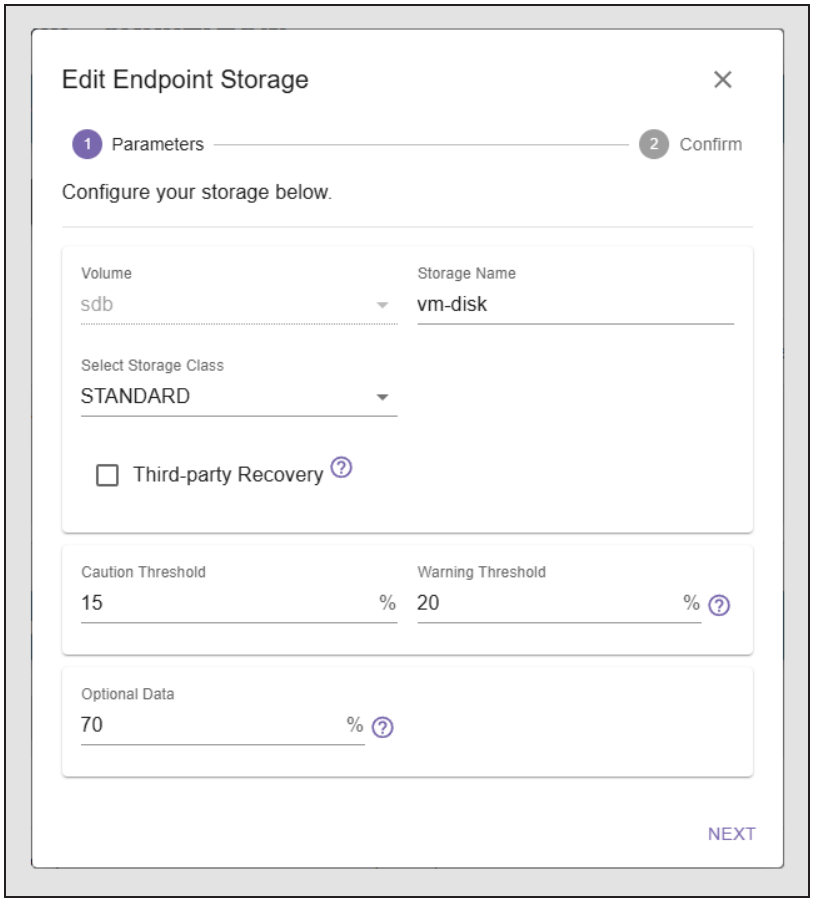


Figure 142 The Edit Endpoint Storage - Parameters - Object Manager VM Node screen.

4. If desired, use the **Select Storage Class** drop-down menu to change the storage class for the Object Manager VM storage endpoint.
5. If desired, use the **Use With Buckets** drop-down menu (not pictured) to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.
6. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and negatively affects performance.

7. If desired, you can change the **Caution Threshold** or **Warning Threshold**.
8. If desired, change the **Optional Data** threshold, which specifies the percentage of storage space to be used for optional clones of objects that are no longer required to be present on the storage.
9. Click **Next**.
10. Review the configuration, and click **Submit** to save the changes to the Object Manager VM storage.

Edit Google Cloud Platform Storage

Here is how to edit Google Cloud Platform storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Cloud Storage** banner, (**1**) select the row of the storage and (**2**) click **Edit**.

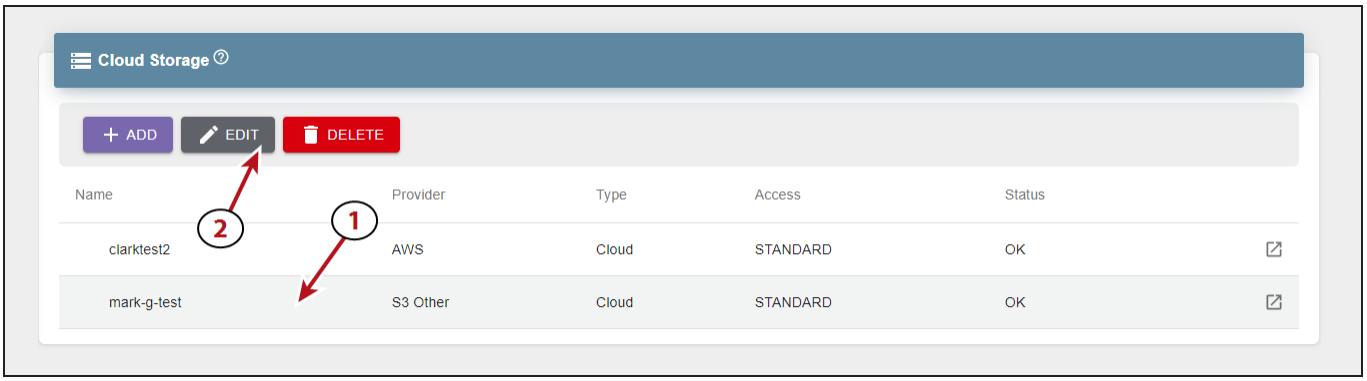


Figure 143 The Endpoint Storage pane.

3. Select either **Modify Parameters** or **Modify Authorization**, then click **Next**.

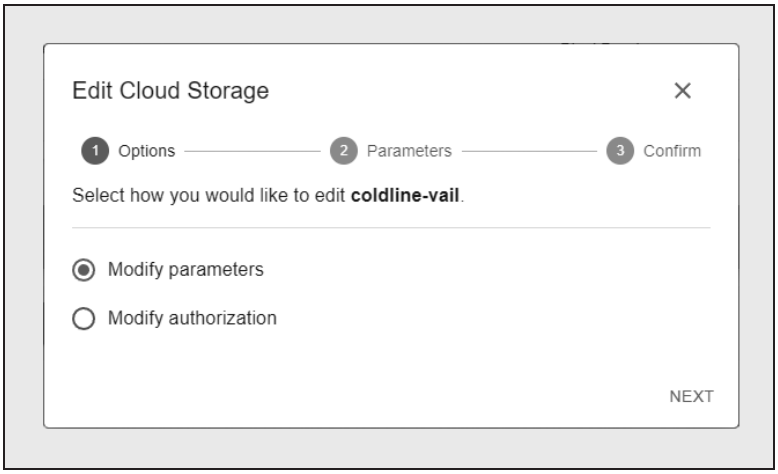


Figure 144 The Edit Cloud Storage - Options screen.

If you selected Modify Parameters...

a. If desired, you can change the **Storage Name** and **Storage Class**.

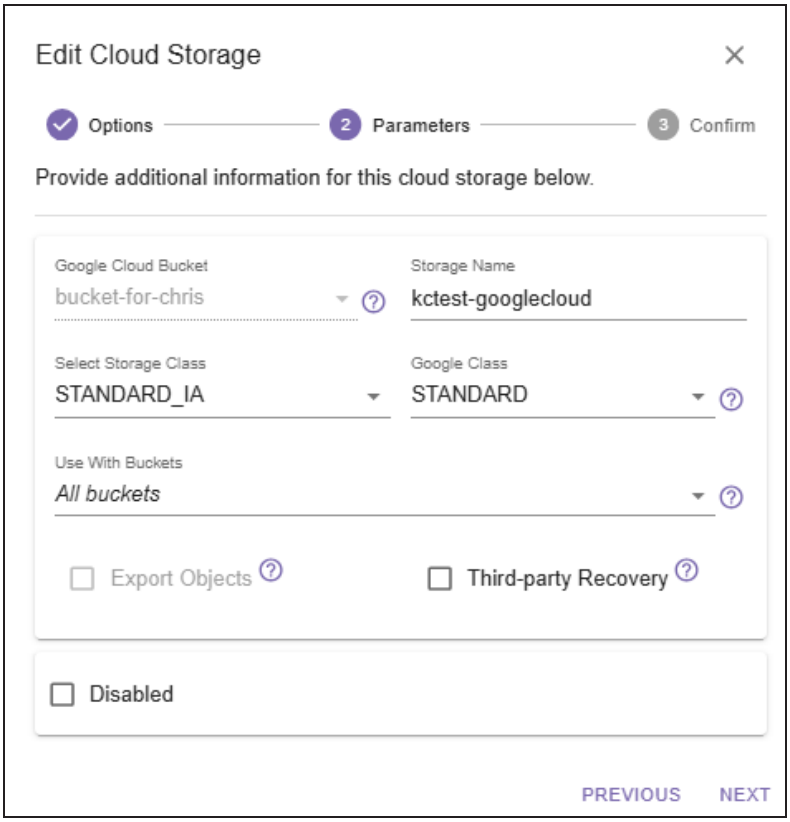


Figure 145 The Edit Cloud Storage - Parameters - Google Cloud Platform screen.

b. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

c. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Note: This option uses additional storage space and negatively affects performance.

d. If desired, select **Disabled**. This sets the cloud storage to a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

e. Click **Next**.

f. Review the configuration, and click **Submit** to save the changes to the cloud storage.

If you selected Modify Authorization...

a. If desired, you can enter new **Google Cloud Platform JSON Credentials**.

Note: If you change your credentials in the Google Cloud Platform system, you must update the Object Manager with the new credentials.

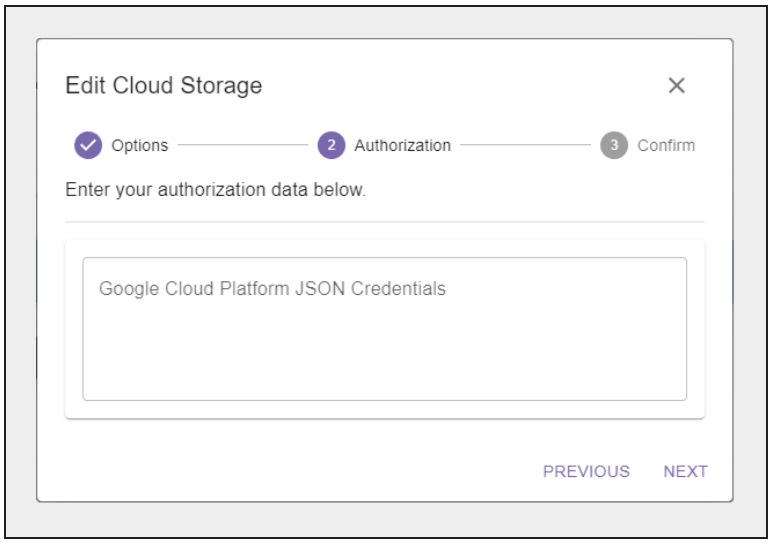


Figure 146 The Edit Cloud Storage - Authorization - Google Cloud Platform screen.

b. Click **Next**.

c. Review the configuration, and click **Submit** to save the changes to the cloud storage.

Edit AWS S3 Cloud Storage

Here is how to edit Amazon AWS S3 cloud storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Cloud Storage** banner, (**1**) select the row of the storage and (**2**) click **Edit**.

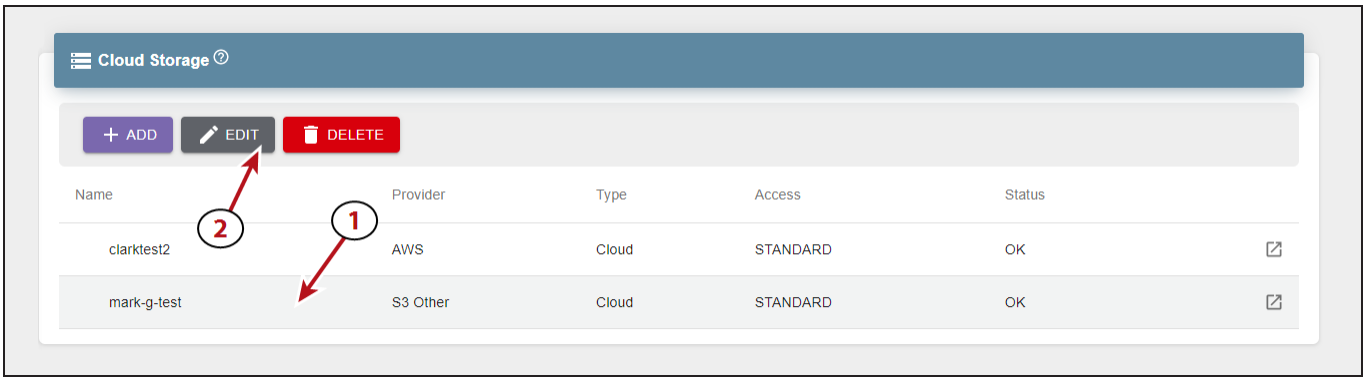


Figure 147 The Endpoint Storage pane.

3. Select either **Modify Parameters** or **Modify Authorization**, then click **Next**.

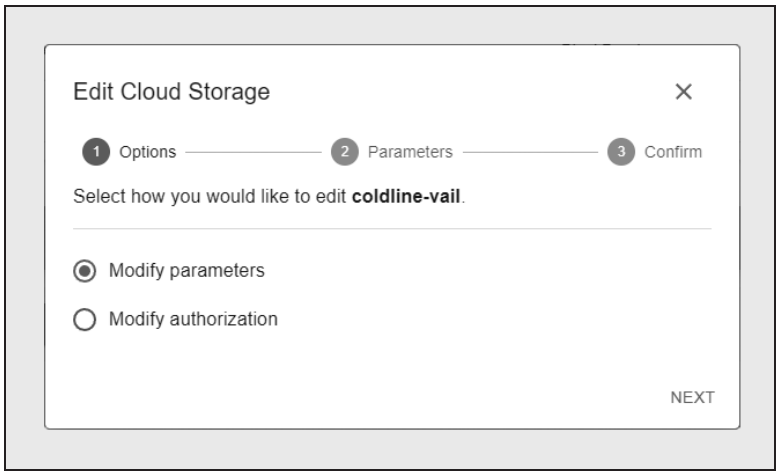


Figure 148 The Edit Cloud Storage - Options screen.

If you selected Modify Parameters...

a. If desired, you can change the **Storage Name**.

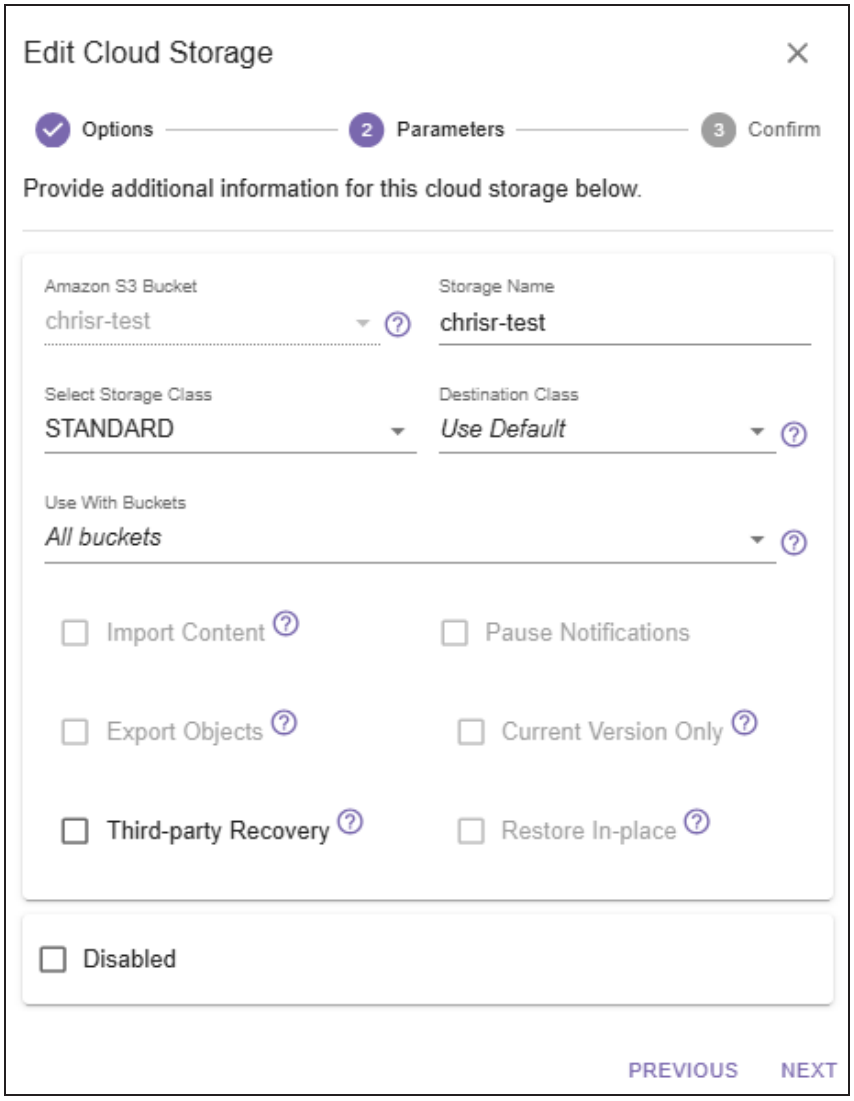


Figure 149 The Edit Cloud Storage - Parameters - AWS S3 Storage screen.

b. If you are editing a linked bucket storage endpoint, if desired, select **Pause Notifications** to stop receiving notifications when the contents of the AWS bucket have changed. If you are editing a standard bucket storage endpoint, this setting is greyed out and cannot be changed.

c. Change the **Storage Class** if desired.

d. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

e. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.

f. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Notes:
- This option uses additional storage space and negatively affects performance.
- You cannot change this setting if you selected to Export Objects when you created the cloud storage.

g. If desired, select **Disabled**. This sets the cloud storage to a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

h. Click **Next**.

i. Review the configuration, and click **Submit** to save the changes to the cloud storage.

If you selected Modify Authorization...

a. If desired, you can change the **Region**, **AWS Access Key** information and **AWS IAM** role settings.

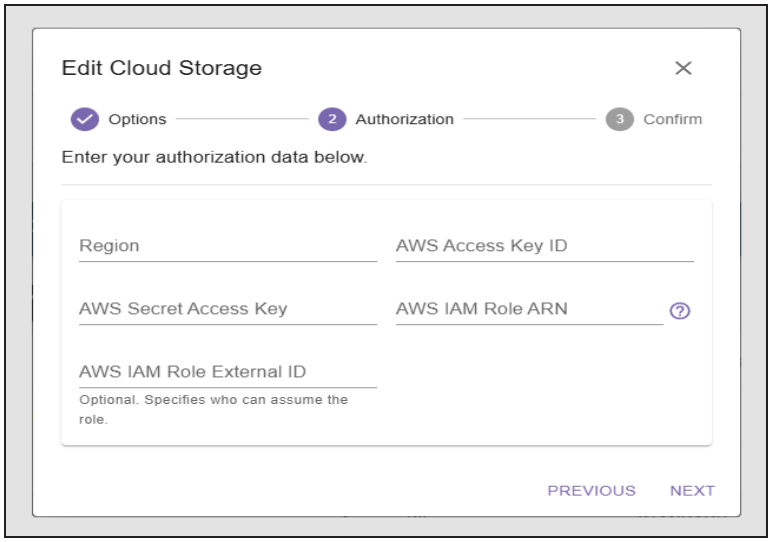


Figure 150 The Edit Cloud Storage - Authorization - AWS S3 Storage screen.

b. Click **Next**.

c. Review the configuration, and click **Submit** to save the changes to the cloud storage.

Edit Microsoft Azure Cloud Storage

Here is how to edit Microsoft Azure cloud storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Cloud Storage** banner, (**1**) select the row of the storage and (**2**) click **Edit**.

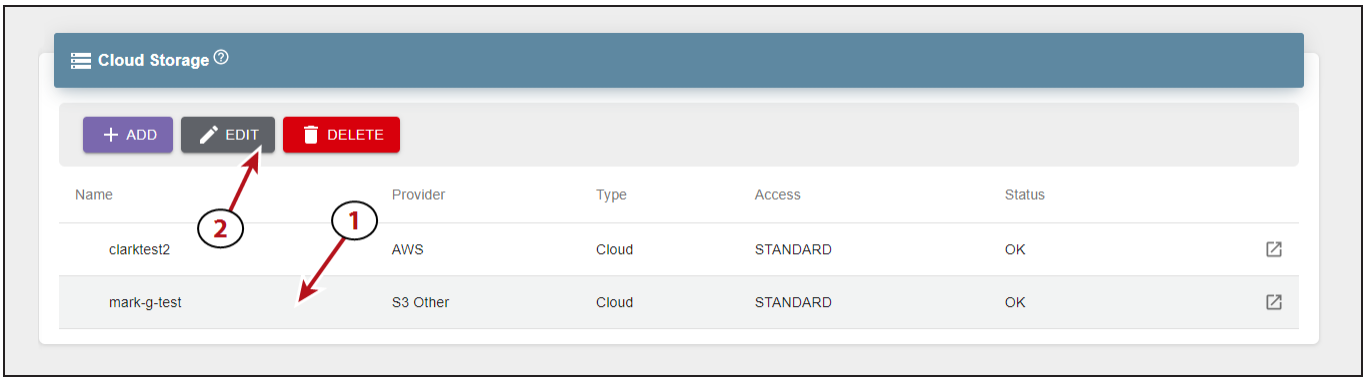


Figure 151 The Endpoint Storage pane.

3. Select either **Modify Parameters** or **Modify Authorization**, then click **Next**.

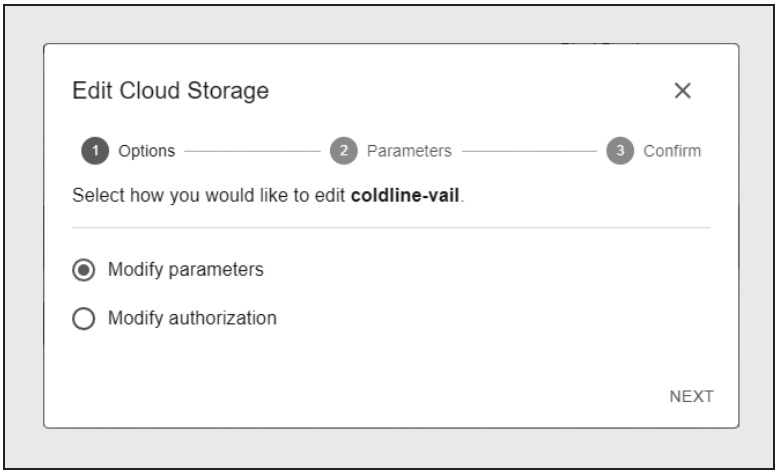


Figure 152 The Edit Cloud Storage - Options screen.

If you selected Modify Parameters...

a. If desired, you can change the **Storage Name** and **Storage Class**.

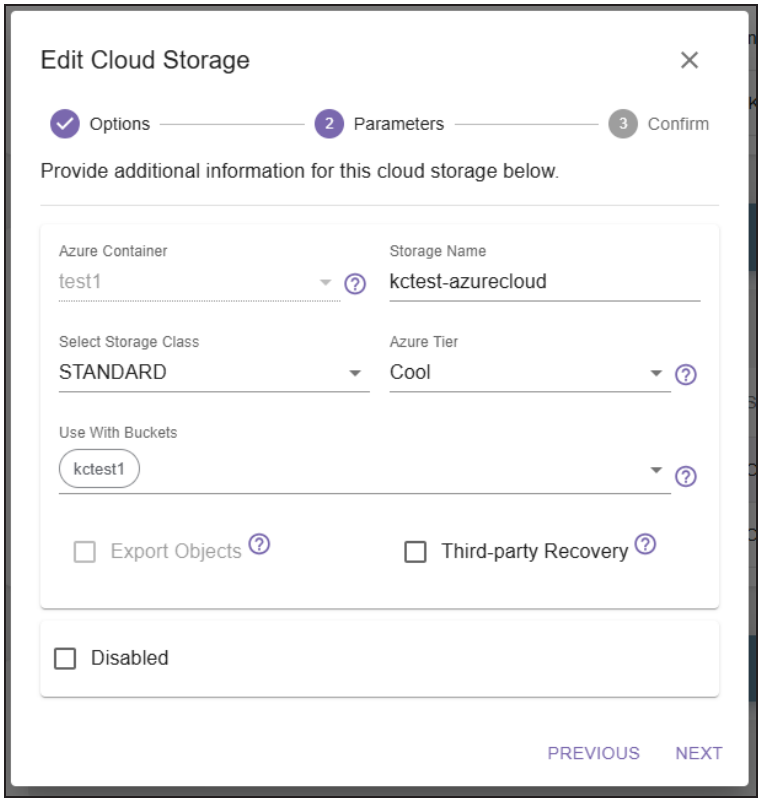


Figure 153 The Edit Cloud Storage - Parameters - Azure Storage screen.

b. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

c. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Notes:
- This option uses additional storage space and negatively affects performance.
- You cannot change this setting if you selected to Export Objects when you created the cloud storage.

d. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.

