

IBM Cloud Object Storage System  
Version 3.12.4 for March Maintenance Release

## *Release Notes*



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## Support information

For more information on the product or help with troubleshooting, contact IBM Support at [IBMCloudStorageSupport@us.ibm.com](mailto:IBMCloudStorageSupport@us.ibm.com) or visit the Directory of worldwide contacts.



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## **Chapter 1. New Features and Improvements in ClevOS 3.12.4**

This release has various defect fixes.





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## Chapter 2. Interface Modifications

API updates for the 3.12 release have been referenced in the following documentation:

- CSO API Developer Guide
  - NEW section added for Compliance Enabled Vaults
- REST API Developer Guide
  - Updated section on Access Pool Management>Create an access pool  
Request parameters
  - Updated section on Storage Pool Management>Edit a storage pool  
Request parameters
  - Updated section on Administration>Configure Accesser API  
Request parameters
  - Added new section to Vault Management  
View a concentrated dispersal vault IDAs

### API Changes 3.12

Only S3 is supported for operations on Protected Vaults/Objects and includes the following changes:

- Create Vault - 4 new parameters are added to the existing API: status and retention durations
- Edit Vault - 4 new parameters are added to the existing API: status, and retention durations
- Create Vault template - 4 new parameters are added to the existing API: status and retention durations
- Edit Vault Template - 4 new parameters are added to the existing API: status and retention durations
- Configure Vault Protection - new api to enable the feature.

COS-26638: In prior releases, the Storage Pool Capacity and Disk Report Manager REST API provided duplicate entries for any disk within a storage pool that is not in a “good” (pre-3.10.1) or “online” (3.10.1 or later) state. This issue has now been resolved.

COS-26512: The Compliance Report has been renamed to System Usage and Configuration Summary Report. The corresponding REST API endpoints have been updated to reflect this, as have any REST API fields that specify the Compliance Report.

Support retrieval of region code and billing class separately [1141]. APIs modified for this feature:

- Create Vault - Two parameters, region and storageClass are added to the request.
- Edit Vault - Two parameters, region and storageClass are added to the request.
- Create Vault From Template - Two parameters, region and storageClass are added to the request.



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## Chapter 3. Resolved Issues

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### Resolved issues in 3.12.4 March Maintenance Release

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Table 1. Resolved issues

| Issue     | Description   |
|-----------|---|
| COS-34232 | Resolved an issue that might result in inconsistent revisions of slices for an index node being persisted under heavy load. Affects any environment that uses the distributed index, including the name index, data migration services, globally prioritized rebuilder, and multi part uploads. Inconsistent slices are more likely to produce availability or reliability issues in configurations where the difference between width, and write threshold, is larger than the difference between write threshold and threshold. |
| COS-34143 | Resolved an issue that was causing increased memory pressure on Slicestor devices when heavy slice listing operations were being performed. This was particularly prominent when utilizing Vault Mirrors or Data Migration Services, but could also be seen in heavy rebuild scenarios on storage pool sets with a large number of Slicestor devices.   |
| COS-35277 | Resolved an issue with Slicestors going into inconsistent state after upgrade.  |

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### Resolved issues in 3.12.4

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Table 2. Resolved issues

| Issue     | Description   |
|-----------|---|
| COS-32649 | Fixed an issue with manager startup handling of chassis ID in multi node chassis. |

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### Resolved issues in 3.12.3

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Table 3. Resolved issues

| Issue     | Description  |
|-----------|--|
| COS-31605 | In previous releases, when using Concentrated Dispersal with an older version of Firefox (before version 47), any creation of mirrored vaults can fail. This issue is resolved; however, users should upgrade to the latest version of Firefox.                |
| COS-30962 | In the Device Statistic API, service state and uptime metrics were unnecessarily included in the output, and have been removed.  |
| COS-31470 | In previous releases, if a set replacement or set removal was performed before initiating a device replacement activity, the set numbering displayed on pages that are associated with the device replacement flow is incorrect. This issue has been resolved. |
| COS-31449 | Addressed an issue that is related to deletion of vault alias during migration.  |
| COS-30097 | 500 Errors for GET.SERVICE request while PUT.VAULT is in process.  |

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### Resolved issues in 3.12.2 January Maintenance Release

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Table 4. Resolved issues

| Issue     | Description  |
|-----------|--|
| COS-27973 | Addressed an issue where Slicestors are exhibiting high cpu and causing dlm process to be restarted. |

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Table 4. Resolved issues (continued)

| Issue     | Description  |
|-----------|--|
| COS-30612 | Addressed an issue where the server returns a 403 when a bucket is created through S3 and using the HMAC account/keys. |
| COS-30999 | Fixed an issue with Manager returning internal error when the devices are approved in bulk.                            |
| COS-31227 | Fixed an issue when adding a device on a storage pool with missing Slicestors.   |
| COS-31482 | Robust handling of Accesser stability in an error scenario.  |