Note: You cannot enable this setting if you selected to Export Objects when you created the cloud storage.

e. If desired, select to **Disable** the endpoint storage. This sets the cloud storage to a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

f. Click **Next**.

g. Review the configuration, and click **Submit** to save the changes to the cloud storage.

If you selected Modify Authorization...

a. If desired, you can change the **Shared Secret** information.

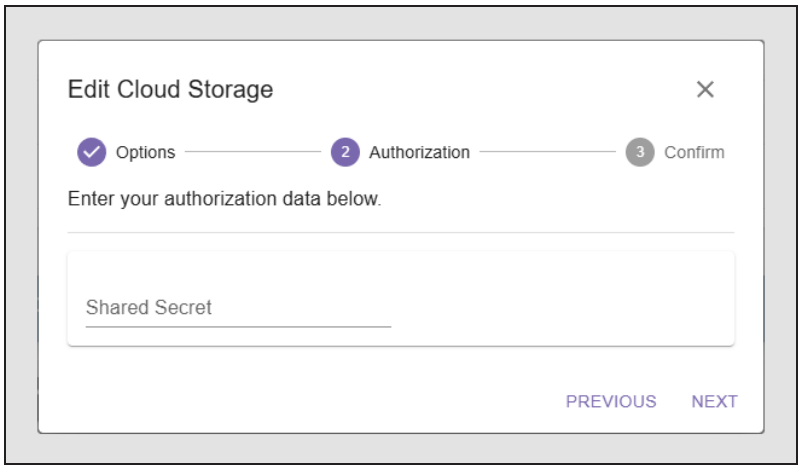


Figure 154 The Edit Cloud Storage - Authorization - Azure Storage screen.

b. Click **Next**.

c. Review the configuration, and click **Submit** to save the changes to the cloud storage.

Edit Other S3 Cloud Storage

Here is how to edit Other S3 cloud storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Cloud Storage** banner, (**1**) select the row of the storage and (**2**) click **Edit**.
3. Select either **Modify Parameters** or **Modify Authorization**, then click **Next**.

If you selected Modify Parameters...

a. If desired, you can change the **Storage Name**.

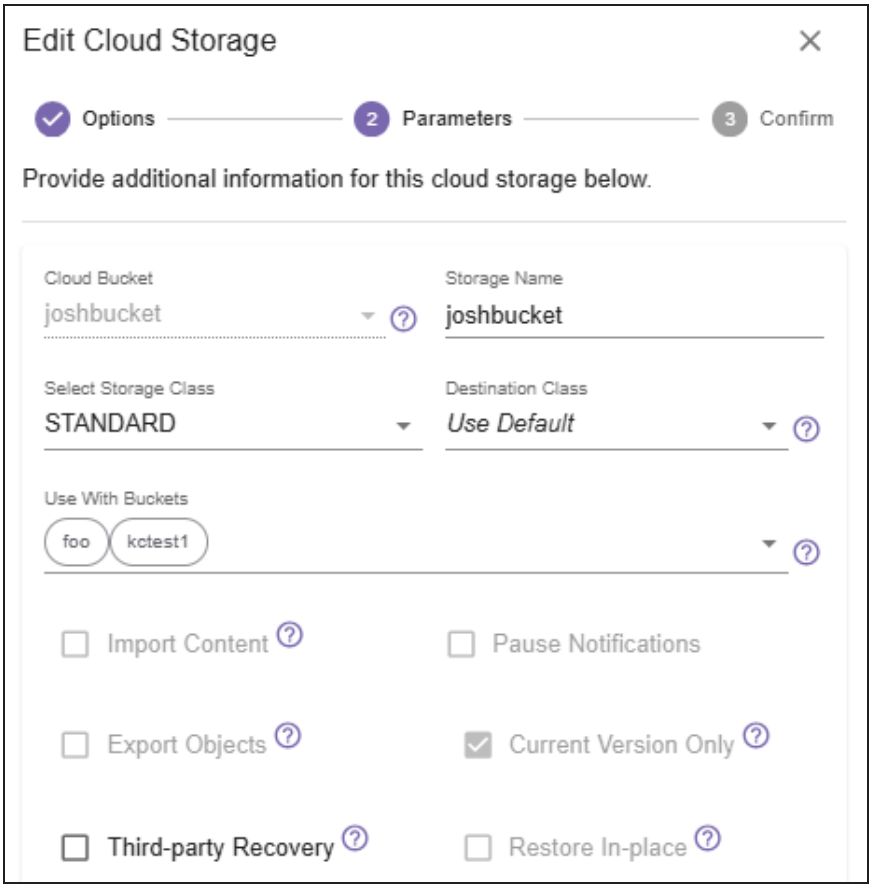


Figure 155 The Edit Cloud Storage - Parameters - Other S3 Storage screen.

b. If you are editing a linked bucket storage endpoint, if desired, select **Pause Notifications** to stop receiving notifications when the contents of the AWS bucket have changed. If you are editing a standard bucket storage endpoint, this setting is greyed out and cannot be changed.

c. Edit the **Storage Class** if desired.

d. Edit the **Destination Class** if desired.

e. If desired, use the **Use With Buckets** drop-down menu to select buckets for the storage endpoint. This option configures the storage endpoint to only store data object clones on the selected buckets.

f. If desired, select to enable **Third-Party Recovery**. This option creates a clone for delete markers, 0-length objects, and tiny objects, even though those clones are unnecessary. It also enables storage of full object metadata, which allows you to generate full objects from the content on the storage endpoint.

Notes:
- This option uses additional storage space and negatively affects performance.
- You cannot enable this setting if you selected to Export Objects when you created the cloud storage.

g. If you selected Glacier or Deep Archive as the storage class, you may select to enable **Restore In Place**. The restore in-place option uses internal resources on archival storage to create a clone in the same storage. If this setting is not enabled, new clones are created on different storage. Selecting this option may use additional cache space or incur additional cloud storage fees.

h. Select the desired **Addressing Style**. This setting controls the URL format used when communicating with the cloud storage provider.

Selection	Description
Path Style	Path style formatting uses the bucket name as part of the URL path. **Example**: *http://endpoint/bucket-name/object-key*
Virtual-Hosted	Virtual-hosted style addressing uses the bucket as the prefix to the endpoint name **Example**: *http://bucket-name.endpoint/object-key*

i. If desired, select **Disabled**. This sets the cloud storage to a disabled state. The cloud storage must be manually enabled before it can be used for data storage operations.

j. Click **Next**.

k. Review the configuration and click **Submit**.

If you selected Modify Authorization...

a. If desired, edit URL address of the **Data Path Endpoint**.

b. If desired, change the **Region** of the Other S3 endpoint.

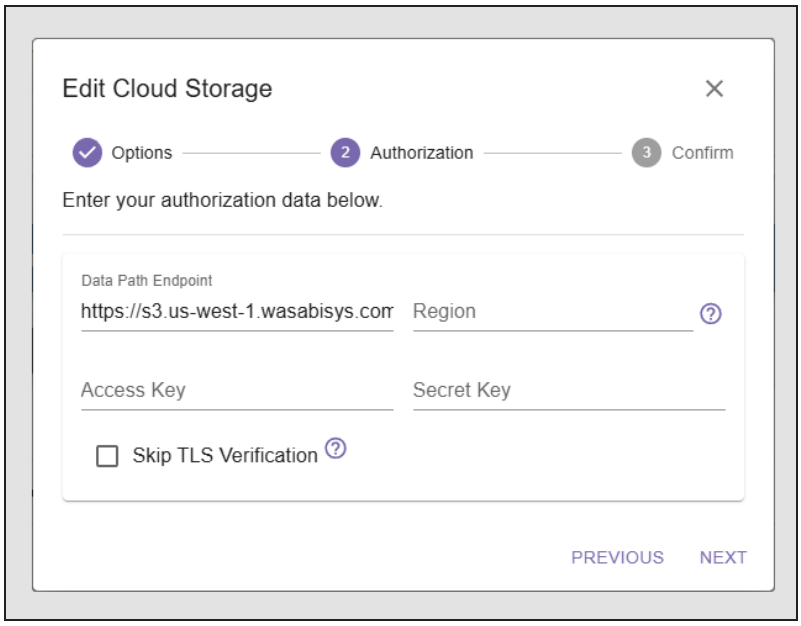


Figure 156 The Edit Cloud Storage - Authorization - Other S3 Storage screen.

c. If desired, you can change the **Access Key** and **Secret Key** information.

d. If desired, select **Skip TLS Verification**. This option disables TLS certificate verification for HTTPS endpoints.

Note: This setting does not apply to HTTP endpoints.

e. Click **Next**.

f. Review the configuration, and click **Submit** to save the changes to the cloud storage.

CONSOLIDATE STORAGE

The consolidate storage function performs two tasks, consolidation of data packs and consolidation of metadata packs. Both tasks run when you consolidate storage, you cannot run one task separately.

Consolidate Storage Pack

This option is useful if you have deleted a large number of object clones and want to consolidate the partial data packs. The consolidate storage pack task runs everyday automatically at the scheduled daily processing time. You only need to consolidate storage packs manually if you do not want to wait for the daily processing schedule.

Consolidate Metadata Packs

This option is useful if you have third-party recovery enabled. The third-party recovery option writes daily metadata packs for use in recovering your data outside of the Object Manager environment. These metadata packs accumulate over time, so the consolidation of metadata packs merge these packs into the smallest number of metadata packs possible.

Note: The consolidate storage feature may take a long time depending on the number of objects.

Here is how you consolidate storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** or banner, (**1**) select the row of the storage, and (**2**) click **Consolidate**.

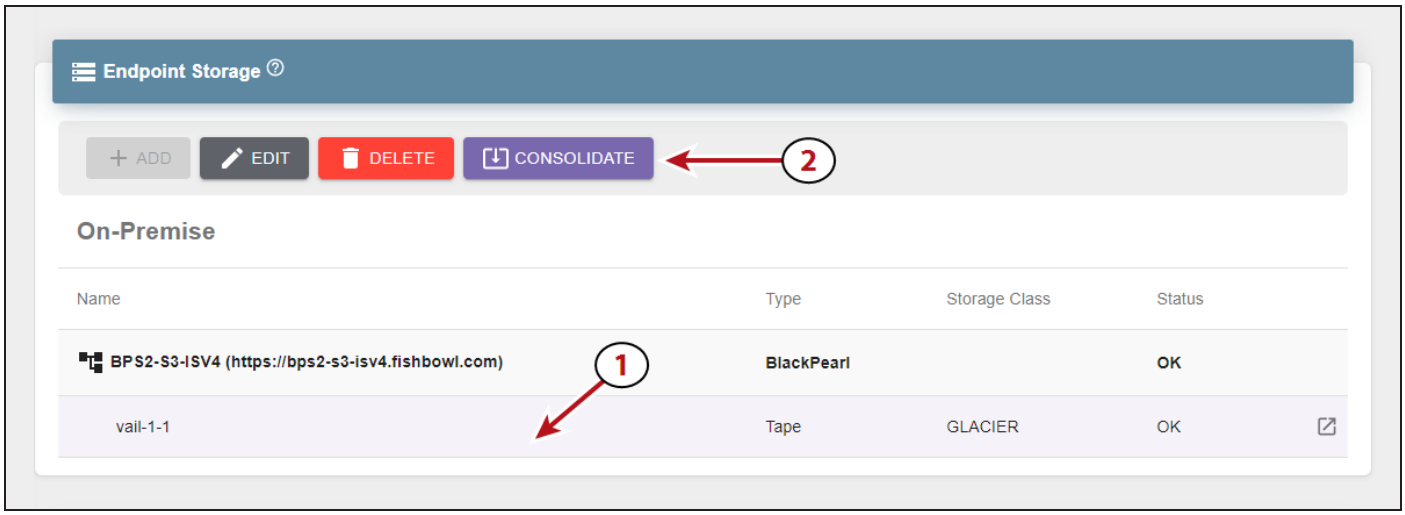


Figure 157 The Endpoint Storage pane.

3. On the confirmation screen, click **Consolidate**.

Note: The consolidate storage feature may take a long time depending on the number of objects.

DELETE STORAGE

When you delete storage, you can select to delete all data on the storage, or to move data to alternative storage.

CAUTION If you select **Delete All Data**, any object clone that is **only** persisted on the storage is permanently deleted and cannot be recovered.

If you select **Choose Alternative Storage**, any object clone that exists only on the storage to be deleted is moved to the specified alternate storage. After all unique objects are moved, the storage is deleted.

To make sure you do not lose any data unintentionally, it is recommended to select **Choose Alternative Storage** and allow the Object Manager to migrate any necessary data to alternative storage.

Note: You cannot delete storage that contains the only clone of a locked object.

Here is how to delete endpoint storage or cloud storage and optionally move data to alternative storage:

1. In the Object Manager user interface taskbar, click **Storage**.
2. Under the **Endpoint Storage** or **Cloud Storage** banner, (**1**) select the row of the storage, and (**2**) click **Delete**.

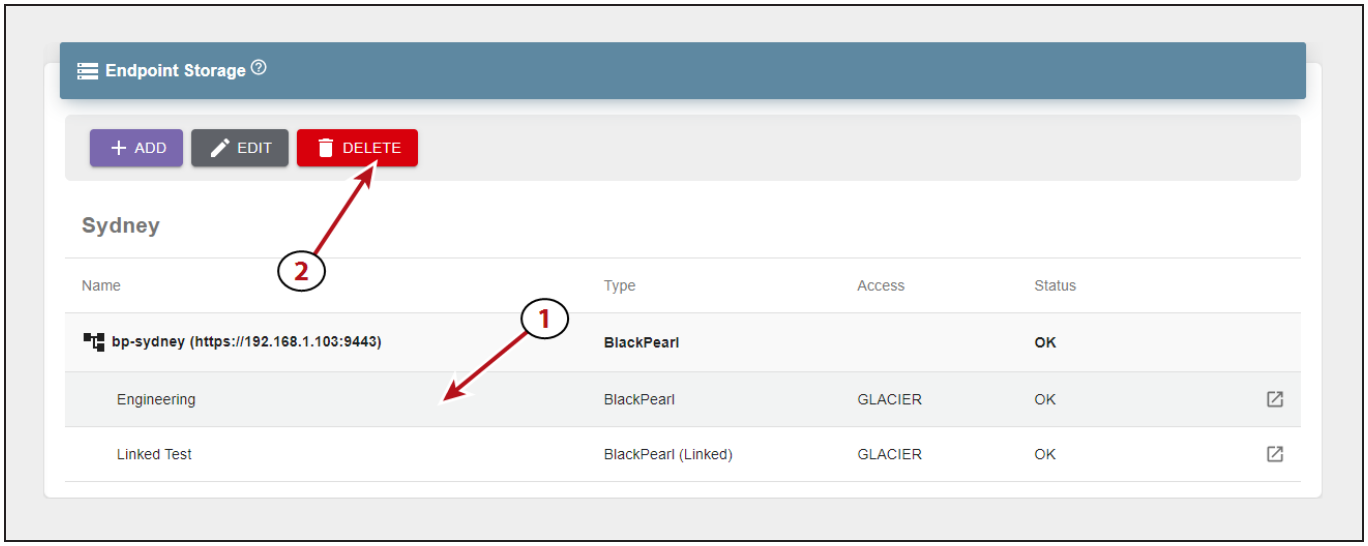


Figure 158 The Endpoint Storage pane.

To move unique object data to alternative storage:

1. Select **Choose Alternative Storage**.

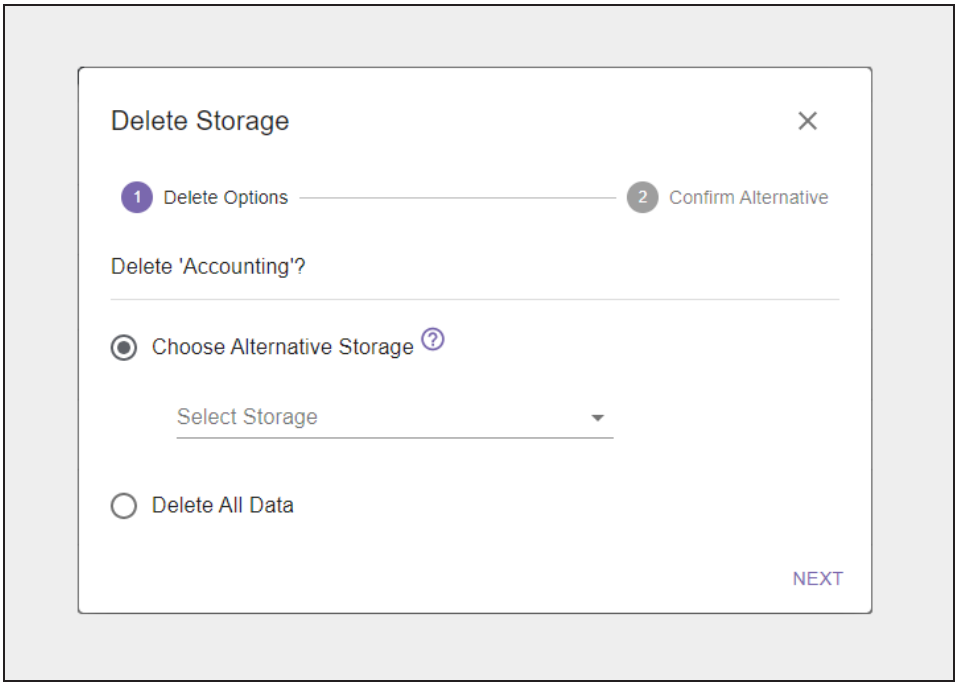


Figure 159 The Delete Storage - Delete Options screen.

2. Using the **Select Storage** drop-down menu, select the storage to use as alternative storage.
3. Click **Next**.

4. Select the **check box** confirming you understand the storage is permanently deleted after moving unique object data to the alternative storage.

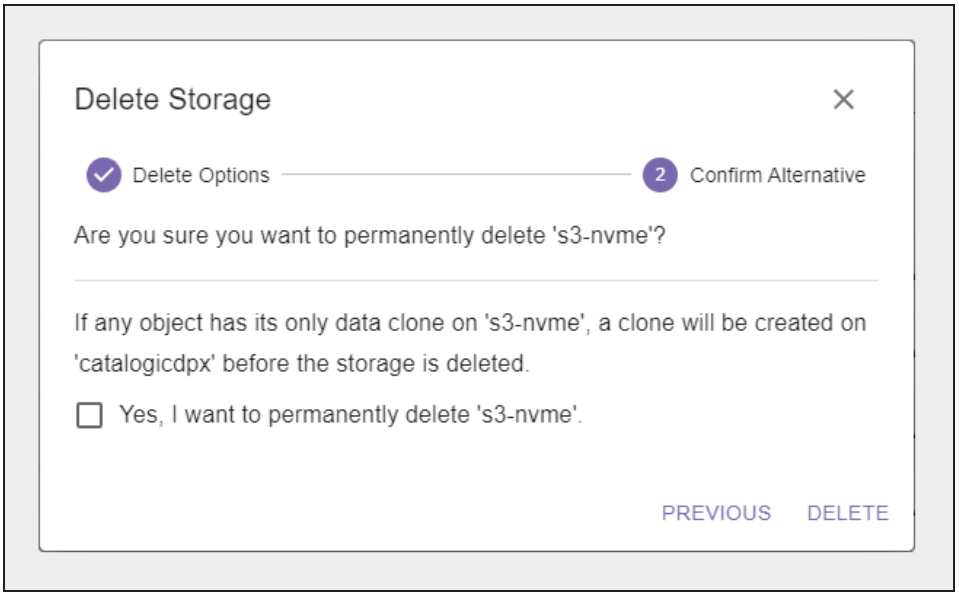


Figure 160 The Delete Storage - Confirm Alternative screen.

5. Click **Delete**.

To delete all data:

1. Select **Delete All Data** and click **Next**.

CAUTION If you select **Delete All Data**, any object clone that is **only** persisted on the storage is permanently deleted and cannot be recovered.

2. Enter the name of the storage in **Confirmed Name** field.

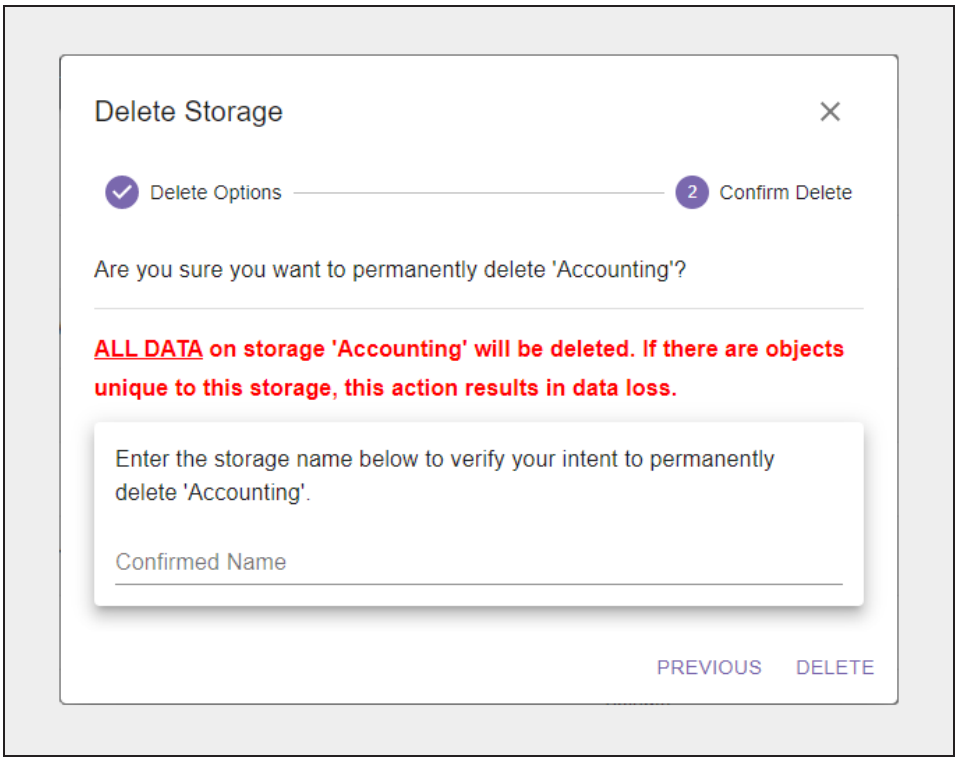


Figure 161 The Delete Storage - Confirm Delete screen.

3. Click **Delete**.

VIEW LIFECYCLE DETAILS

The lifecycles detail screen displays information about the selected lifecycle, including all lifecycle properties and rules.

Here is how to view the details of a lifecycle:

1. In the Object Manager user interface taskbar, click **Lifecycles**.
2. Under the **Lifecycles** banner, click the **View Details** icon on the right side of the pane for the lifecycle which you want to view details.

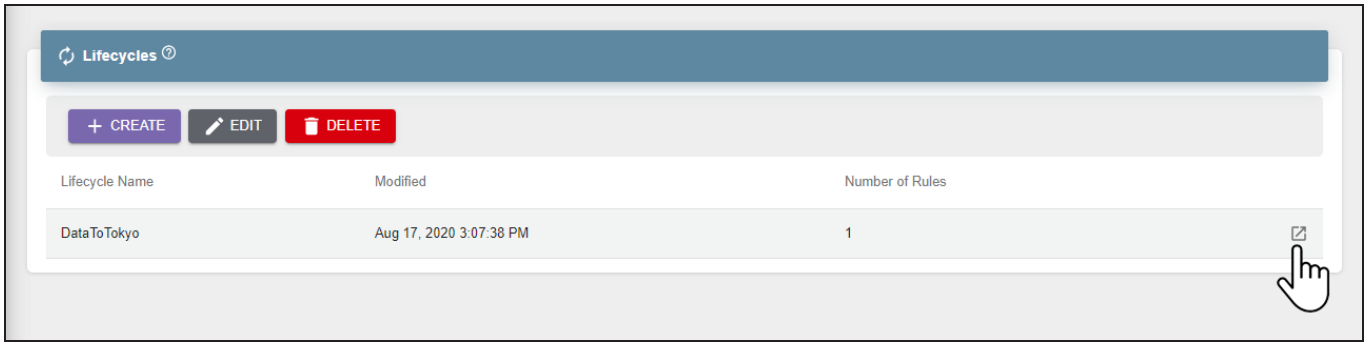


Figure 162 The Lifecycles pane.

3. Click **Properties** or **Rules** to view the current lifecycle settings.

- The Properties screen:

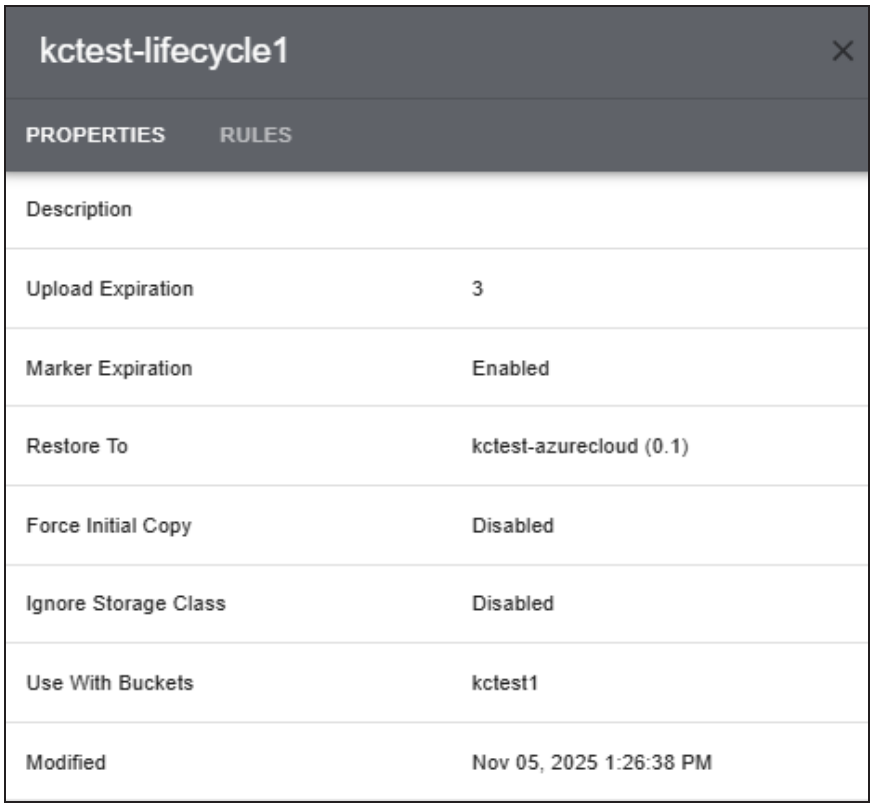


Figure 163 The Lifecycle Rule Details - Properties screen.

Field	Description
Description	The text, if any, entered in the Description field when creating the bucket.
Upload Expiration	The number of days that must pass before a multipart upload is aborted. When a multipart upload is aborted, it deletes all parts associated with the upload, which prevents remaining incomplete uploads from being stored.
Marker Expiration	Indicates if the Delete Marker Expiration option is **Enabled** or **Disabled**.
Restore To	The configured location where clones are restored.
Force Initial Copy	Indicates if the lifecycle is configured to initially place data as STANDARD storage. Additional clones are created immediately as GLACIER storage.
Ignore Storage Class	Indicates if the lifecycle is configured to ignore the storage class requested in a PUT or upload operation and instead use the configured storage class of the selected storage endpoint.
Use With Buckets	Indicates if the lifecycle is configured to use specific buckets.
Modified	The date and time the lifecycle was last modified.

- The Rules screen:

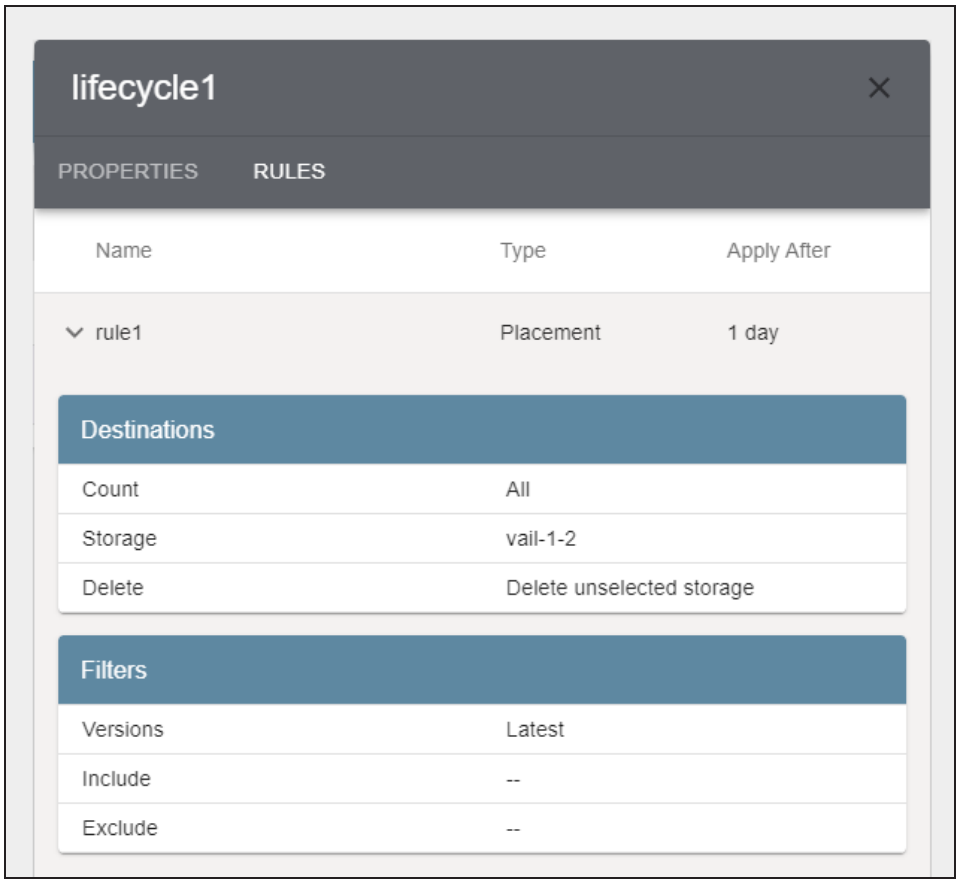


Figure 164 The Lifecycle Rule Details - Rules screen.

Field	Description
Name	The name of the lifecycle.
Type	The type of lifecycle rule. **Values:** Clone, Move, Expiration.
Apply After	The number of days before the lifecycle rule is applied.
Destinations - Count	The number of destinations configured for the lifecycle. **Values:** 1-5, All.
Destinations - Storage	The storage endpoint(s) used by the lifecycle.
Destinations - Delete	Whether or not the lifecycle is configured to delete clones on storage destinations that are not configured in the lifecycle.
Filters - Versions	The versioning setting configured for the lifecycle.
Filters - Include	The text string used to filter objects to include in storage operations.
Filters - Exclude	The text string used to filter objects to exclude from storage operations.

EDIT A LIFECYCLE

If desired, you can edit a lifecycle to change how it controls data movement and retention. All settings used when creating a lifecycle are available when editing a lifecycle.

Here is how to edit a lifecycle:

1. In the Object Manager user interface taskbar, click **Lifecycles**.
2. Under the **Lifecycles** banner select the lifecycle to edit, and click **Edit**.
3. If desired, edit the lifecycle **Name** and **Description**.

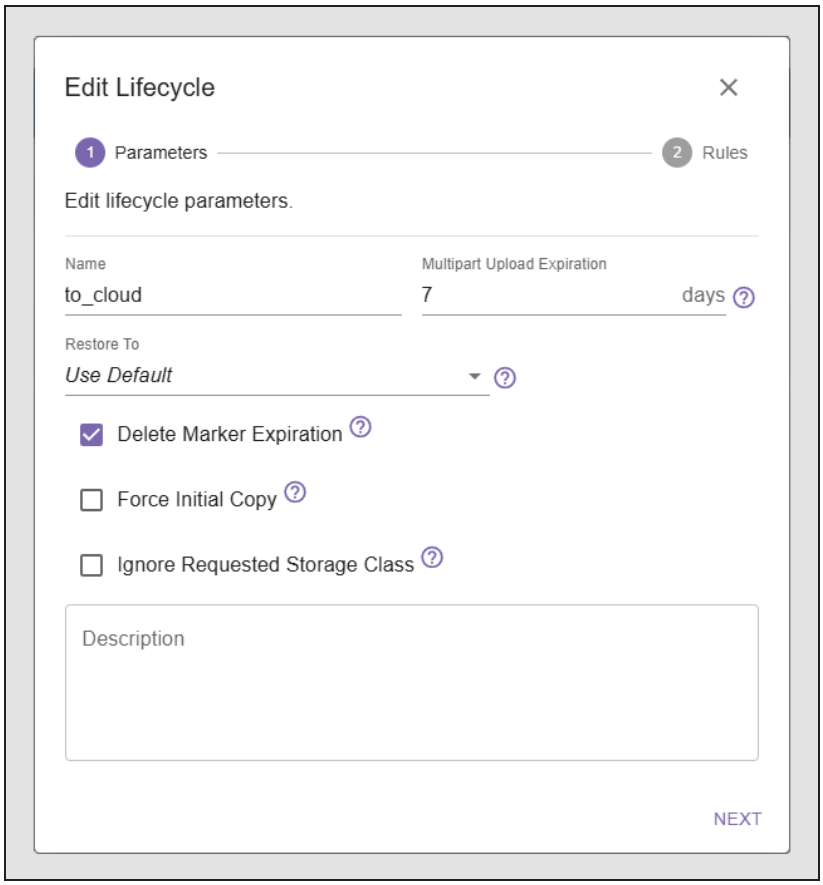


Figure 165 The Edit Lifecycle - Parameters screen.

4. If desired, enter a value for **Multipart Upload Expiration** in days. This setting controls how long the Object Manager waits before aborting multipart uploads. When the multipart upload aborts, all parts of the upload are deleted. This prevents retaining multiple incomplete uploads.
5. If desired, use the **Restore To** drop-down menu to select a specific storage pool where you want to restore bucket objects. If you use the default setting, the Object Manager application decides which storage pool to restore objects.

6. If desired, select or clear **Delete Marker Expiration**. A delete marker keeps track of deletions of versioned objects so that the application can determine if the object is missing. If enabled, the Object Manager removes delete markers when they are the last remaining version of an object.
7. If desired, select or clear **Force Initial Copy**. When enabled, the Object Manager application initially places data as STANDARD storage. Additional clones are created immediately as GLACIER storage. This may provide performance advantages as copying clones to GLACIER results in a clone that is ordered sequentially and more optimally packed.
8. If desired, select or clear **Ignore Requested Storage Class**. When enabled, the Object Manager application does not consider the storage class requested in a PUT or upload operation and instead uses the storage class of the selected storage endpoint.
9. Click **Next**.

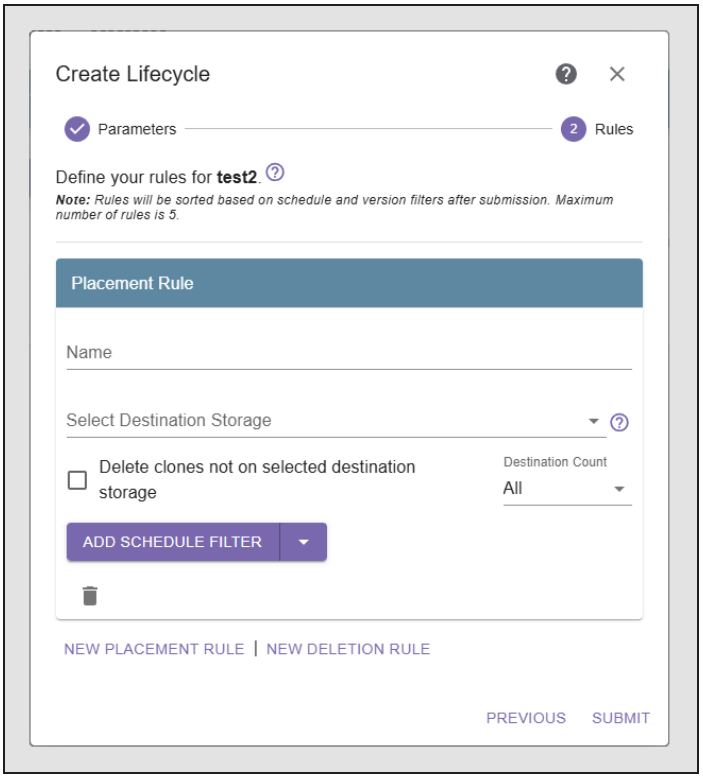


Figure 166 The Edit Lifecycle - Rules screen.

- Use the links below to create or edit lifecycle rules.
  - **Add a Transfer Rule on page 82**
  - **Add a Deletion Rule on page 85**
- To delete a lifecycle rule, click the **trash can icon**.

Note: There is no confirmation step for this action.

10. After making the desired changes, click **Submit**.

DELETE A LIFECYCLE

If desired, you can delete a lifecycle when its data placement schema is no longer needed.

Note: You cannot delete a lifecycle currently being used by a Object Manager bucket.

Here is how to delete a lifecycle:

1. In the Object Manager user interface taskbar, click **Lifecycles**.
2. Under the **Lifecycles** banner, (**1**) select the lifecycle to delete, and (**2**) click **Delete**.

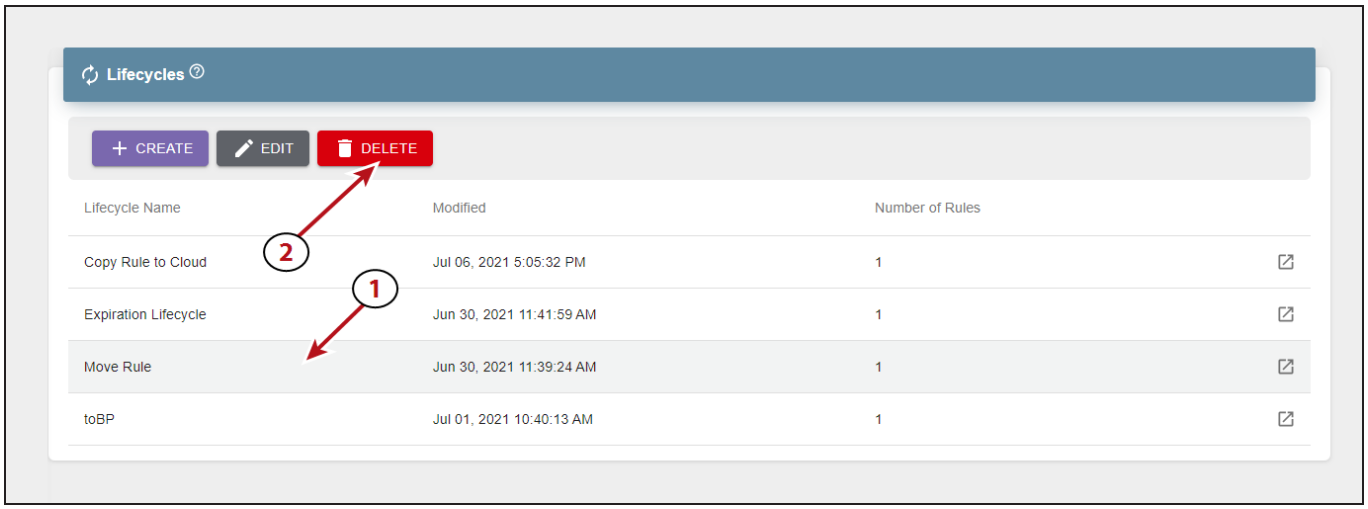


Figure 167 The Lifecycles pane.

3. A confirmation screen displays. Click **Delete** to confirm deleting the lifecycle.

CLEAR THE IAM CACHE

The Object Manager maintains an IAM (Identity and Access Management) cache independent from the cache maintained by Amazon Web Services. When users make IAM changes, AWS sends a notification to the Object Manager, but the Object Manager user interface may not update immediately. Clearing the Object Manager IAM cache deletes the current information and causes the Object Manager to retrieve all IAM information from AWS.

Additionally, clear the IAM Cache if you make security changes to or create a new set of IAM credentials in the AWS management console and want them to immediately display in the Object Manager user interface.

Note: It may take several minutes for AWS security changes to take effect. Spectra Logic recommends waiting approximately 3-5 minutes after making changes before clearing the IAM cache, or updated settings may not display.

Here is how to clear the IAM cache:

1. In the upper right corner of the management console, click the **gear icon** and select **IAM Users & Groups**.
2. In the **IAM Users** pane, click **Clear Cache**.
3. In the confirmation window, click **Clear Cache**.

VIEW REPORTS

The Reports screen allows you to view any existing audit logs for the Object Manager, and detailed information for each audit log.

- In the Object Manager user interface taskbar, click **Reports**.

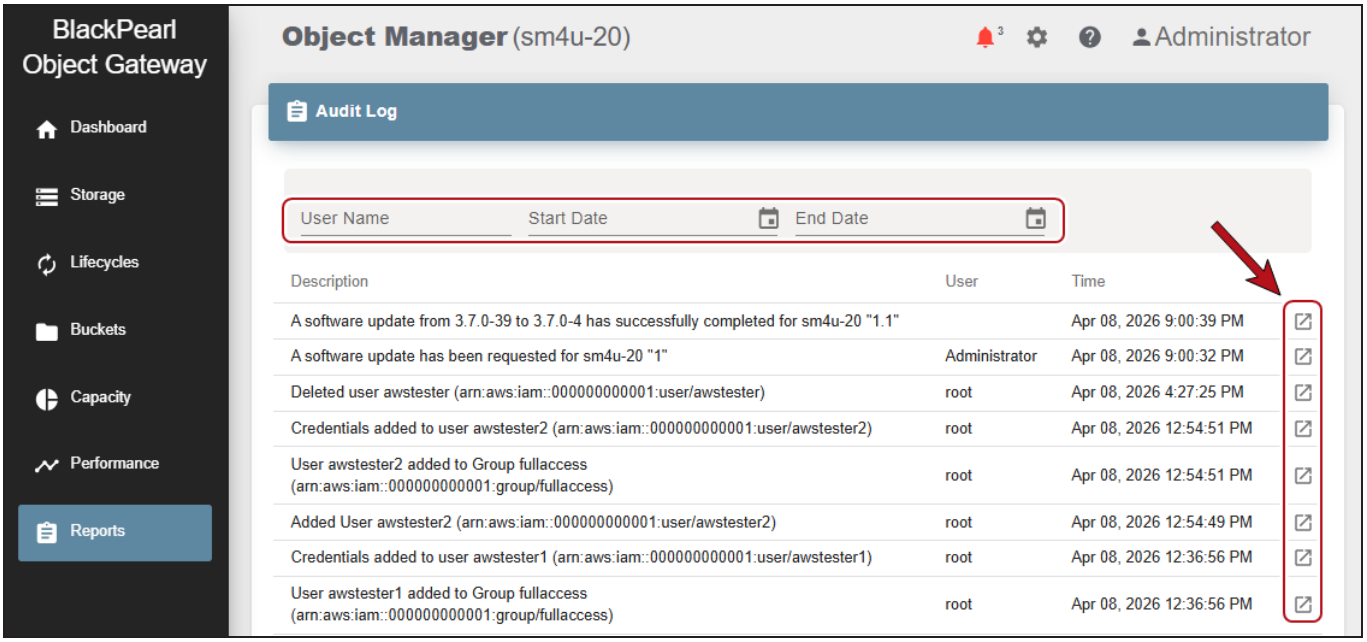


Figure 168 The Reports screen.

- Use the **User Name**, **Start Date**, or **End Date** menus to refine the list of audit logs.

  Note: Not all audit logs contain a User Name.

- Click the **View Details** icon on the right end of each audit log row to view details about the audit log.

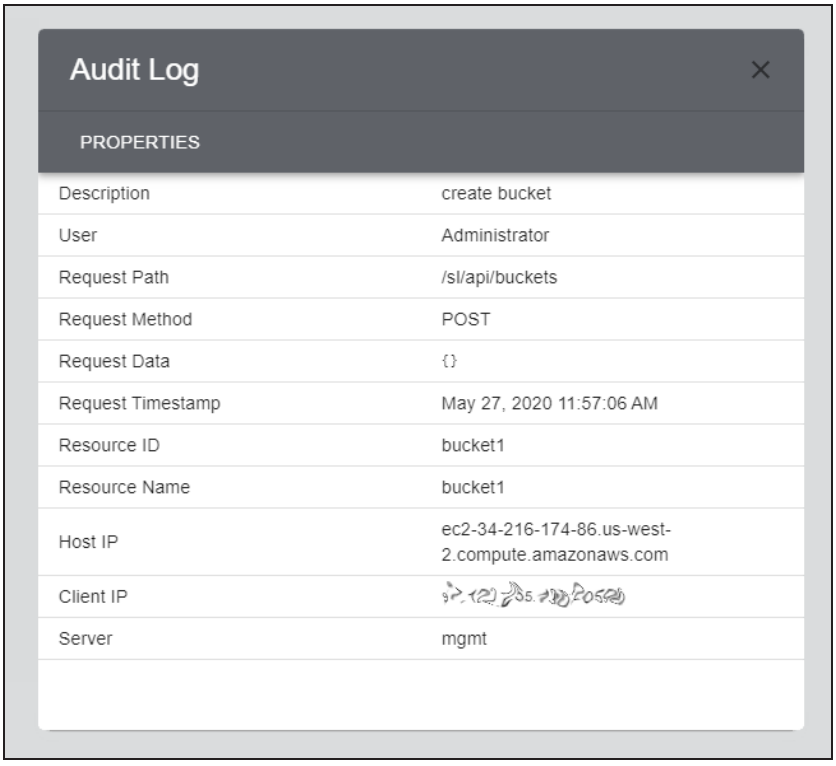


Figure 169 The Audit Logs details screen.

Option	Description
Description	The description of the audit log.
User	The user associated with the log.
Request Path	The API path for the log.
Request Method	The method by which the log was generated.
Request Data	The contents of the log.
Request Timestamp	The time and date the log was generated.
Resource ID	The ID of the resource associated with the log.
Resource Name	The name of the resource associated with the log.
Host IP	The IP address of the Object Manager sphere.
Client IP	The IP address of the BlackPearl system or Object Manager VM node associated with the log.
Server	The name of the resource within the Object Manager sphere.

VIEW SPECTRA BLACKPEARL OBJECT MANAGER MESSAGES

Object Manager messages provide important information about the status and current functionality of the Object Manager sphere. If desired, you can configured sphere administrators to receive messages automatically.

Note: The Object Manager does not generate a message when an AWS cloud storage target is unavailable for backup operations. Some third-party applications may report this event as a warning message in their user interface.

Here is how to view messages:

In the upper right corner of the management console, click the **bell icon**. The value to the left of the icon indicate the number of unread messages.

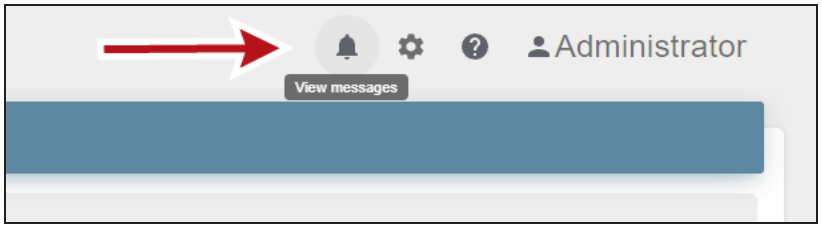


Figure 170 The Bell icon.

The messages screen displays. Any unread messages are shown in bold font.

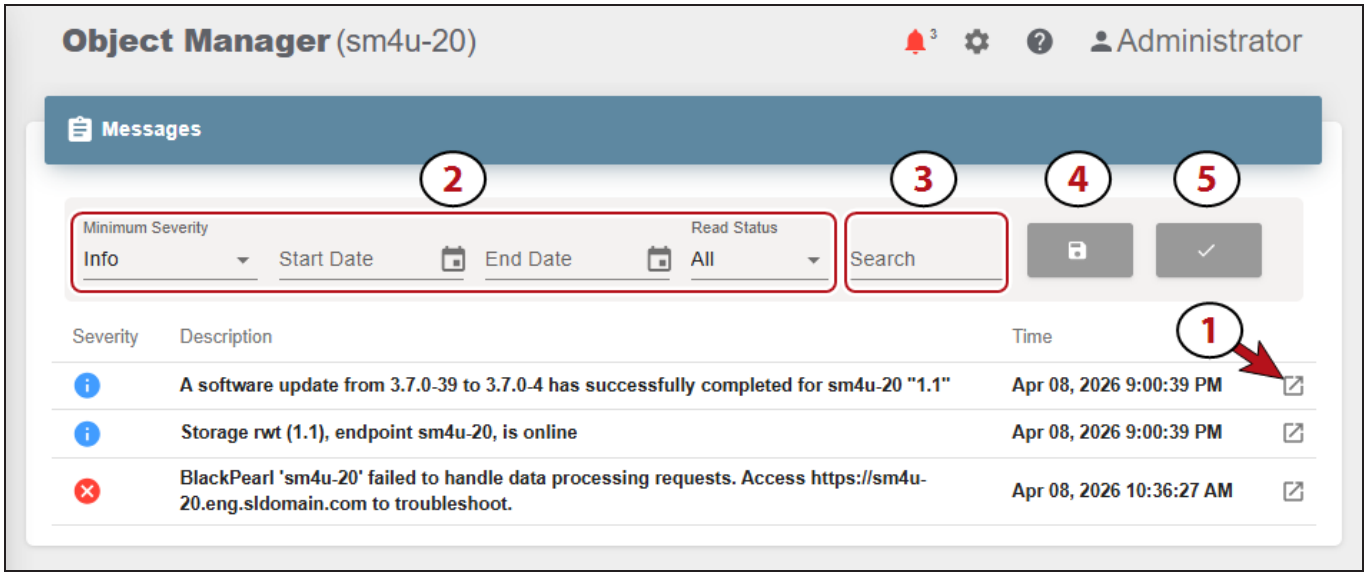


Figure 171 The Messages screen.

- To view message details, on the right end of the message row, click the **View Details** icon (**1**).
- You can sort messages using the **Minimum Severity**, **Start Date**, **End Date**, and **Read Status** drop-down menus (**2**).
- You can search messages for a text string by typing in the **Search** field (**3**).
- To download messages to your local host, in the upper-right corner of the Messages pane, click the **disk icon** (**4**).
- To mark all messages as read, in the upper-right corner of the Messages pane, click the **check mark icon** (**5**).

Message Details

In addition to the information on the Messages screen, the message details pane also displays the message key.

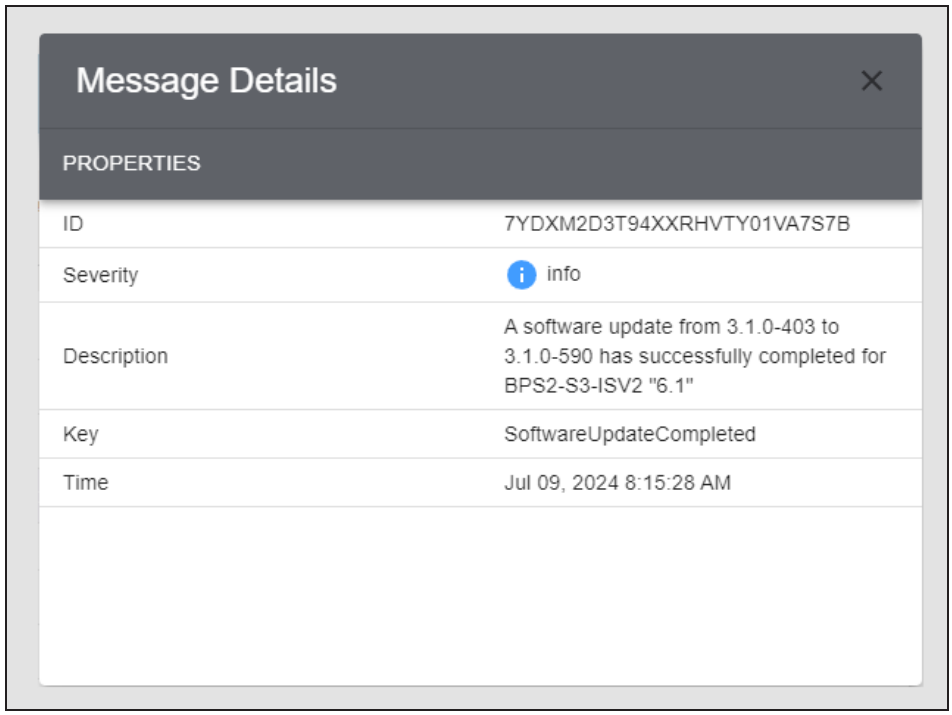


Figure 172 The Message Details screen.

Field	Description
ID	The ID value of the message.
Severity	The severity of the message. **Info** - an event occurred such as a successful firmware update of the Object Manager sphere. **Warning** - An event that may affect data transfers occurred, such as the Object Manager sphere detects a down-level firmware version. **Error** - An event that prevents data transfers occurred, such as the nonavailability of a storage endpoint.
Description	The message description.
Key	The message key. This value is useful when using the REST API to gather messages.
Time	The date and time the message was generated.

SPECTRA BLACKPEARL OBJECT MANAGER LOGS

Use the Logs page to generate and download logs for use in troubleshooting problems with the Object Manager sphere.

Note: If you delete the logs bucket in your AWS account, the bucket is recreated the next time you generate a log set in the Object Manager.

In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Logs**.

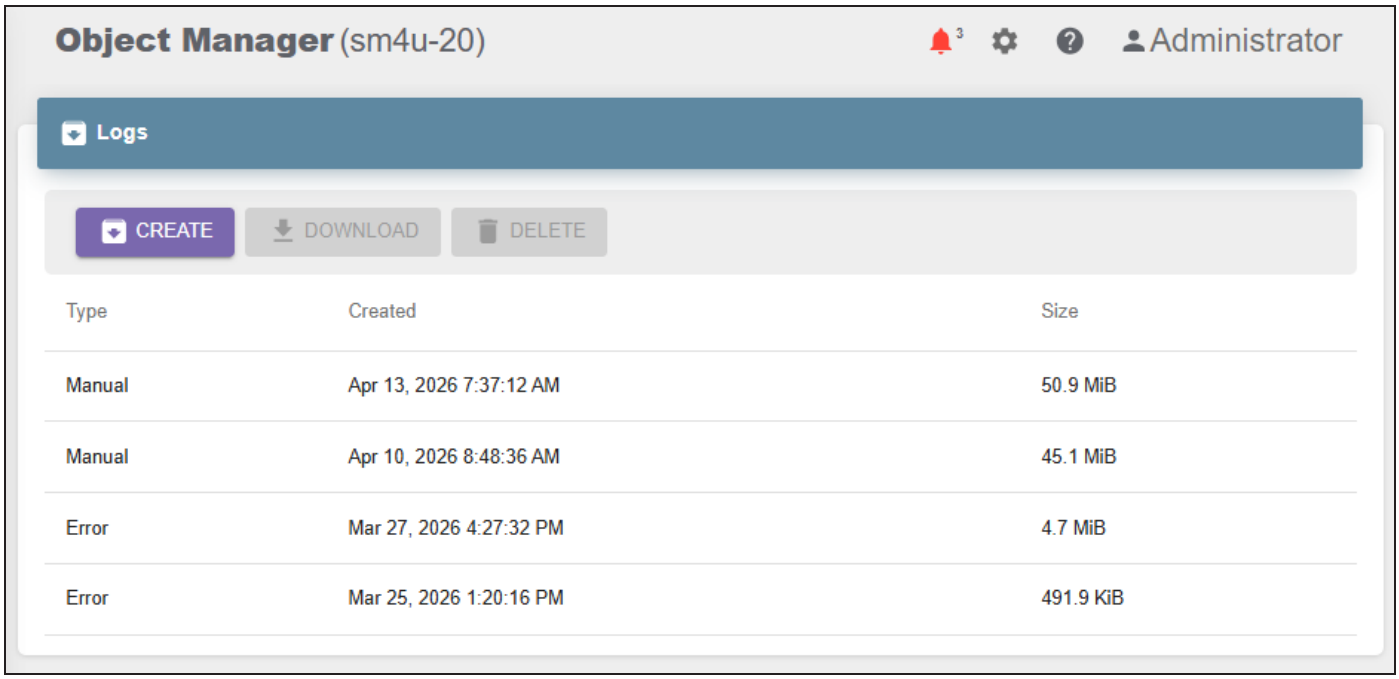


Figure 173 The Logs screen.

- To generate a new logset, click **Create** and use the **Select Endpoint** drop-down menu to select the storage for which you want to generate a logset.
- To generate a new logset, click **Create**.
- To download an existing logset, select the row of the logset and click **Download**.
- To delete an existing logset, select the row of the logset and click **Delete**.

UPDATE THE SPECTRA BLACKPEARL OBJECT MANAGER SOFTWARE

Use the instructions below to update the Object Manager sphere software, and the software that storage endpoints use to communicate with the Object Manager sphere.

Each component must be updated separately, and each component update must be initiated manually. Components include the Object Manager sphere, BlackPearl Storage Manager and Object Manager VM nodes.

Note: The software running on the BlackPearl system is not updated using this process. See the *BlackPearl Storage Manager User Guide* for instructions on updating BlackPearl software.

In general, update the Object Manager software in the following order:

- Object Manager sphere software
- BlackPearl Storage Manager software
- Object Manager VM Node software

Note: Spectra Logic recommends checking the Object Manager Release Notes for any changes to the update order that may be required for specific Object Manager release versions.

Update Requirements

- Before upgrading the Object Manager software, confirm the BlackPearl Storage Manager is running BlackPearl OS 5.8.x or later.
- Before upgrading to Object Manager 3.6, you must update **all** nodes in the current sphere are updated to Object Manager 3.5.x, before updating any nodes to Object Manager 3.6.

Update Procedure

Here is how to update the Object Manager sphere or endpoint software:

IMPORTANT The Object Manager application restarts after updating the application software. Any data transfer operations fail when the application restarts. Internal operations, such as Lifecycles, automatically restart. External operations must be manually restarted.

1. Discontinue storage operations. The Object Manager application restarts after updating the application software.
2. In the upper right corner of the management console, click the **gear icon** and select **Software Updates**.

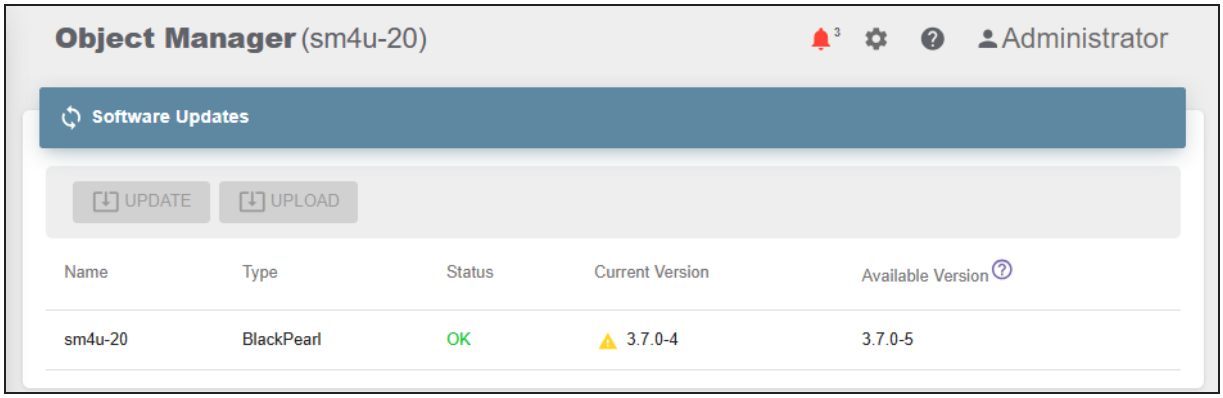


Figure 174 The Software Updates screen.

To update using the online package sever...

a. Select the row of the component you want to update and click **Update**.

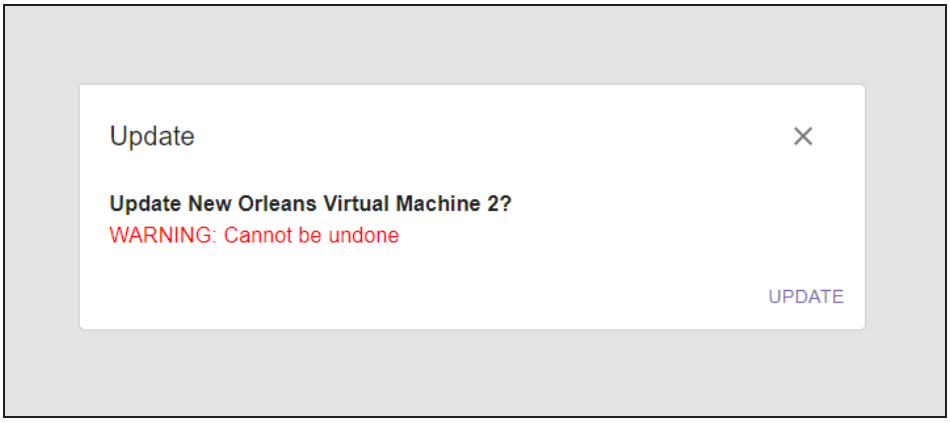


Figure 175 The Update screen.

b. Click **Update**. The update process for the selected component begins.

IMPORTANT Do not reboot or power-cycle the BlackPearl Storage Manager or Object Manager VM node during the update process or the BlackPearl Storage Manager or Object Manager VM node fails to initialize.

Note: Depending on what component is being updated, the Object Manager user interface may display a lost communication error while the component updates.

To update using a local file...

a. Select the row of the component you want to update and click **Upload**.

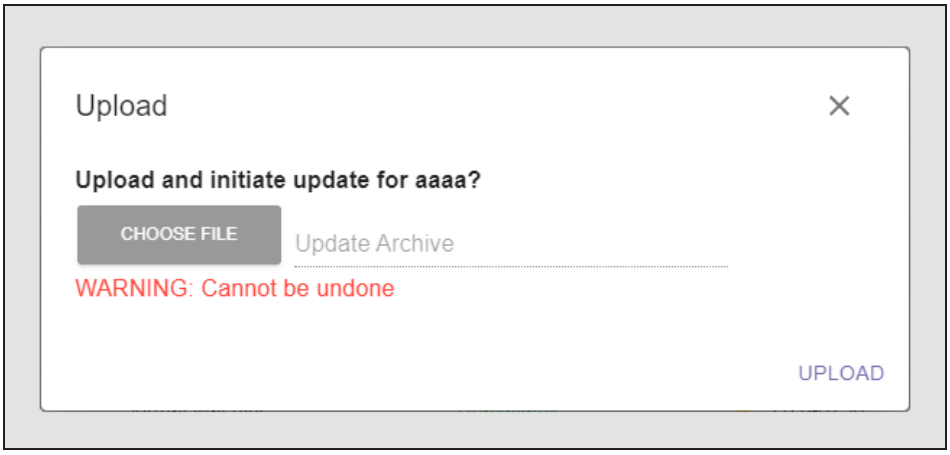


Figure 176 The Upload screen.

b. Click **Choose File**, then browse to the archive update file.

c. Click **Upload**. The file is uploaded and the update process for the selected component begins.

IMPORTANT Do not reboot or power-cycle the BlackPearl Storage Manager or Object Manager VM node during the update process or the BlackPearl Storage Manager or Object Manager VM node fails to initialize.

Note: Depending on what component is being updated, the Object Manager user interface may display a lost communication error while the component updates.

ACCESSING THE TECHNICAL SUPPORT PORTAL

The Spectra Logic Technical Support portal provides access to the Knowledge Base, the current version of Object Manager software, and additional service and support tools. You can also open or update a support incident and upload log files.

Create an Account

Access to *User Guides* and compatibility matrices does not require you to create an account. You must create a user account and log in to access *Release Notes*, to download the latest version of Object Manager software, or to open a support incident.

Note: If you have multiple Spectra Logic products, the serial numbers for all products will be associated with your account. If you do not see the serial numbers for all of your products when you log in, contact Technical Support (see Contacting Spectra Logic on page 15).

1. Access the Technical Support portal login page at *support.spectralogic.com*.
2. On the home page, click **Register Now**.

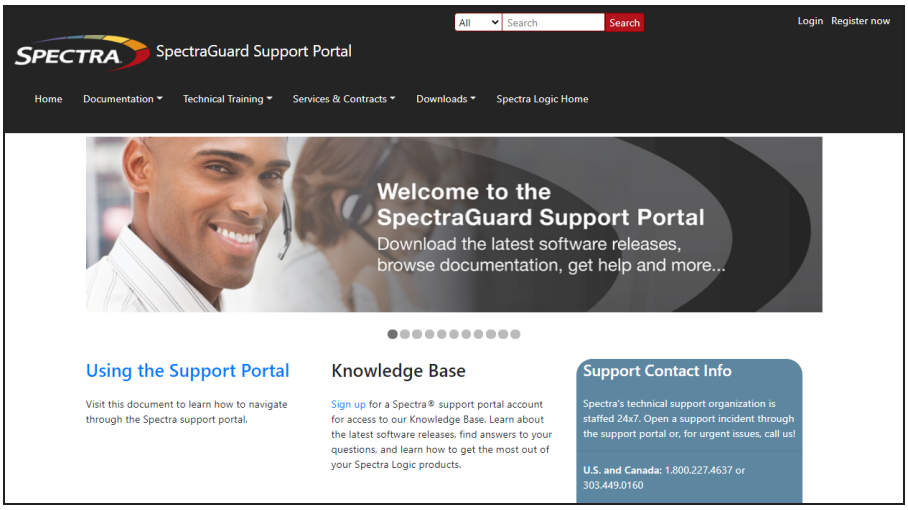


Figure 177 The Spectra Logic Technical Support portal home page.

3. Enter your registration information. Your account is automatically associated with the serial numbers of all Spectra Logic products owned by your site.

- If you have an invitation, follow the link and enter the invitation code.

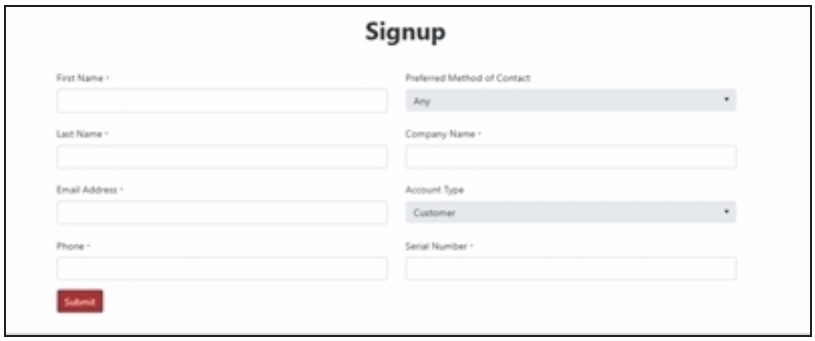


Figure 178 The Signup screen.

- If you do not have an invitation, enter the requested information to create your account. When you are finished, click **Submit**.

When the account is approved, you receive an email with an initial password. Use your email address and the password provided in the email to log in to your account. After you log in, you can change your password if desired.

Log Into the Portal

1. Access the Technical Support portal login page at *support.spectralogic.com*.
2. Use your email address and password to log into the Technical Support Portal.

OPENING A SUPPORT TICKET

You can open a support incident using the Spectra Logic Technical Support portal or telephone.

Search for Help Online

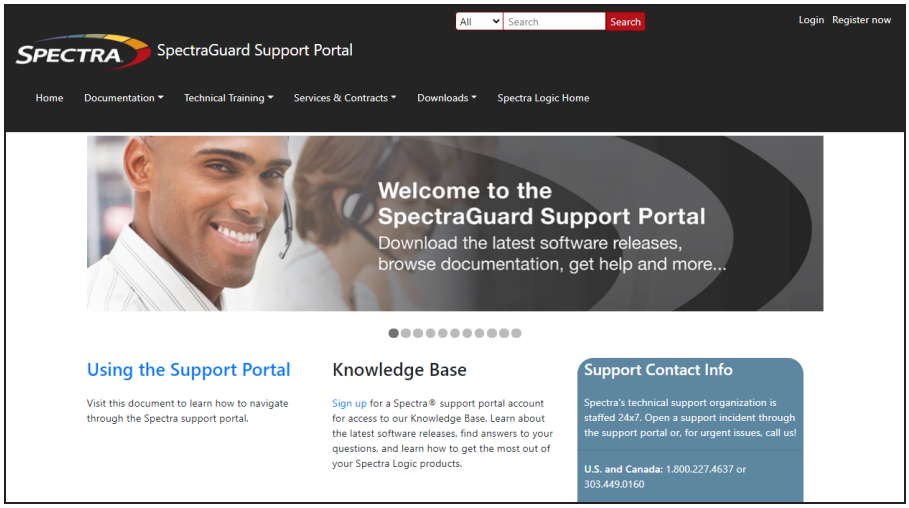


Figure 179 The Spectra Logic Technical Support portal home page.

1. Make notes about the problem, including what happened just before the problem occurred.
2. Gather the following information:
   - Your Spectra Logic customer number
   - Company name, contact name, phone number, and email address
   - The library serial number on the **Configuration>Settings** screen.
   - Type of host system being used
   - Type and version of host operating system being used
   - Type and version of host storage management software being used
3. If necessary, log in to the Support Portal by clicking **Login**, enter your **email address** and **password**, and click **Log in**.

Note: See Accessing the Technical Support Portal on page 219 if you have not previously created an account on the Technical Support portal.

4. From any page, select **Incident>Incidents & Inventory**.

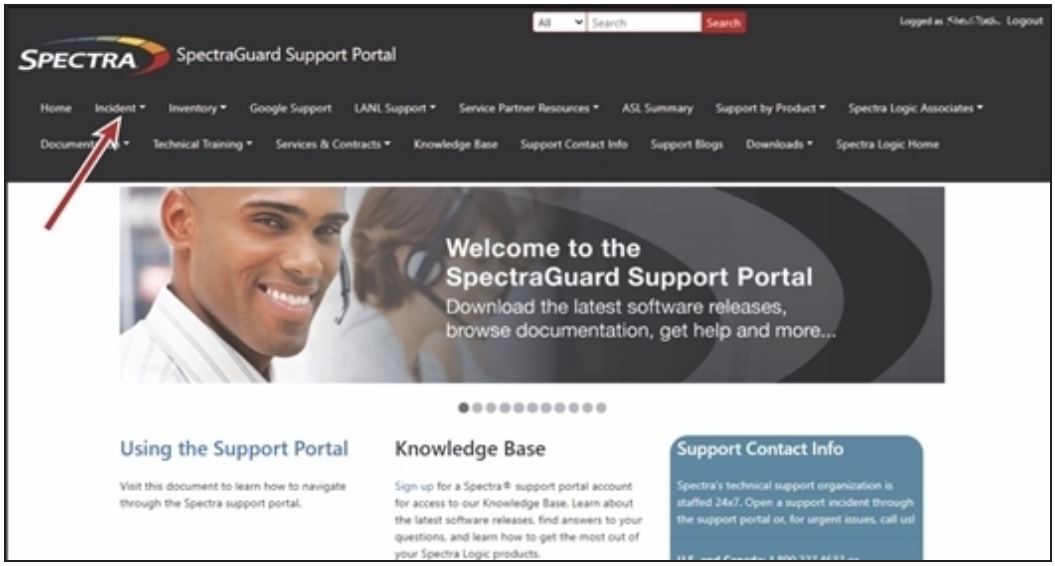


Figure 180 Select **Incidents>Incidents & Inventory**.

5. Select **Open or View Incidents**.

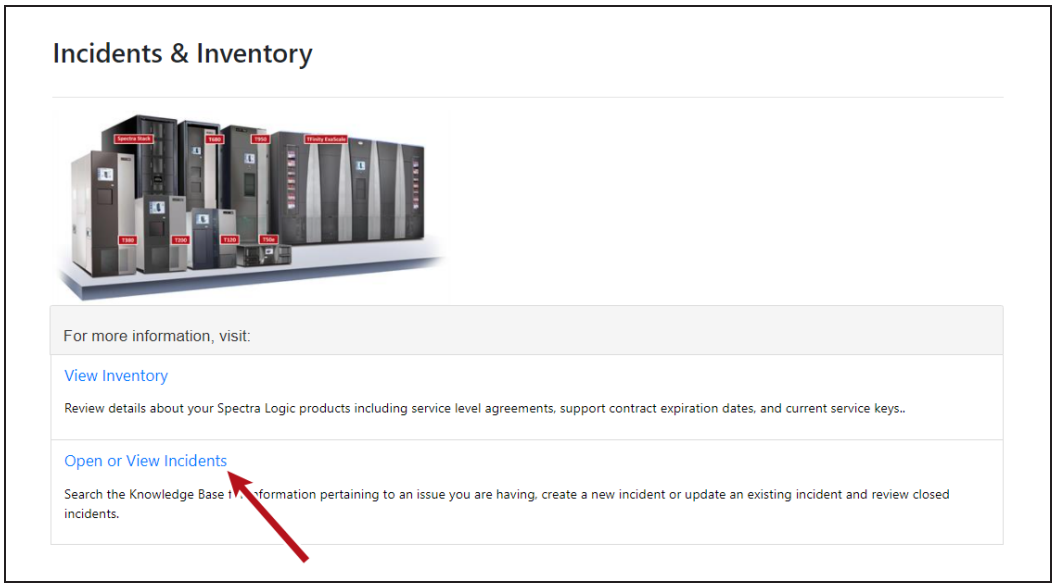


Figure 181 Select **Open or View Incidents**.

6. In the Search dialog box, enter a term or phrase about your problem (**1**) and click **Search** (**2**).

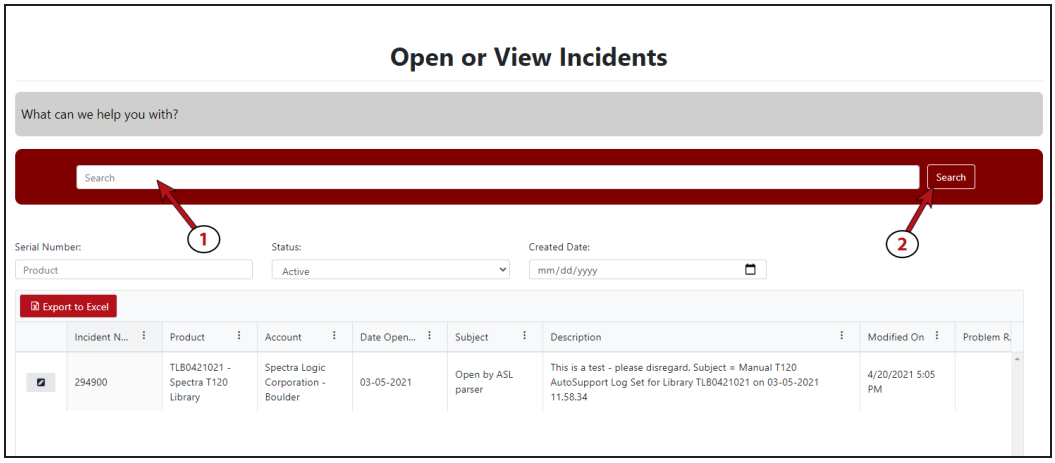


Figure 182 Enter a search phrase and click **Search**.

7. If the search does not provide an answer, click **Open a New Incident**.

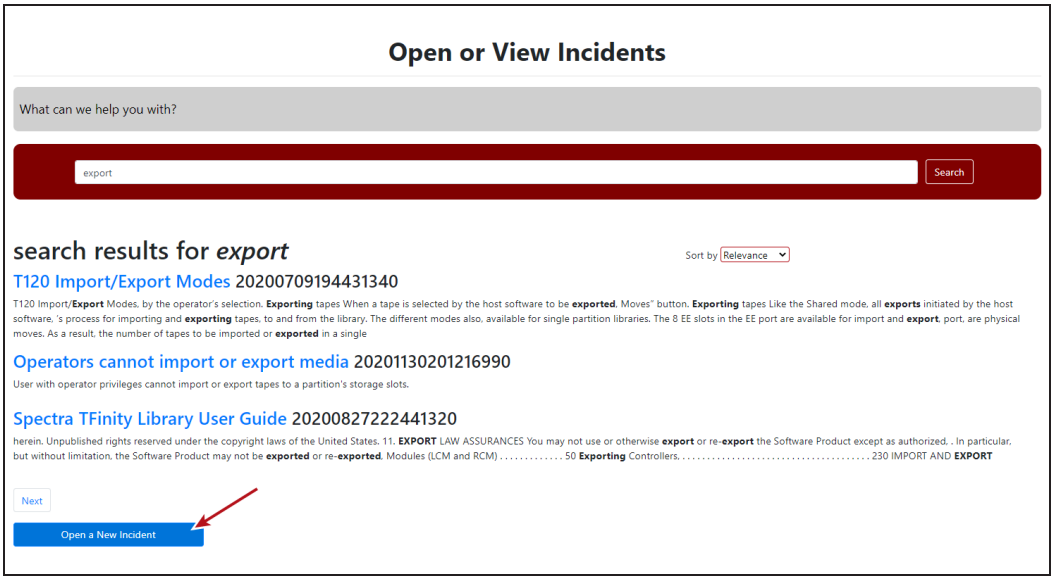


Figure 183 Click **Open a New Incident**.

8. On the Create Incident page, enter the requested information providing as much detail as possible. When you are finished, click **Submit**.

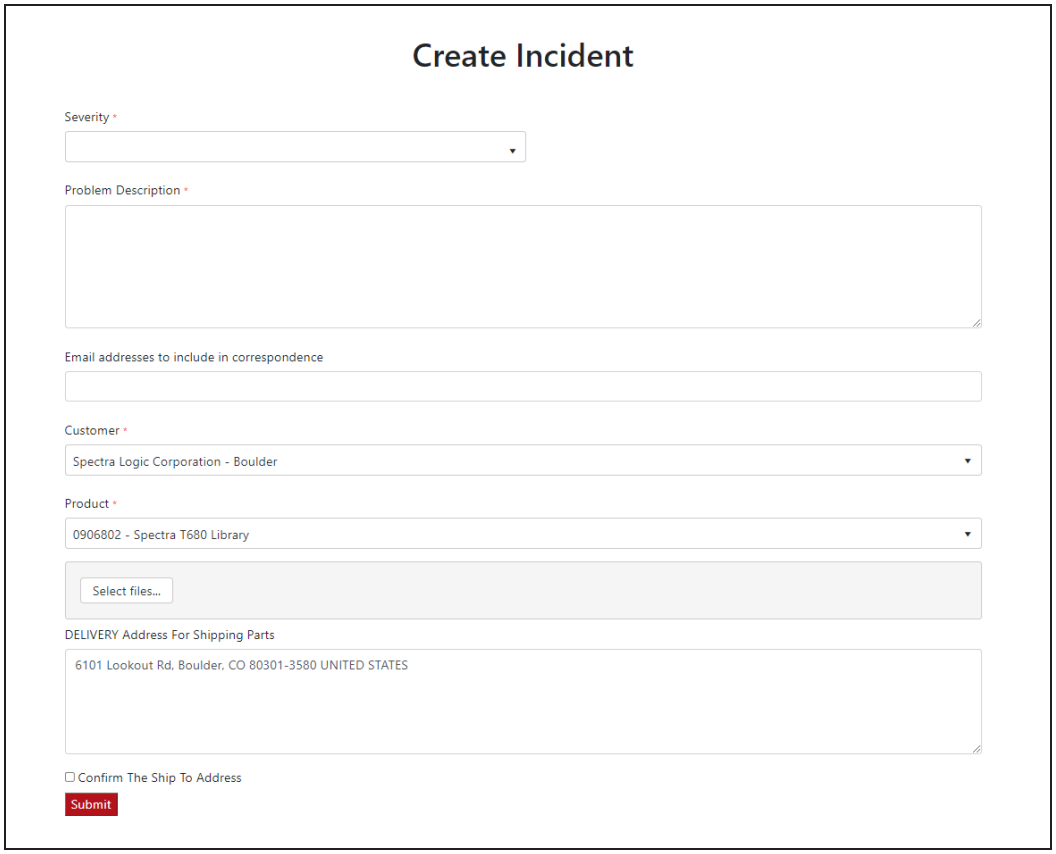


Figure 184 Enter information about your incident and click **Submit**.

Submit an Incident Online

1. Make notes about the problem, including what happened just before the problem occurred.
2. Gather the following information:
   - Your Spectra Logic customer number
   - Company name, contact name, phone number, and email address
   - The library serial number on the **Configuration>Settings** screen.
   - Type of host system being used
   - Type and version of host operating system being used
   - Type and version of host storage management software being used
3. If necessary, log in to the Support Portal by clicking **Login**, enter your **email address** and **password**, and click **Log in**.

Note: See Accessing the Technical Support Portal on page 219 if you have not previously created an account on the Technical Support portal.

4. From any page, select **Inventory>My Inventory**.
5. Locate the row of the product for which you want to submit an incident and click **Create Incident**.

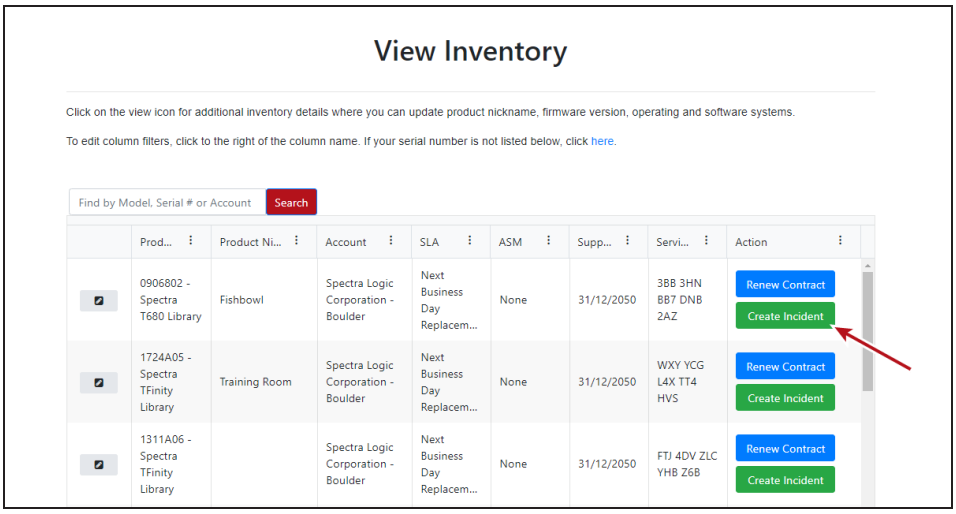


Figure 185 Click **Create Incident**.

6. On the Create Incident page, enter the requested information providing as much detail as possible. When you are finished, click **Submit**.

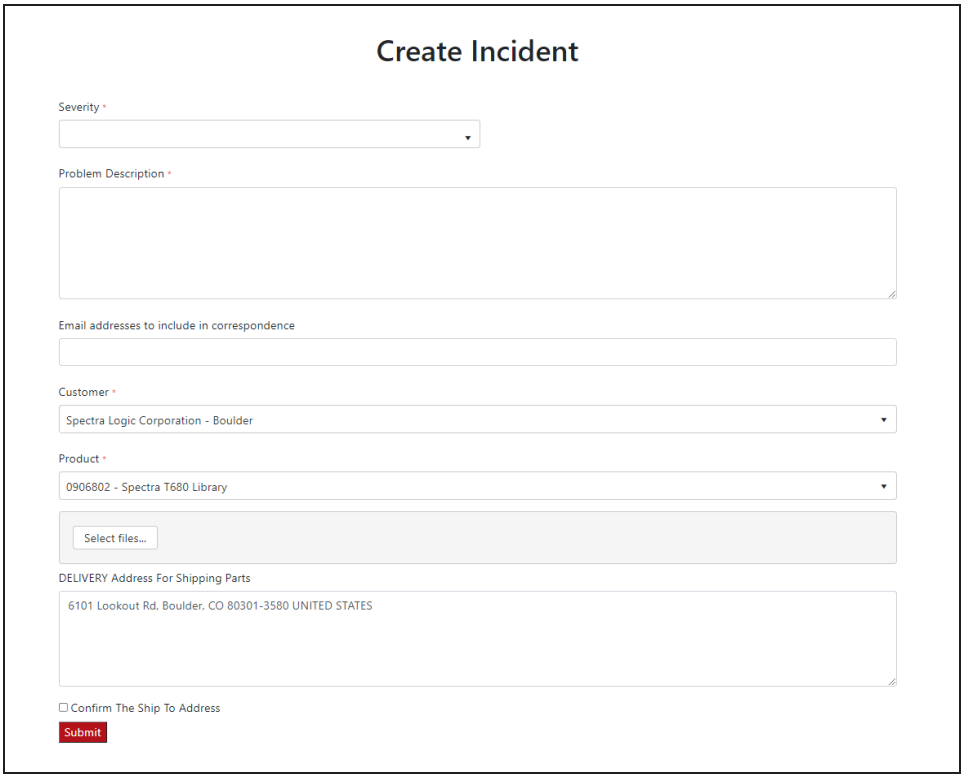


Figure 186 Enter information about your incident and click **Submit**.

Submit an Incident by Phone

Contact Spectra Logic Technical Support by phone using the information below.

Spectra Logic Technical Support	
Technical Support Portal: ***support.spectralogic.com***	
United States and Canada **Phone:** **Toll free US and Canada:** 1.800.227.4637 **International:** 1.303.449.0160	**Europe, Middle East, Africa** **Phone:** 44 (0) 870.112.2185 **Deutsch Sprechende Kunden** **Phone:** 49 (0) 6028.9796.507
Additional international numbers available at *support.spectralogic.com/home* **If you have a Spectra Logic Portal account, please log in for country-specific numbers at *support.spectralogic.com/support-contact-info***	

Appendix A - Working with Object Manager VM Nodes

This chapter describes the creation and configuration steps for a Object Manager VM Node.

CREATE A OBJECT MANAGER VM NODE

Using a Object Manager VM node is useful when you want on-premise Standard or Standard_IA class storage.

The instructions in this section describe setup of a Object Manager VM node using a VMDK file. A Object Manager VM node can also be created using an OVA file. Contact Spectra Logic for assistance.

Note: Contact Spectra Logic for assistance configuring a Object Manager VM node with other virtual machine software such as Fusion, or Synology.

Object Manager VM Node Host Requirements

A Object Manager VM node requires the following:

- 8 core CPU or higher
- 16 GB RAM or higher
- 10 GigE Ethernet network connection or higher
- A network that allows access to port 443 to allow for data transfer

Router Requirements

IMPORTANT **All** Object Manager VM nodes must be able to see each other using their announced IP address or hostname.

You may need to adjust the settings of any firewalls or proxy servers in your environment for the Object Manager VM nodes to communicate with each other. Contact your system administrator for assistance.

Port Requirements

All Object Manager VM nodes must be on a network that allows access on port 443.

VM Instance Protection

Spectra Logic recommends creating Object Manager VM nodes on reliable host computers and establishing a strong data protection system for your VM instances including regular snapshots to be used in the event of disaster recovery.

Create a Node Using VMWare vSphere

Here is how to create a Object Manager VM node using a VMDK file using VMWare® vSphere. These instructions are specific to vSphere and require familiarity with VM software.

1. If the Object Manager VM image file was provided to you by Spectra Logic, skip to Step 2. Otherwise, download the latest Object Manager VM node image:
   a. In the Object Manager user interface, click the **gear icon**, then **Software Updates**.
   b. Click **Download VM Image**.

Note: The file size is approximately 800 MB.

2. After the download completes, unpack the file.
3. Launch the VMWare vSphere application.
4. In the **Navigator** pane, select the host on which to create the VM node.

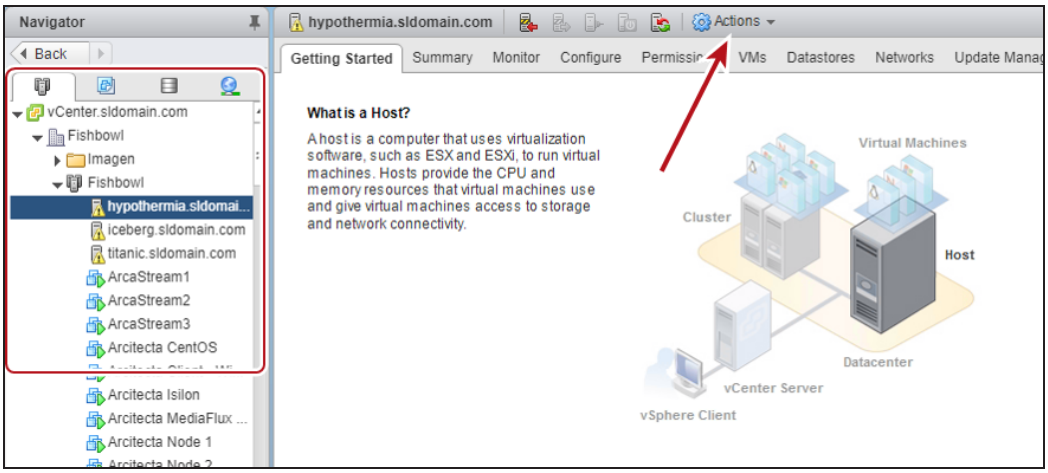


Figure 187 The VMWare vSphere home screen.

5. From the title bar, select **Actions > New Virtual Machine**.
6. In the New Virtual Machine wizard, select **Create a new virtual machine** and click **Next**.

7. Enter a **Name** for the VM node, select a **Location** , and click **Next**.

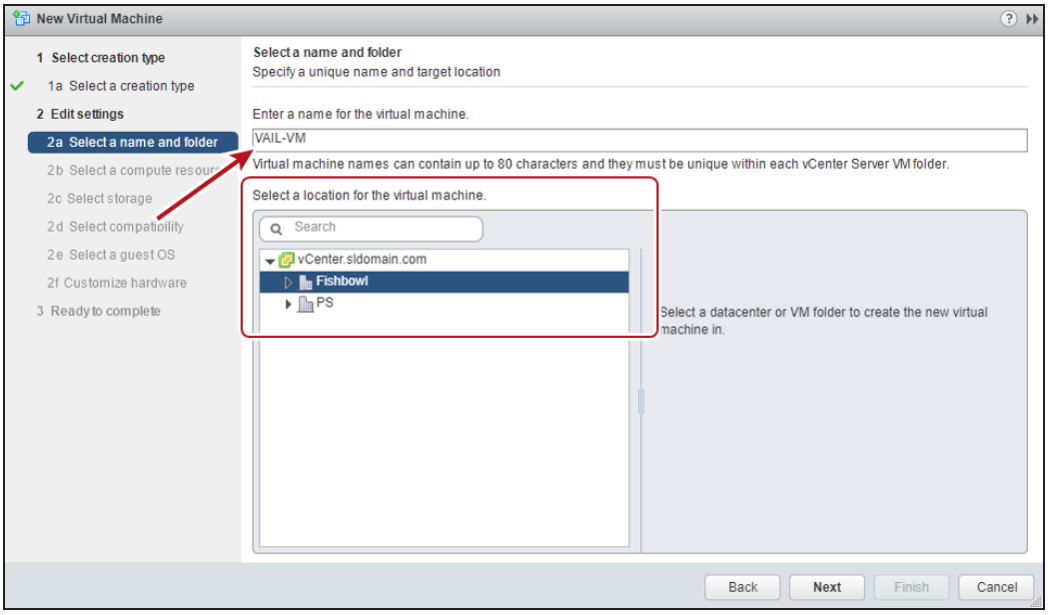


Figure 188 The New Virtual Machine - Select Name and Folder screen.

8. Using the **Select a compute resource** network browser, select an ESXi-based host in your network environment, and click **Next**.

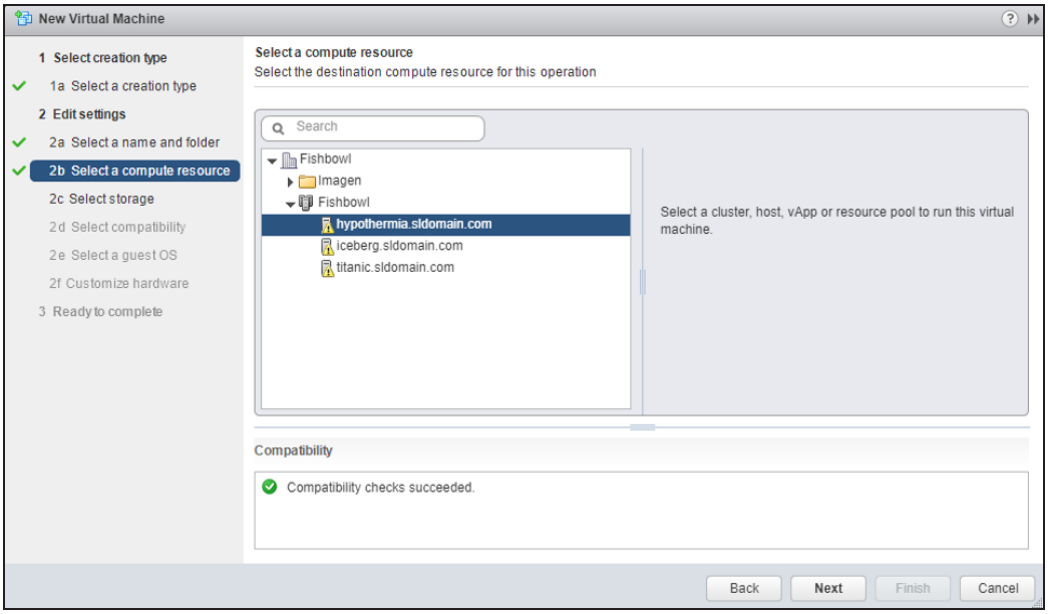


Figure 189 The New Virtual Machine - Select Compute Resource screen.

9. Using the **Select storage** table, select where to store the VM configuration files and virtual disks, and click **Next**.

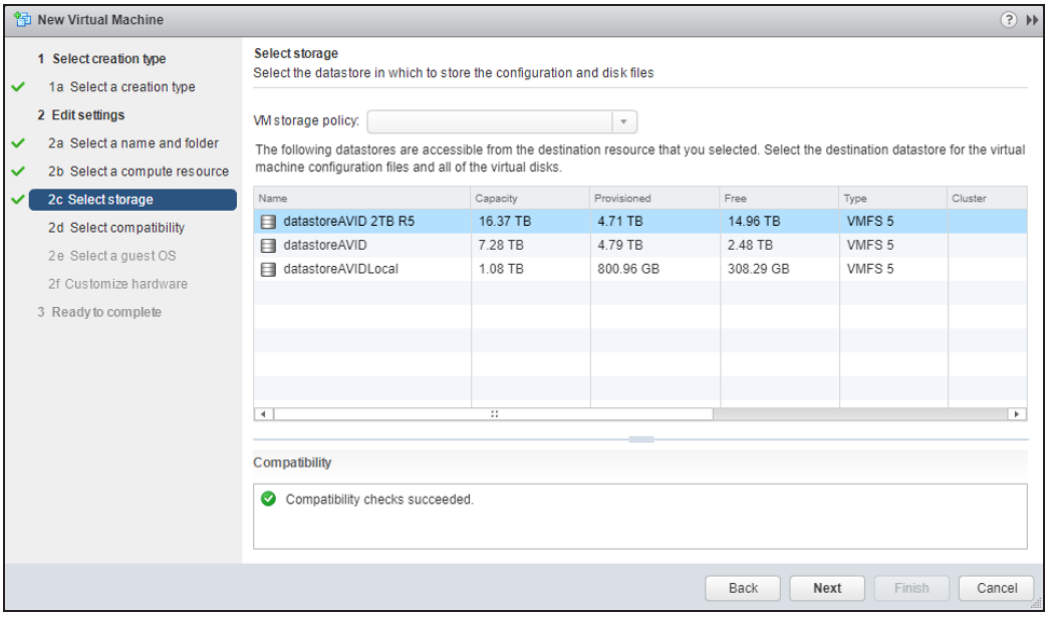


Figure 190 The New Virtual Machine - Select Storage screen.

10. Using the **Compatible with** drop-down menu, select **ESXi 6.5 and later**, and click **Next**.
11. Using the **Guest OS** drop-down menus, select the following:
    - Guest OS Family: **Linux**
    - Guest OS Version: **Ubuntu Linux (64-bit)**
12. Click **Next**.

13. Using the **Customize hardware** screen, select the following:

- CPU: **8**
- Memory: **16 GB**

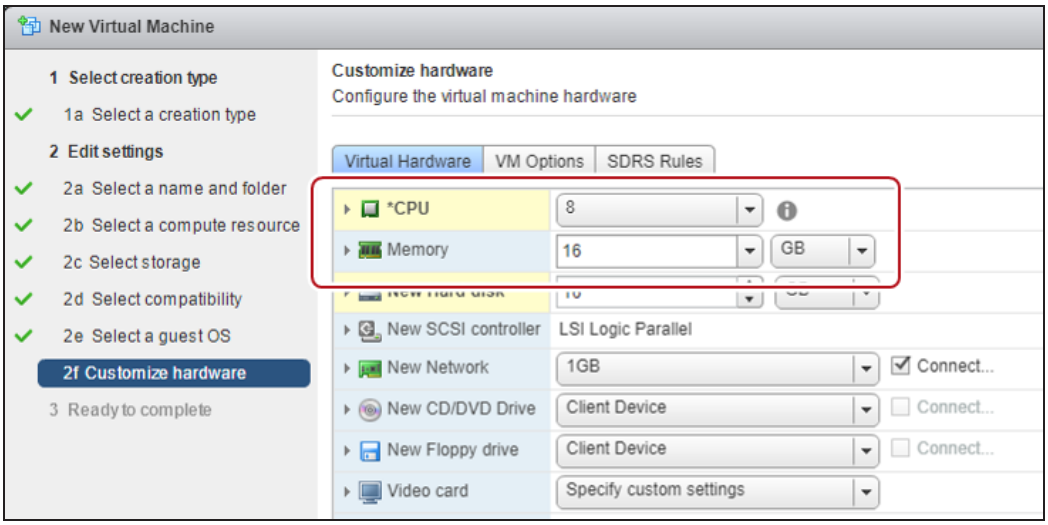


Figure 191 The New Virtual Machine - Customize Hardware screen.

14. On the right-hand side of the **New Hard disk** row, click the **X icon** to delete the default hard disk.

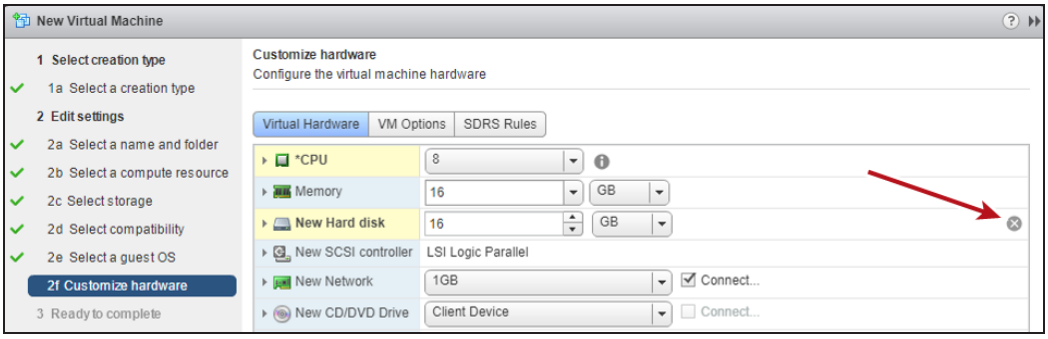


Figure 192 The New Virtual Machine - Customize Hardware screen.

15. Using the **New device** drop-down menu, select **Existing Hard Disk**, then click **Add**.

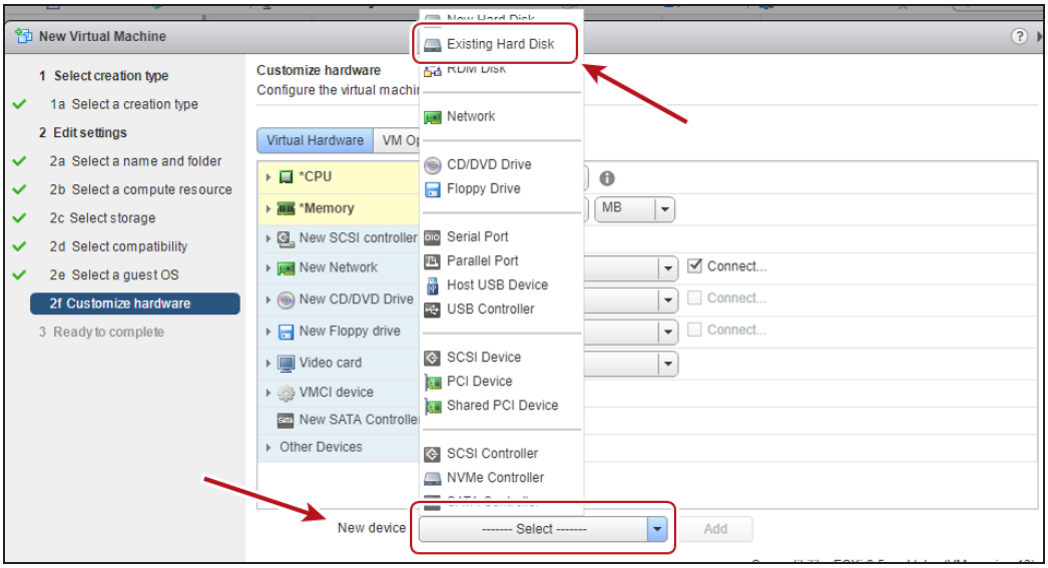


Figure 193 The New Virtual Machine - Customize Hardware screen.

16. Select the storage location of the VMDK file in the **Datastores** pane, then select the VMDK file to use in the **Contents** pane, and click **OK**.

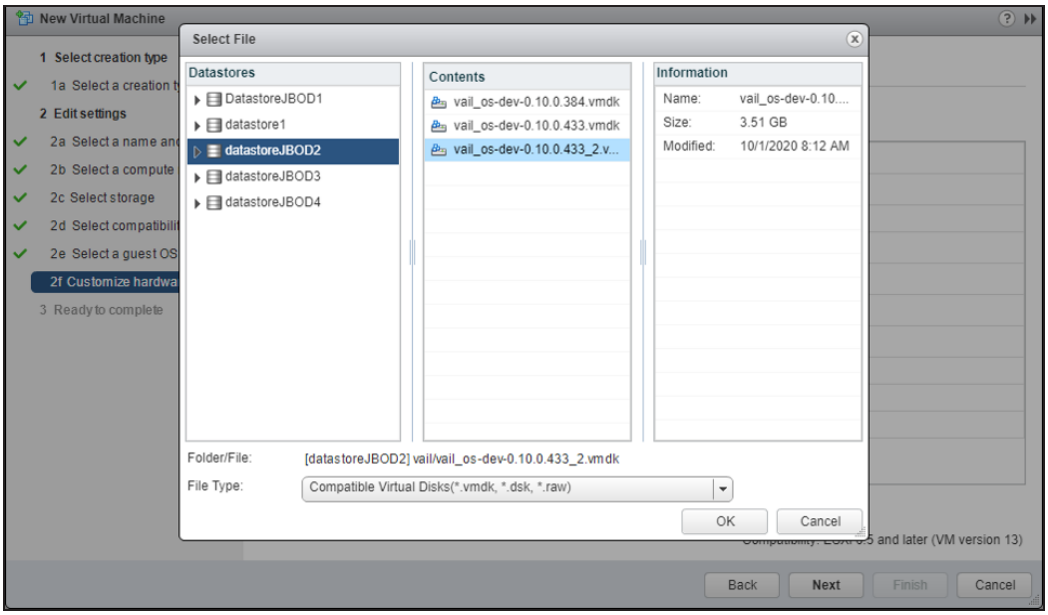


Figure 194 The New Virtual Machine - Customize Hardware - Select File screen.

17. Using the **New device** drop-down menu, select **New Hard Disk**, then click **Add**. This creates the drive that the Object Manager VM node uses for data storage.

Note: If you increase the size of the drive after creating the Object Manager VM, the Object Manager application recognizes this change and allows you to use the newly available storage space.

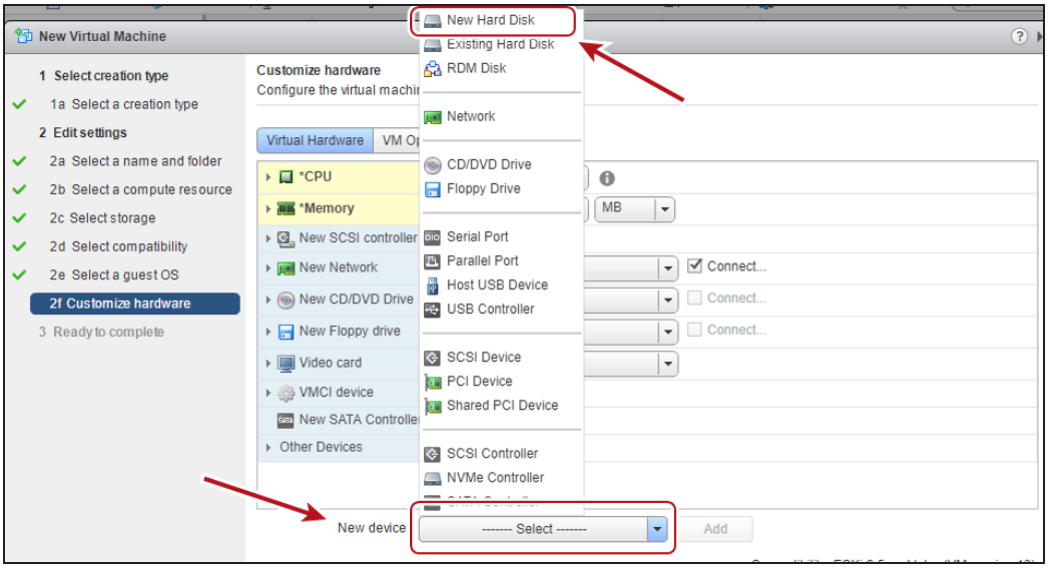


Figure 195 The New Virtual Machine - Customize Hardware screen.

18. Adjust the **Size** of the hard disk as required for your data storage environment.

Note: The size displays as GiB in the Object Manager user interface.

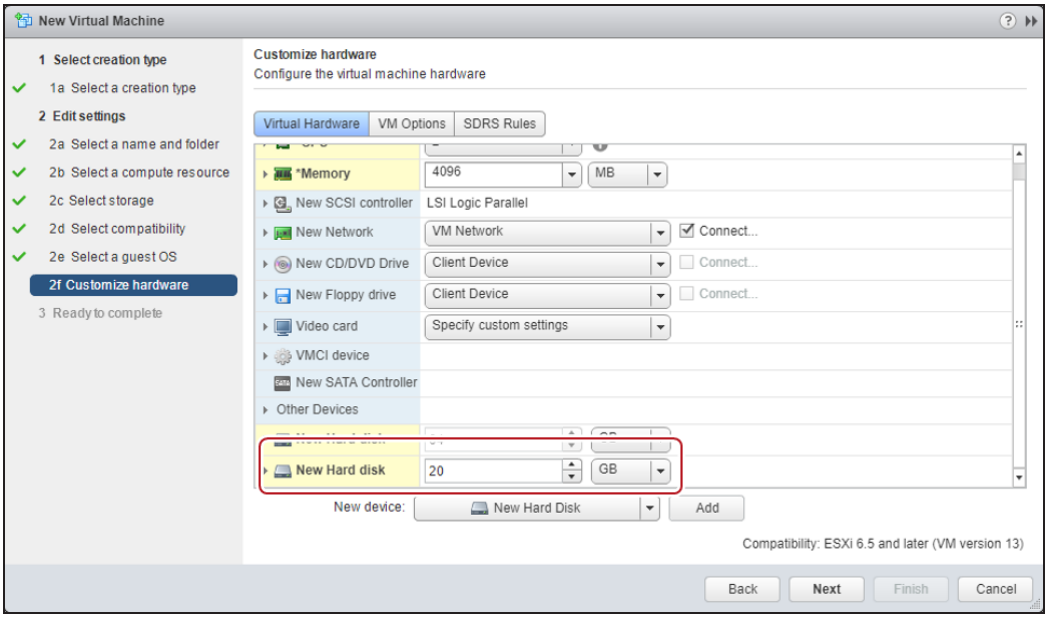


Figure 196 The New Virtual Machine - Customize Hardware screen.

19. Using the **New Network** drop-down menu, select **VM Network** and click **Next**.

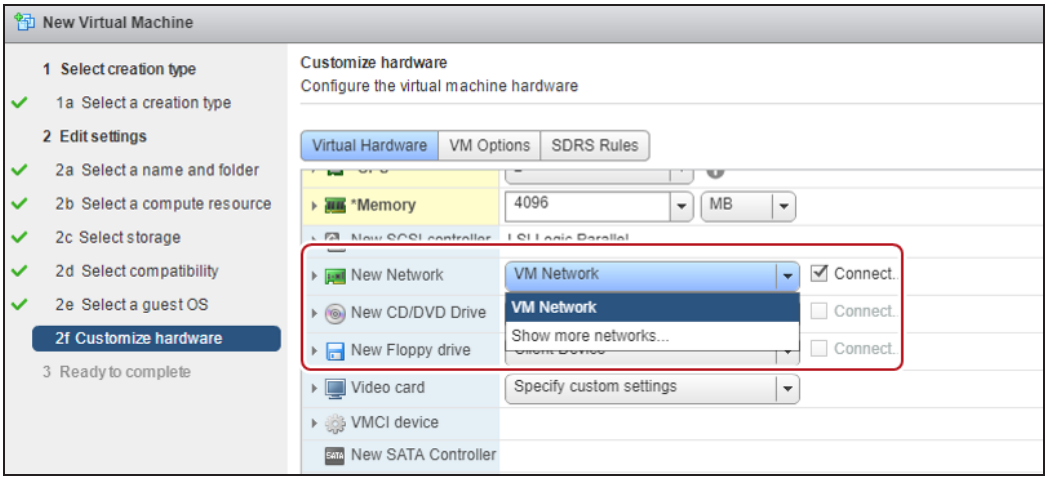


Figure 197 The New Virtual Machine - Customize Hardware screen.

20. Verify all settings are correct and click **Finish**.

21. In the **Navigator** pane, select the VM you just created, and on the title bar, click the **green Play triangle** to power-on the VM node.

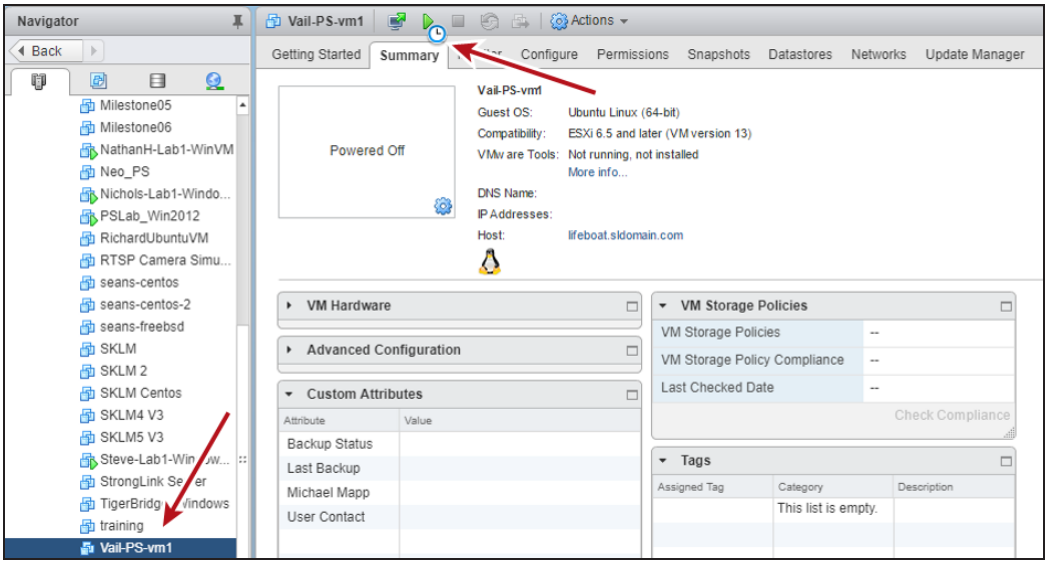


Figure 198 The New Virtual Machine - Summary screen.

22. When the VM boot completes, press **Enter**. If a DHCP server is configured, the IP address of the Object Manager VM node displays.

Notes:
- Do not close the VM window.
- If no DHCP server is configured, contact Spectra Logic Professional Services to set a manual IP address.
- You can change the network configuration of the Object Manager VM node after logging into the Object Manager VM management console.

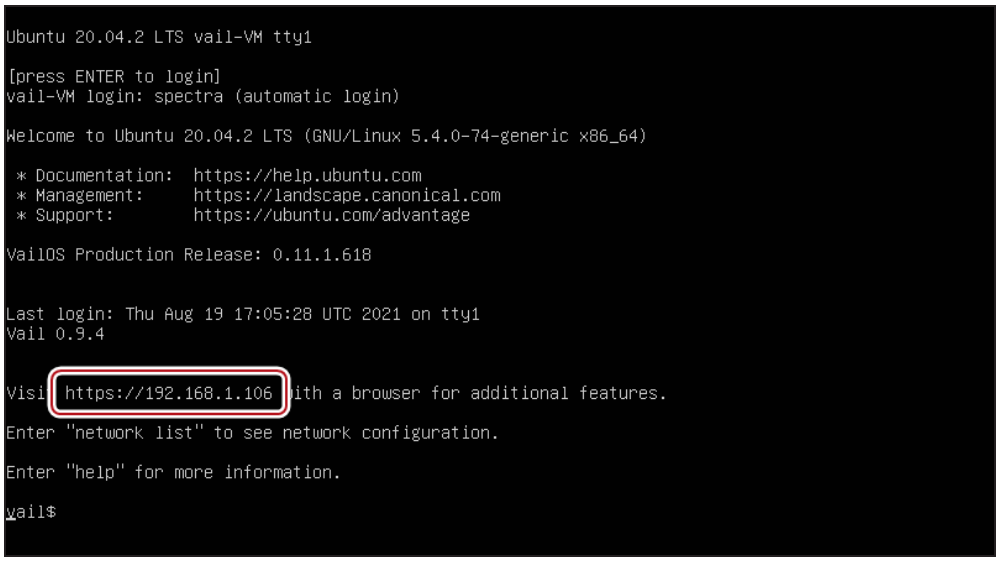


Figure 199 The Object Manager VM command line screen.

23. Open a web browser and enter the IP address. You are automatically logged in to the Object Manager VM user interface.

Note: The Object Manager VM node management console does not require any login credentials at this time.

Create a Node Using Oracle VirtualBox

Here is how to create a Object Manager VM node using a VMDK file using Oracle VirtualBox. These instructions are specific to the Windows version of Oracle VirtualBox and require familiarity with VM software.

1. If the Object Manager VM image file was provided to you by Spectra Logic, skip to Step 2. Otherwise, download the latest Object Manager VM node image:
   a. In the Object Manager user interface, click the **gear icon**, then **Software Updates**.
   b. Click **Download VM Image**.

Note: The file size is approximately 800 MB.

2. After the download completes, unpack the file.
3. Launch Oracle VirtualBox.

4. Click **New**.

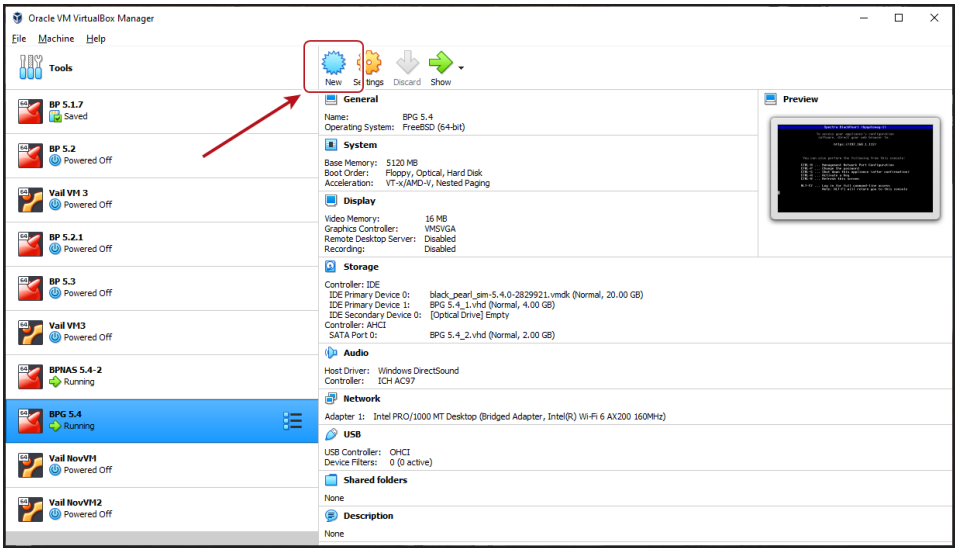


Figure 200 Oracle VM VirtualBox Manager.

5. Enter the desired **Name**.

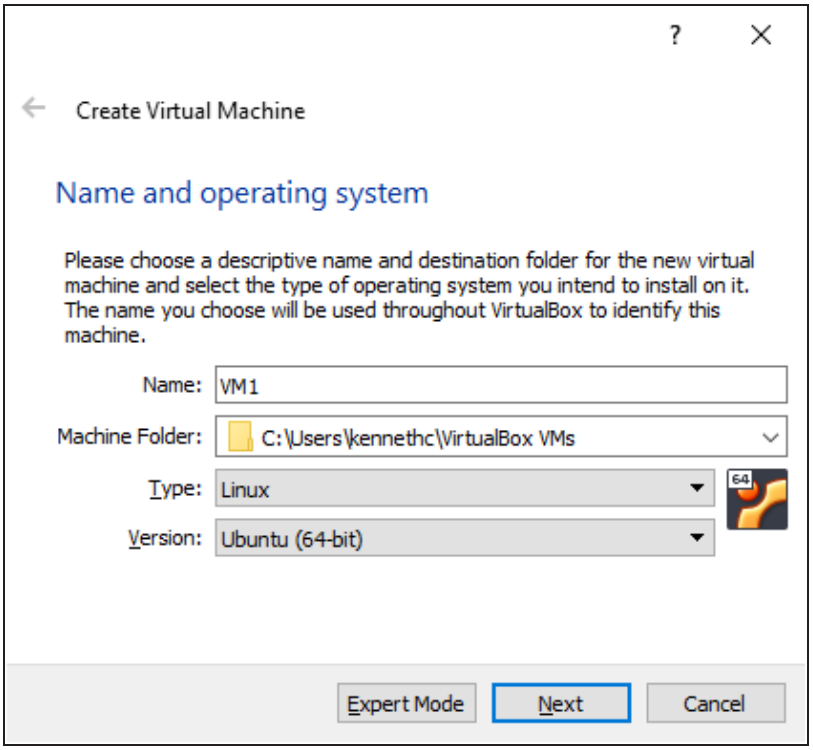


Figure 201 The Create Virtual Machine - Name & OS screen.

6. If desired, change the **Machine Folder** location.
7. Using the **Type** drop-down menu, select **Linux**.
8. Using the **Version** drop-down menu, select **Ubuntu 64-bit**.

9. Click **Next**.

Note: If you are asked to select the number of CPUs to use for the Object Manager VM, use the default setting.

10. Set the **Memory size** to **4096 MB** and click **Next**.

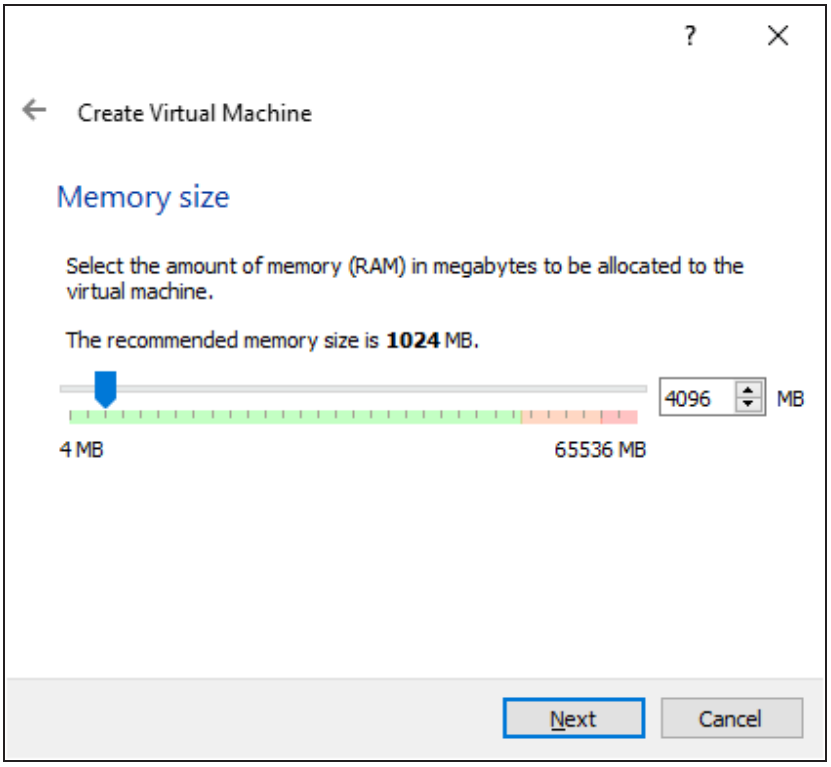


Figure 202 The Create Virtual Machine - Memory Size screen.

11. Select **Use an existing virtual hard disk file**, and click the folder icon to the right of the drop-down menu.
12. In the Hard Disk Selector screen, click **Add**, and browse to the VMDK you unpacked in Step 2.
13. Select the file and click **Open**.

14. Under the **Not Attached** header, select the row of the new hard drive, then click **Choose**.

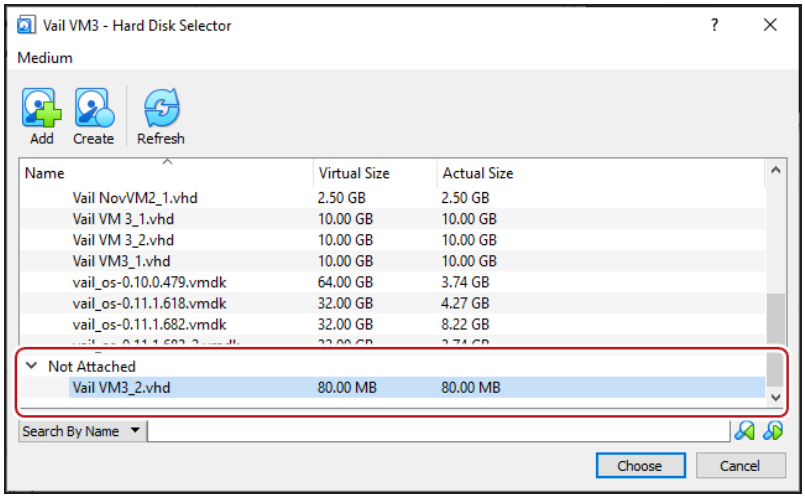


Figure 203 The Hard Disk Selector screen.

15. On the Create Virtual Machine - Hard disk screen, click **Create**.

16. After the VM is created, click **Settings**.

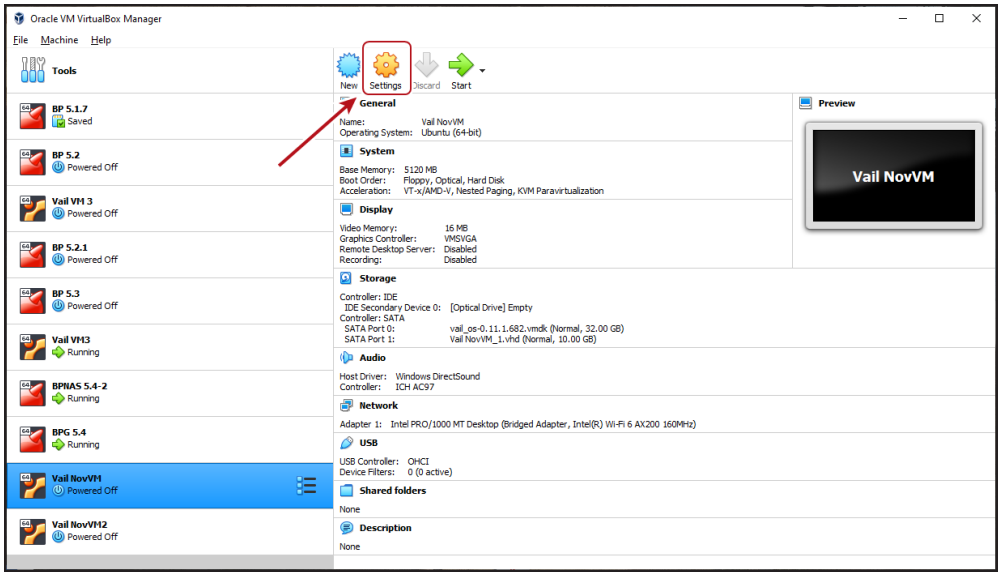


Figure 204 Oracle VM VirtualBox Manager.

17. In the left-hand pane of the Setting screen, click **Storage**.

18. Select the **Controller: SATA** row, and click the **Add hard disk** icon.

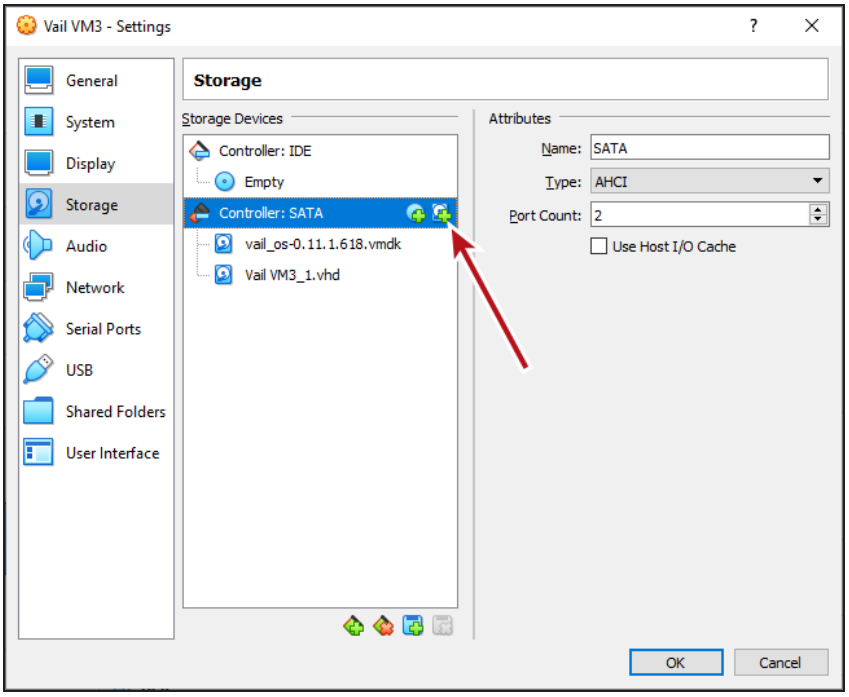


Figure 205 The VM Settings - Storage screen.

19. Select **Create**.

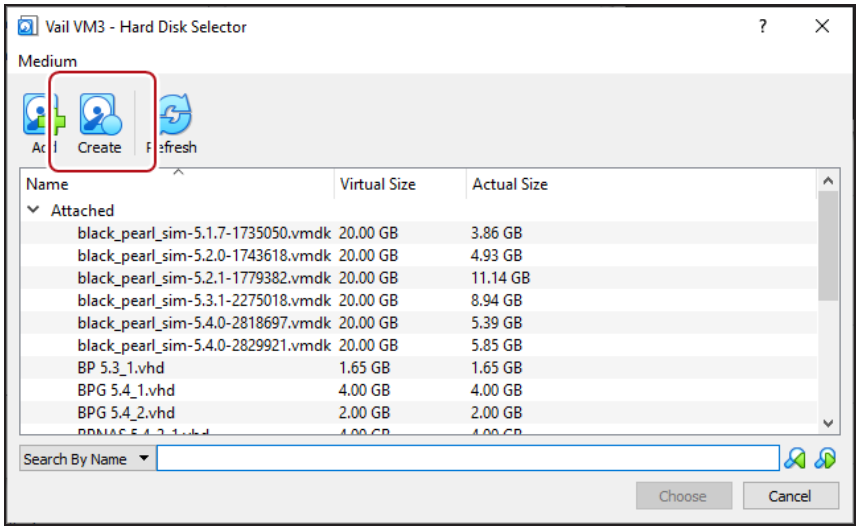


Figure 206 The Hard Disk Selector screen.

20. Select **VHD (Virtual Hard Disk)** and click **Next**. This is the disk the Object Manager VM node uses for data storage.

Note: If you increase the size of the drive after creating the Object Manager VM, the Object Manager application recognizes this change and allows you to use the newly available storage space.

21. Choose to allow the virtual hard disk to be **Dynamically allocated**, or to have a **Fixed size**, and click **Next**.

22. Configure the VHD file and size in GB, then click **Create**.

Note: The size displays as GiB in the Object Manager user interface.

23. In the **Not Attached** list, select the row of the new hard drive, then click **Choose**.

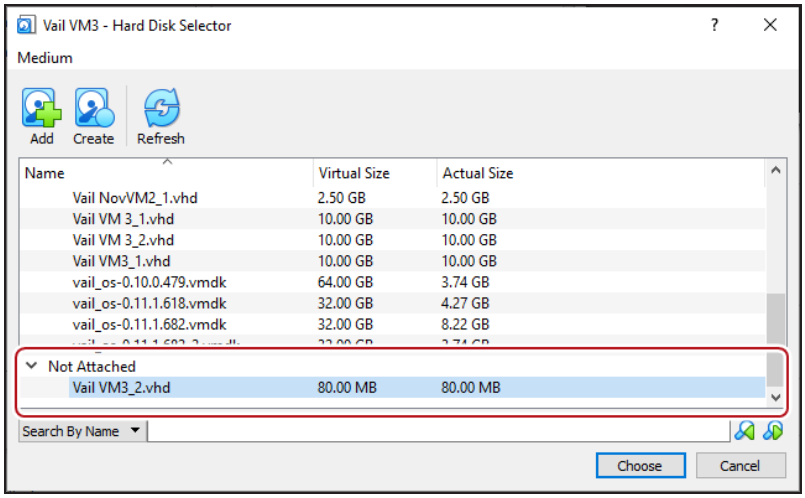


Figure 207 The Hard Disk Selector screen.

24. In the left-hand pane of the Settings screen, click **Network**.

25. Using the **Attached to:** drop-down menu, select **Bridged Adapter**.

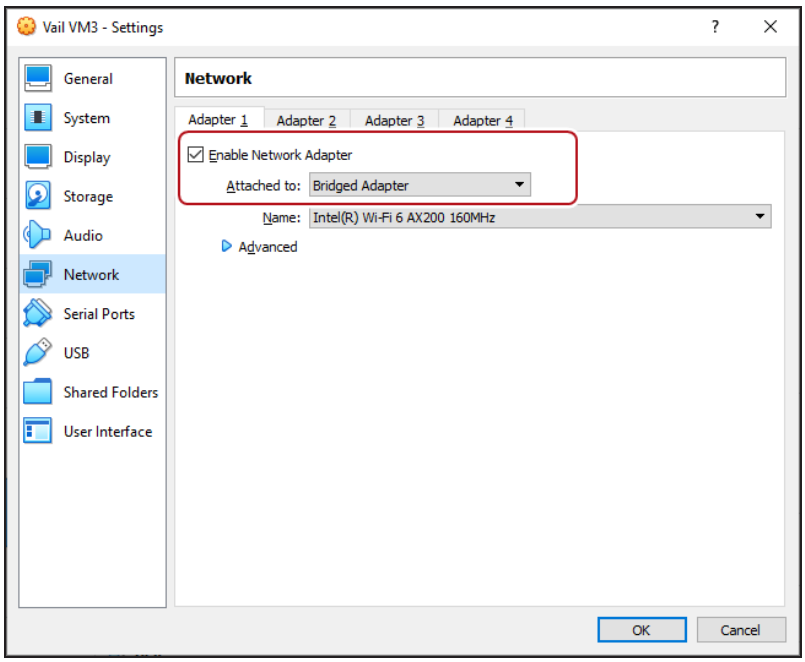


Figure 208 The VM Settings - Network screen.

26. If necessary, click the blue **Advanced** arrow to configure additional settings for your network environment.

27. Click **OK** to close the Settings window.

28. In the Oracle VM Manager main window, select the VM, and click **Start**.

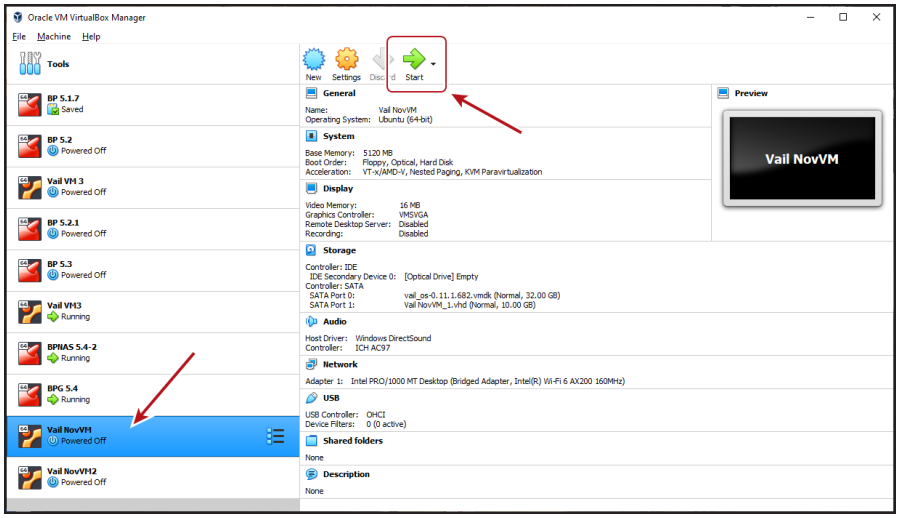


Figure 209 The VM Settings - Storage screen.

29. When the VM boot completes, press **Enter**. If a DHCP server is configured, the IP address of the Object Manager VM node displays.

Notes:

- Do not close the VM window.
- If no DHCP server is configured, contact Spectra Logic Professional Services to set a manual IP address.
- You can change the network configuration of the Object Manager VM node after logging into the Object Manager VM management console.

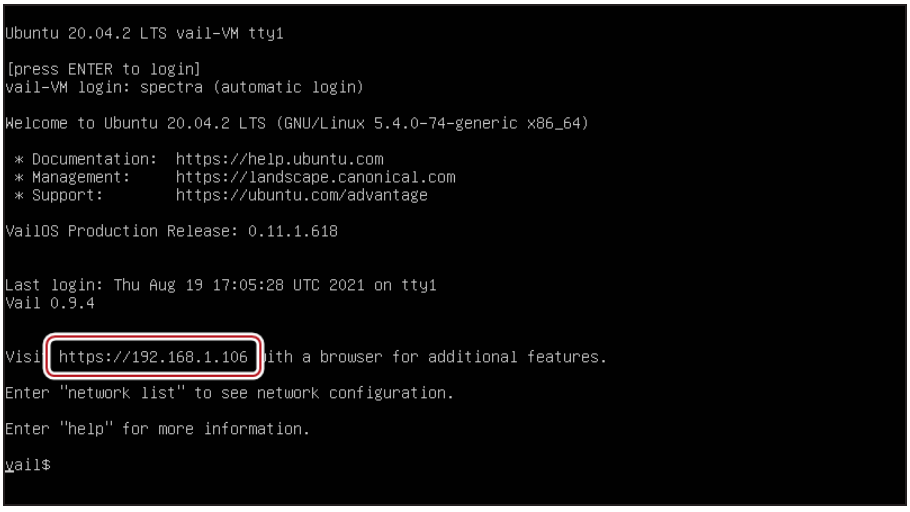


Figure 210 The Object Manager VM command line screen.

30. Open a web browser and enter the IP address. You are automatically logged in to the Object Manager VM user interface.

Note: The Object Manager VM node management console does not require any login credentials at this time.

CONFIGURE THE OBJECT MANAGER VM NODE NETWORK SETTINGS

If desired, use the instructions in this section to edit the Object Manager VM node IP address, hostname, and SSL certificate.

If your Object Manager is running on a BlackPearl system, the network settings for IP addressing, SSL certificates, and hostname are controlled by the BlackPearl system. See the *BlackPearl Storage Manager User Guide* for information.

IMPORTANT Spectra Logic recommends setting a static IP address and changing the hostname as described in the sections below.

Use one of the sections below to configure network settings.

- **Configure Network Settings on the next page**
- **Configure the Object Manager VM Node Hostname on page 247**
- **Configure the SSL Certificate on page 248**

Configure Network Settings

IMPORTANT The Object Manager application restarts after changing the VM network settings. Any data transfer operations fail when the application restarts. Internal operations, such as Lifecycles, automatically restart. External operations must be manually restarted.

Here is how to configure the Object Manager VM node IP address:

1. Discontinue storage operations. The Object Manager application restarts after changing the network settings.
2. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Network**.
3. Select the interface adapter row and click **Edit**.

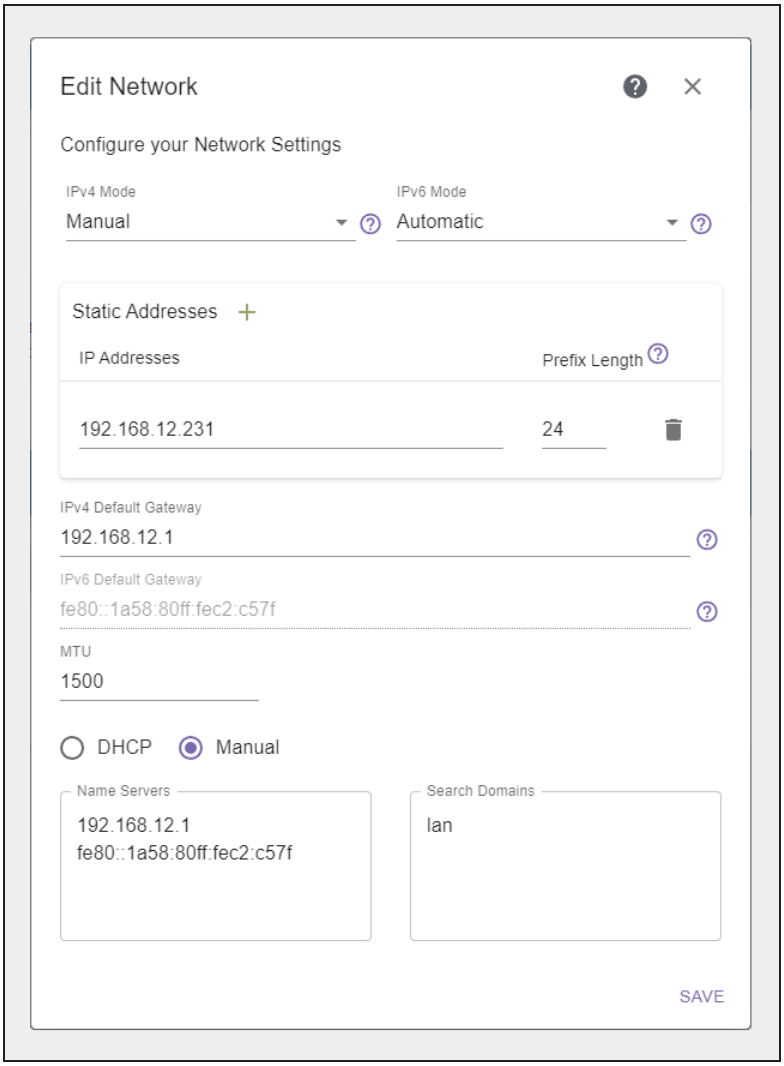


Figure 211 The Object Manager VM Node Edit Network screen.

By default, DHCP is selected on the Edit Network screen to provide the IPv4 address. However, Spectra Logic recommends configuring a static IPv4 address.

Note: If you require the Object Manager VM node to be configured using a DHCP address, Spectra Logic recommends you use your DHCP server to bind the IP address to the Object Manager VM node.

- To configure the IP address manually,

  a. Using the **IPv4 Mode** and **IPv6 Mode** drop-down menus, select **Manual**.

  a. Edit the IPv4 and IPv6 **IP Addresses** as required.

  b. Enter a value for the **Prefix Length**.

  Note: To add a new IP address, click the **+** sign. To remove an IP address, click the **garbage can** icon.

  c. Edit the **IPv4 Default Gateway**.

  d. If desired, enter the **IPv6 Default Gateway**.

  e. Change the **MTU** value as desired.

  f. Enter one or more **Name Server(s)** and **Search Domain(s)**.

  g. Click **Save**.

  Note: The Object Manager VM node interface refreshes after the node changes network settings. The interface may display a lost communication error for several seconds.

- To use DHCP to set the IP address,

  Note: If you require the Object Manager VM node to be configured using a DHCP address, Spectra Logic recommends you use your DHCP server to bind the IP address to the Object Manager VM node.

  a. If necessary, using the **IPv4 Mode** drop-down menu, select **DHCP**.

  b. If necessary, using the **IPv6 Mode** drop-down menu, select **Automatic**.

  c. Configure the DNS settings:

  - To configure the DNS settings automatically, select **DHCP** and click **Save**.
  - To configure DNS settings manually, select **Manual**. Enter one or more **Name Server(s)** and **Search Domain(s)** and click **Save**.

  d. Click **Save**.

  Note: The Object Manager VM node interface refreshes after the node changes network settings. The interface may display a lost communication error for several seconds.

Configure the Object Manager VM Node Hostname

The Object Manager VM node hostname is used as the top level name of the storage endpoint displayed in the Object Manager user interface. Spectra Logic recommends using a name that includes both the location and type of storage.

For example, in the Dallas location, add the storage type as a suffix such as, Dallas-VM1 and Dallas-VM2.

Here is how to configure the hostname:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **Hostname**.
2. Under the **Hostname** banner, click **Edit**.

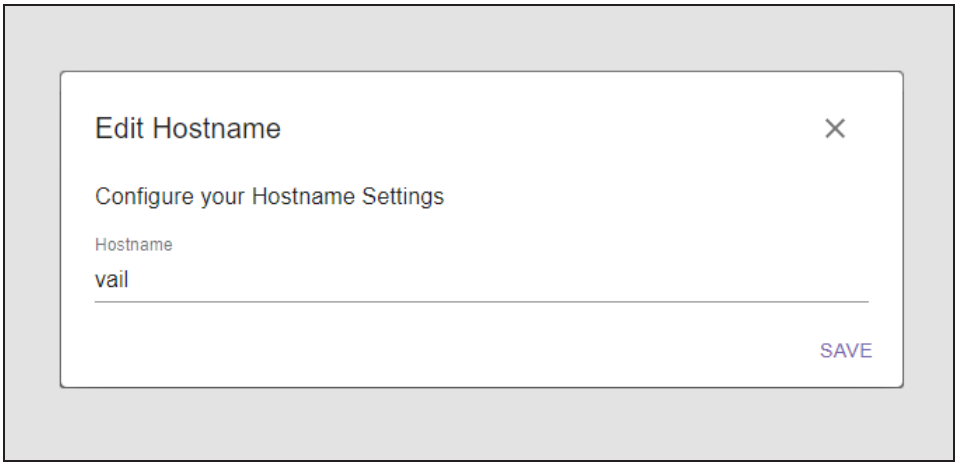


Figure 212 The Object Manager VM Node Edit Hostname screen.

3. Edit the desired **Hostname** and click **Save**.

Note: Only alphanumeric and the dash (-) character are allowed. The hostname is case sensitive.

Configure the SSL Certificate

IMPORTANT The Object Manager requires that SSL certificate for the Object Manager and the BlackPearl Storage Manager are recognized as valid by clients on your DNS network servers.

Here is how to configure SSL certificate:

1. In the upper right corner of the Object Manager user interface, click the **gear icon** and select **SSL Certificate**.
2. Under the **SSL Certificate** banner, click **Edit**.

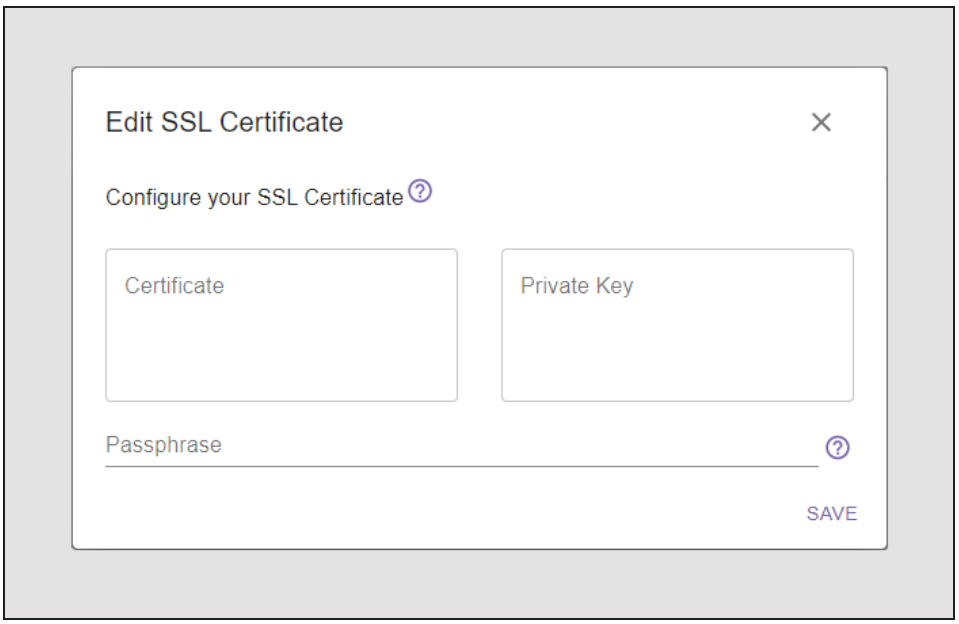


Figure 213 The Object Manager VM Node Edit SSL Certificate screen.

3. Enter the desired **Certificate** and **Private Key** in PEM format.
4. If necessary, enter the **Passphrase** that was used to encrypt the private key.
5. Click **Save**.

REGISTER A OBJECT MANAGER VM NODE WITH A OBJECT MANAGER SPHERE

Registering a Object Manager VM node with a Object Manager sphere allows you to use the node for data storage.

Here is how to register a Object Manager VM node with a Object Manager sphere:

1. In the Object Manager VM node management console taskbar, click **Dashboard**.
2. Under the **Dashboard** banner, click **Activate**.

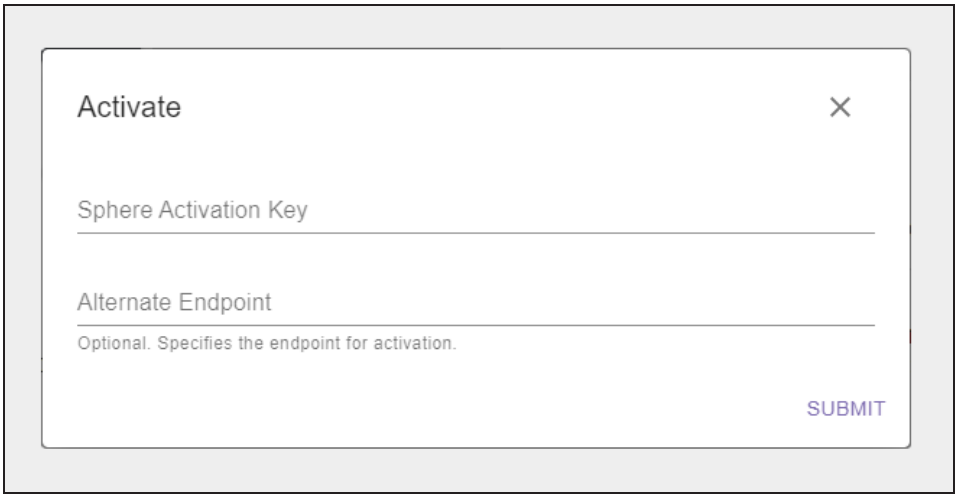


Figure 214 The Object Manager VM Node - Activate screen.

3. Enter the **Sphere Activation Key** provided by Spectra Logic.
4. If necessary, enter the **Alternate Endpoint**.
5. Click **Submit**. After a few moments the Dashboard screen refreshes once activation completes.

6. Under the **Dashboard** banner, click **Register With Sphere**.

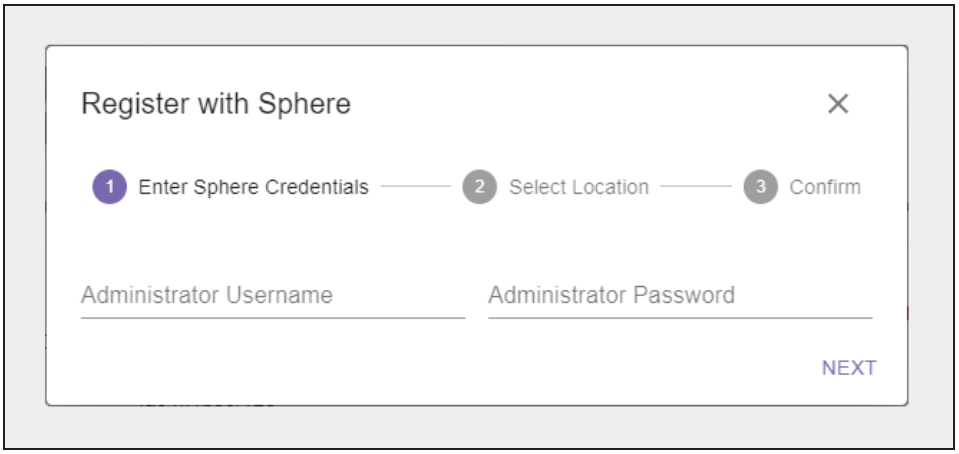


Figure 215 The Register With Sphere - Credentials screen.

7. Enter the Object Manager **Administrator Username** and **Password**.
8. Click **Next**.

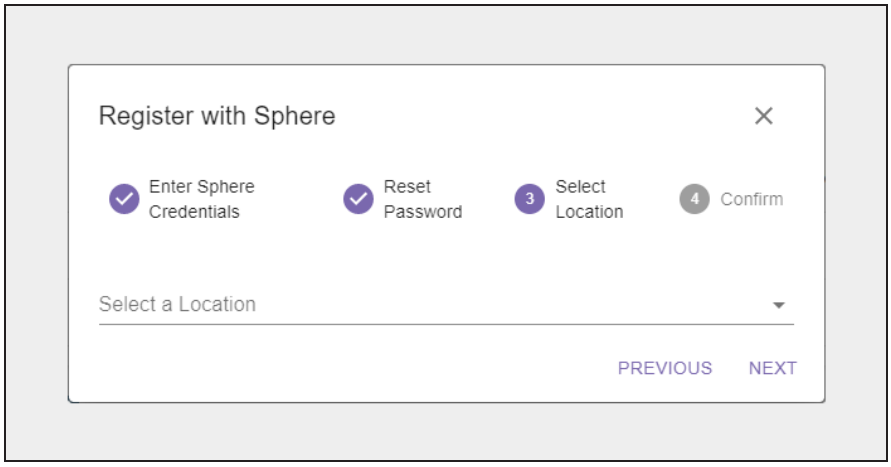


Figure 216 The Register with Sphere - Select Location screen.

9. On the Select Location screen, chose to create a new location, or to use an existing location:

- **Create a New Location on the next page**
- **Select an Existing Location on page 254**

Create a New Location

Here is how to create a new location:

1. To create a new location, use the drop-down to select **New Location**.
2. To map a location, you can search for the location, manually enter the latitude and longitude, or create a location with no corresponding geographic location.

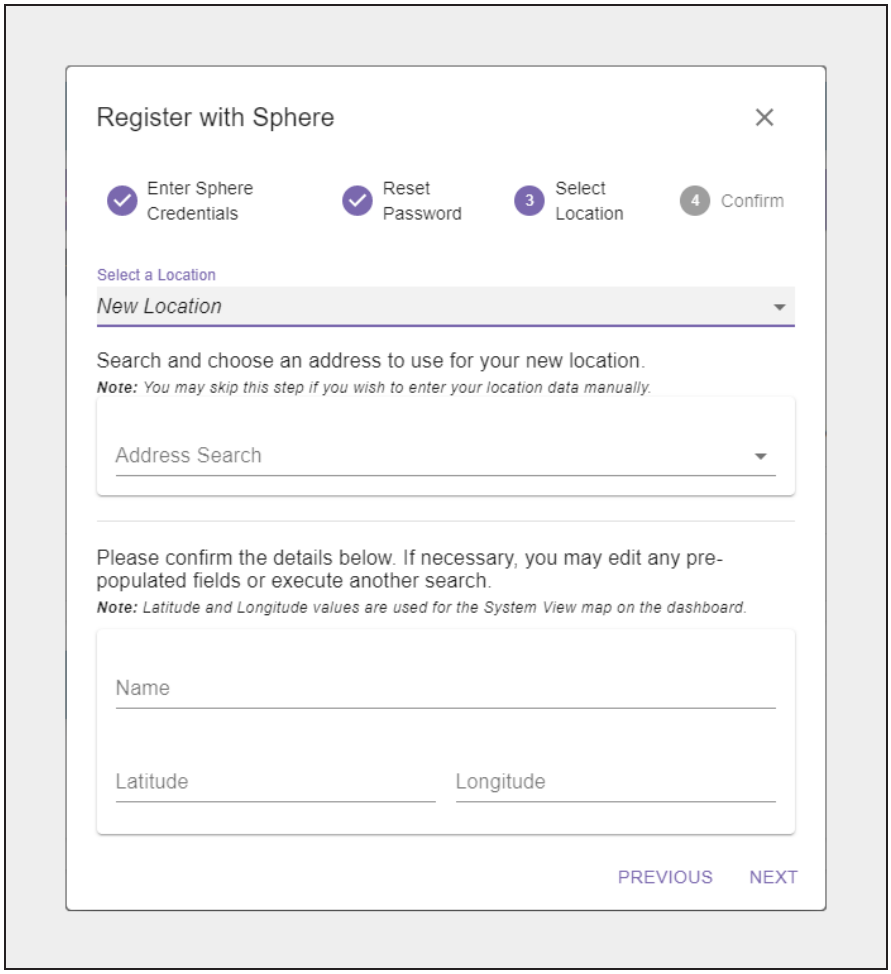


Figure 217 The Register with Sphere - New Location screen.

- To search for a location...

    a. In the **Address Search** field, enter a geographic location. You can enter a full or partial postal address, city, county, province, or country.

    b. Select the correct match from the list.

    Note: If no match is located, try changing the format of the address you entered. For example, use 9th Street in place of Ninth St.

    c. If desired, manually edit the **Name**.

    Spectra Logic recommends naming each location after its physical location in the world.

    For example, if Object Manager resources are located in Dallas, use that as the location name if there is only one Object Manager resource in that city. If there are multiple Object Manager resources consolidated in the same city, use suffixes to identify each group such as Dallas-HQ, Dallas-Research, or Dallas-Production.

    d. Confirm the information is correct and click **Next**.

- To manually enter a location...

    a. Enter the desired **Name**.

    Spectra Logic recommends naming each location after its physical location in the world.

    For example, if Object Manager resources are located in Dallas, use that as the location name if there is only one Object Manager resource in that city. If there are multiple Object Manager resources consolidated in the same city, use suffixes to identify each group such as Dallas-HQ, Dallas-Research, or Dallas-Production.

    b. Enter the **Latitude** and **Longitude** of the location.

    Notes:
    - When entering a value for **Latitude**, use positive values for locations north of the equator, and negative values for locations south of the equator.
    - When entering a value for **Longitude**, use positive values for locations east of the prime meridian, and negative values for locations west of the prime meridian.

    c. Click **Next**.

- To skip entering a location...

    a. Enter the desired **Name**.

    Spectra Logic recommends naming each location after its physical location in the world.

    For example, if Object Manager resources are located in Dallas, use that as the location name if there is only one Object Manager resource in that city. If there are multiple Object Manager resources consolidated in the same city, use suffixes to identify each group such as Dallas-HQ, Dallas-Research, or Dallas-Production.

    b. Click **Next**.

Note: If you do not enter an address or latitude and longitude, the location displays on the right-hand pane of the Object Manager dashboard, but does not display on the world map.

3. Confirm the information is correct, and click **Register**.

Wait while the Object Manager VM node registers with the Object Manager sphere. This may take several minutes, during which time the Object Manager VM node interface changes to the Object Manager management console, and may display communication errors.

Select an Existing Location

Here is how to select an existing location:

1. Using the drop-down menu, **Select a Location** where you want to associate the Object Manager VM node and click **Next**.

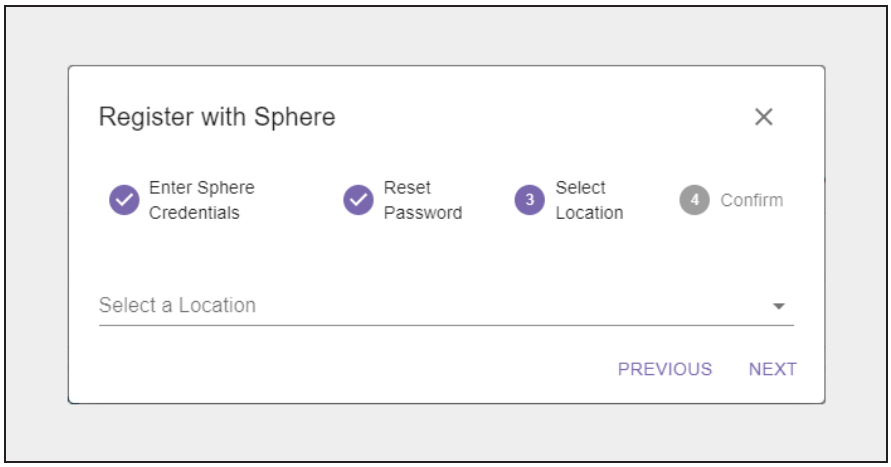


Figure 218 The Register with Sphere - Select Location screen.

2. Confirm the information is correct, and click **Register**.

   Wait while the Object Manager VM node registers with the Object Manager sphere. This may take several minutes, during which time the Object Manager VM node interface changes to the Object Manager management console, and may display communication errors.

Frequently Asked Questions

This section covers frequently asked questions that help you understand how the Object Manager operates.

Why Do Object Manager Jobs Show as Canceled in the BlackPearl User Interface?

When the Object Manager requests an object(s) from a BlackPearl Storage Manager, it initiates a Start Bulk Get job in the BlackPearl Storage Manager. However, the Object Manager has a back-door path to read objects from the BlackPearl cache. The BlackPearl Storage Manager is only aware of when objects are read through the front door path. When the Object Manager completes reading the requested object(s) from the BlackPearl cache, it cancels the job on the BlackPearl Storage Manager.

What is the Difference Between AWS Linked Buckets and BlackPearl Linked Buckets?

Object Manager linked buckets allow the Object Manager to connect to an AWS or BlackPearl bucket, and link to the objects in that bucket. These linked buckets are connected to a Object Manager bucket. With both AWS and BlackPearl linked buckets, any objects that are currently in the bucket become part of the associated Object Manager bucket when they are linked. Additionally, any objects added to the AWS or BlackPearl bucket after it is linked to Object Manager also becomes part of the Object Manager linked bucket.

AWS linked buckets additionally allow objects added to the Object Manager bucket to be copied to the linked AWS bucket.

Note: A BlackPearl system does not support this feature.

Who Owns Objects Managed by the Object Manager Sphere?

Objects copied from an external bucket to a Object Manager bucket are owned by the owner of the Object Manager bucket, while objects coped to an external bucket are owned by the user with the credentials used when creating the BlackPearl storage for the bucket.

At What Size Must a PUT Job be a Multi-Part Upload?

The upper size limit before an object must be PUT using multi-part upload is 5 GB.

Note: Spectra Logic recommends using multi-part upload for any object over 1 GB.

Why Do I Receive AWS Connectivity Error Messages From Third-Party Software But Not From Object Manager?

The Object Manager and the BlackPearl Storage Manager do not generate error messages when an AWS connection is unavailable. However some third-party applications, such as Rubrik, may generate an error message when this occurs. In most cases, no user action is necessary.

Best Practices

Note: This section will be updated in future releases of this guide.

Using Object Manager and a BlackPearl System Simultaneously

The best practice for using a BlackPearl system with the Object Manager application is to allow the Object Manager application to control all aspects of the BlackPearl system.

If you need to use the BlackPearl system for data storage outside of the Object Manager application control, keep logical separation of as many elements on the BlackPearl system as possible. All buckets, users, data policies, and storage domains should be separate and unique between the BlackPearl system side and the Object Manager application side.

GLOSSARY

BlackPearl System

A BlackPearl Storage Manager is used to provide the interface between the Object Manager and tape storage. A BlackPearl system stores data in a local cache before writing to tape media. When data is requested by the Object Manager the BlackPearl system copies data from tape storage to the cache so it can be accessed by the Object Manager. A BlackPearl system can additionally provide storage to disk media, using Online and NAS storage.

Lifecycle

A lifecycle consists of one or more rules that dictate where objects data is stored and the length of time it is stored in each specified storage location. Users control the data placement using placement and deletion rules, and the storage endpoint where those clones are placed. Lifecycle rules are interpreted on a once per day basis, thereby producing a list of content to move. Data is then moved as a background process.

The available storage targets consist of Object Manager VM nodes, S3 buckets, and BlackPearl® systems that are associated with the Object Manager. Users can create up to five rules per lifecycle to govern the movement and location of data. Users can delete rules at any time, and any data movement in progress completes based on the known rules at the time the transaction started.

Storage

A storage destination consists of either disk-based storage provided by a Object Manager cluster, block storage provided by a Object Manager VM node, a BlackPearl bucket, a BlackPearl NAS share, or an AWS® S3 repository. Disk-based and block storage can utilize the Standard or Standard-Infrequent Access storage classes, while BlackPearl bucket storage on tape can only use the Glacier storage class. AWS repositories can use any storage class.

Storage Classes

Amazon S3 provides multiple storage classes for different use cases. The Object Manager recognizes all storage classes supported by AWS, but only uses storage class types Standard, Standard-Infrequent Access, and Glacier.

The Object Manager makes a best guess regarding where to place data if any other storage class is specified. Lifecycles can be used to transition data from one storage class to another.

Standard (SA)

This storage class is best for frequently accessed data, as it offers high performance, availability, and data durability, as well as low latency and high throughput. Standard (SA) is fast access storage such as disk, flash, or block storage, as well as Amazon S3 or third-party S3 object storage.

Standard-Infrequent Access (IA)

This storage class is best suited for data that does not need to be accessed frequently, but needs to be retrieved immediately when access is requested. The Standard-IA storage class offers the same low latency, high performance and durability of the Standard storage class, but at lower cost.

Glacier

This storage class is best suited for long-term storage and archiving, as it offers high security and durability at the lowest cost. This storage class is fundamentally different in that in order to access data in Glacier storage, the data must first be retrieved, and this retrieval can take many hours to complete. In order to use this storage class, S3 clients must be able to issue an "object restore" command to move the object from Glacier storage to Standard storage. After the object is available on Standard storage, a GET command is used to access the object.

Object Manager Bucket

A Object Manager bucket is the highest-level logical storage container for S3 objects. Each Object Manager bucket is a unique endpoint and displays a single view of all objects in the bucket, which can have managed copies at multiple sites, in multiple clouds, and in multiple storage classes or tiers.

Object Manager buckets may be assigned a lifecycle to control the movement of data, but do not require a lifecycle. Multiple Object Manager buckets can use the same lifecycle. Object Manager buckets can also be configured to use encryption.

Linked Bucket

The Object Manager is able to link to existing AWS S3 or BlackPearl buckets and create a linked bucket. When this is done the Object Manager is immediately aware of the existing data which allows for ongoing synchronization with external storage targets in the Object Manager sphere, while still allowing for the application of lifecycle rules.

Only one linked bucket is allowed per storage location.

Location

A Location denotes a physical location in the world that consists of a set of storage targets or physical storage such as a BlackPearl Storage Manager, tape storage connected to a BlackPearl Storage Manager, Object Manager VM node storage, and Object Manager clusters that share the same physical location.

BlackPearl Storage

The Object Manager uses a BlackPearl Storage Manager to provide disk storage as an S3 Standard (SA) target, and to optionally provide On-Prem Glacial storage using Spectra Logic tape libraries.

On-Prem Glacier Storage

A BlackPearl Storage Manager with On-Prem Glacier storage allows data to move seamlessly into tape storage in a way not previously possible. It enables users to deploy a tier of deep storage that is cost effective, easy to manage, and scalable to exabytes of data.

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Version 2.0, January 2004

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Vail

{

"name": "vail",

"version": "0.0.1",

"description": "Vail GUI",

"author": "Spectra Logic Corporation",

"license": "UNLICENSED",

"private": true,
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"html-webpack-plugin": "^5.5.3",
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"@types/react": "^17.0.68"
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"clean": "rm -rf coverage-ui node_modules mgmt/assets",
"start": "webpack --env development --watch",
"build": "yarn lint && webpack --env production",
"build:debug": "webpack --env development",
"test": "jest",
"test:coverage": "jest --coverage",
"lint": "eslint --ext .ts,.tsx ./mgmt/client"
}
}

Included Packages

cel.dev/expr

cloud.google.com/go/auth

cloud.google.com/go/auth/oauth2adapt

cloud.google.com/go/compute/metadata

cloud.google.com/go/iam

cloud.google.com/go/internal

cloud.google.com/go/monitoring

cloud.google.com/go/storage

github.com/Azure/azure-sdk-for-go/sdk/azcore

github.com/Azure/azure-sdk-for-go/sdk/internal

github.com/Azure/azure-sdk-for-go/sdk/storage/azblob

github.com/DataDog/zstd

github.com/GoogleCloudPlatform/opentelemetry-operations-go/detectors/gcp

github.com/GoogleCloudPlatform/opentelemetry-operations-go/exporter/metric

github.com/GoogleCloudPlatform/opentelemetry-operations-go/internal/resourcemapping

github.com/NYTimes/gziphandler
github.com/aws/aws-lambda-go
github.com/aws/aws-sdk-go-v2
github.com/aws/aws-sdk-go-v2/aws/protocol/eventstream
github.com/aws/aws-sdk-go-v2/config
github.com/aws/aws-sdk-go-v2/credentials
github.com/aws/aws-sdk-go-v2/feature/ec2/imds
github.com/aws/aws-sdk-go-v2/feature/s3/manager
github.com/aws/aws-sdk-go-v2/internal/configsources
github.com/aws/aws-sdk-go-v2/internal/endpoints/v2
github.com/aws/aws-sdk-go-v2/internal/ini
github.com/aws/aws-sdk-go-v2/internal/sync/singleflight
github.com/aws/aws-sdk-go-v2/internal/v4a
github.com/aws/aws-sdk-go-v2/service/cloudformation
github.com/aws/aws-sdk-go-v2/service/cloudwatchlogs
github.com/aws/aws-sdk-go-v2/service/cognitoidentityprovider
github.com/aws/aws-sdk-go-v2/service/dynamodb
github.com/aws/aws-sdk-go-v2/service/iam
github.com/aws/aws-sdk-go-v2/service/internal/accept-encoding
github.com/aws/aws-sdk-go-v2/service/internal/checksum
github.com/aws/aws-sdk-go-v2/service/internal/endpoint-discovery
github.com/aws/aws-sdk-go-v2/service/internal/presigned-url
github.com/aws/aws-sdk-go-v2/service/internal/s3shared
github.com/aws/aws-sdk-go-v2/service/kms
github.com/aws/aws-sdk-go-v2/service/s3
github.com/aws/aws-sdk-go-v2/service/ses
github.com/aws/aws-sdk-go-v2/service/sns
github.com/aws/aws-sdk-go-v2/service/sqs
github.com/aws/aws-sdk-go-v2/service/sso
github.com/aws/aws-sdk-go-v2/service/ssooidc
github.com/aws/aws-sdk-go-v2/service/sts

github.com/aws/aws-sdk-go/aws

github.com/aws/smithy-go

github.com/aws/smithy-go/internal/sync/singleflight

github.com/awslabs/aws-lambda-go-api-proxy

github.com/cespare/xxhash/v2

github.com/cncf/xds/go

github.com/dmitryakadiamond/beanstalk

github.com/dustin/go-humanize

github.com/emicklei/go-restful-openapi/v2

github.com/emicklei/go-restful/v3

github.com/envoyproxy/go-control-plane/envoy

github.com/envoyproxy/protoc-gen-validate/validate

github.com/facebookgo/clock

github.com/felixge/fgprof

github.com/felixge/httpsnoop

github.com/fsnotify/fsnotify

github.com/go-logr/logr

github.com/go-logr/stdr

github.com/go-openapi/jsonpointer

github.com/go-openapi/jsonreference

github.com/go-openapi/spec

github.com/go-openapi/swag

github.com/golang-jwt/jwt/v4

github.com/golang/groupcache/lru

github.com/google/pprof/profile

github.com/google/s2a-go

github.com/google/uuid

github.com/googleapis/enterprise-certificate-proxy/client

github.com/googleapis/gax-go/v2

github.com/gorilla/websocket

github.com/hashicorp/hcl

github.com/jmespath/go-jmespath
github.com/josharian/intern
github.com/klauspost/cpuid/v2
github.com/magiconair/properties
github.com/mailru/easyjson
github.com/mattn/go-runewidth
github.com/mattn/go-sqlite3
github.com/minio/sha256-simd
github.com/mitchellh/mapstructure
github.com/nicksnyder/go-i18n/v2
github.com/oklog/ulid
github.com/pelletier/go-toml
github.com/peterh/liner
github.com/pkg/profile
github.com/pkg/xattr
github.com/rivo/uniseg
github.com/spaolacci/murmur3
github.com/spf13/afero
github.com/spf13/cast
github.com/spf13/cobra
github.com/spf13/jwalterweatherman
github.com/spf13/pflag
github.com/spf13/viper
github.com/subosito/gotenv
github.com/ugorji/go/codec
github.com/urfave/negroni/v3
github.com/youmark/pkcs8
go.opentelemetry.io/auto/sdk
go.opentelemetry.io/contrib/detectors/gcp
go.opentelemetry.io/contrib/instrumentation/google.golang.org/grpc/otelgrpc
go.opentelemetry.io/contrib/instrumentation/net/http/otelhttp

go.opentelemetry.io/otel

go.opentelemetry.io/otel/metric

go.opentelemetry.io/otel/sdk

go.opentelemetry.io/otel/sdk/metric

go.opentelemetry.io/otel/trace

go.uber.org/atomic

go.uber.org/multierr

go.uber.org/zap

golang.org/x/crypto

golang.org/x/net

golang.org/x/oauth2

golang.org/x/sync/semaphore

golang.org/x/sys/unix

golang.org/x/term

golang.org/x/text

golang.org/x/time/rate

google.golang.org/api

google.golang.org/api/internal/third_party/uritemplates

google.golang.org/genproto/googleapis/api

google.golang.org/genproto/googleapis/rpc

google.golang.org/genproto/googleapis/type

google.golang.org/grpc

google.golang.org/protobuf

gopkg.in/ini.v1

gopkg.in/natefinch/lumberjack.v2

gopkg.in/yaml.v2

gopkg.in/yaml.v3