## Resolved issues in 3.12.2

Table 5. Resolved issues

| Issue     | Description  |
|-----------|--|
| COS-28338 | Updated access control permissions enforcement for Compliance Enabled Vault API extensions. PUT/GET legal holds require WRITE_ACL/READ_ACL permission and PUT/GET Bucket Protection operations now bucket owner permission after this fix.   |
| COS-28629 | In certain conditions, Execution of the storagectl commands (list, list all, info, and history) through the manager troubleshooting console will timeout, particularly when a significant amount of information is present, resulting in the following message to be displayed on the user interface: "The command is taking too long to execute ." This issue is fixed in this release. |
| COS-27795 | Logging updates for token refresh failures.  |
| COS-28787 | In earlier releases, when operating in container mode with a service vault, the Create Vault link for each vault template on the "Template Management" page of the Manager user interface did not initiate the "Create Vault" process. This issue has now been resolved.   |
| COS-28790 | In release 3.10.2 and after, the CSV content associated with the Vault Summary Report on the Manager user interface did not contain the SSE-C column. The issue has been resolved in this release.   |
| COS-28572 | Fixed an issue where Manager complains about 2 drives missing for Lenovo System x3650.   |
| COS-29667 | Fixed an issue with COS access logs reporting storage_account_id .   |
| COS-22881 | When performing a form-based upload using a POST request, if the client disconnects from the Accesser device before completing the request, the error is incorrectly logged as an HTTP 500 error and generates an event in the Manager UI event console.   |
| COS-28179 | Who to contact in the event of a scenario causing a large number of destroyed data-slices, such as multiple Slicestore reimage, site destruction, site reimage, or large scale long time scale outage.   |

## Chapter 4. Known issues

Table 6. Known issues

| Issue     | Failing Condition   | Disposition   |
|-----------|---|---|
| COS-6803  | For Slicestor <sup>®</sup> devices with multiple OS drives, degradation of OS drives does not affect the device's health on the Monitor device page.  | Repair the OS drive or contact IBM <sup>®</sup> Customer Support for more information.  |
| COS-12691 | Instability has been observed when running two 40 Gbit links in LACP mode.  | Do not use LACP aggregated links with 40 Gbit Intel Network cards.  |
| COS-11201 | In the Event Console of the Manager User Interface, the event details section for failing disk migration events contains a parameter called Migration Progress. However, it is not clear what this value represents.  | This value corresponds to the percentage of failing disk migration that is complete.  |
| COS-11355 | Replacing a failed drive with another failed drive results in an inconsistent view on the Manager User Interface. On the Monitor Device page, in the "Summary of device health" section, both the replaced failed drive and the new failed drive are shown. The "Drive Information and Actions" view of the drive layout shows the replaced failed drive. On the Maintenance page, the FRU report contains the replaced failed drive. | Perform another replacement of the failed drive with a good drive.  |
| COS-15399 | Following an Accesser <sup>®</sup> OS drive replacement, a new device certificate must be generated for this device, and a whitelist containing this certificate information must be distributed to the other devices in the system which this device will attempt to communicate with.   | A core process restart of the Slicestore reporting the authorization error. This will be addressed in a future release.   |
| COS-13575 | The "stop migration" operation for failing disk migration on the Manager User Interface (UI) may take ~20 seconds to complete after being initiated by the user. The button continues to be enabled during this time. This issue exists for dispose and reset disk operations as well.  | Do not hit the button again until the operation completes. If the drive stays in the same state for more than 20 seconds, perform a refresh of the page. If the drive continues to stay in this state, follow the recommended action provided in the Manager Administration Guide under disk lifecycle management.        |
| COS-10031 | When resuming a drive in the DIAGNOSTIC state from the Manager User Interface, it may take ~20 seconds to complete. The resume button is not disabled during this time.   | Do not hit the resume button until the operation completes. If the drive stays in the DIAGNOSTIC state for more than 20 seconds, perform a refresh of the page. If the drive continues to stay in this state, follow the recommended action provided in the Manager Administration Guide under disk lifecycle management. |
| COS-12983 | Virtual devices running ClevOS within VMware may experience a kernel panic when migrating the virtual machine to a new server using VMware (R) vMotion (tm).  | Should this occur when migrating a VMware virtual device using vMotion, a cold migration should be used instead such that the virtual machine is offline during the migration.  |
| COS-10445 | When using the storage command from the localadmin shell on a Slicestor device, it is possible to resume all drives that are currently in the DIAGNOSTIC state. In some cases however, this process may take too long, which will cause the command to return an error code -15 due to a timeout.   | Despite the error, the resume process is continuing in the background. The storage list command can be used to monitor the progress of resume process.  |

Table 6. Known issues (continued)

| Issue     | Failing Condition   | Disposition  |
|-----------|---|--|
| COS-16114 | On systems with RAM roughly equal to or greater than the size of the OS drive, a kernel panic may result in the system being in an unusable state.  | Contact IBM customer support to help correct the situation.  |
| COS-7488  | When performing a storage pool set removal, it is possible that once the reallocation has finished for an source Slicestor device, it may show some small amount of data still present.   | No action is required. Once the set removal has completed, all slices will have been reallocated to the new storage pool. Any discrepancy in a Slicestor device's used space is generally a result of small inaccuracies that may occur during normal usage of the system. |
| COS-13504 | When failing a quarantined drive, it is possible that after data has been migrated off the failing drive, the Manager event console will report that no data migration was attempted.   | No action is required. Despite the event description, data migration will always be attempted unless the user specifically chooses to skip migration via the localadmin shell storage command.   |
| COS-22921 | When someone attempts to delete a bucket they first need to determine the assessor that can be used to issue the command. The S3 GET Bucket Location is one means to determine this. However this command may not work at every access pool.  | Enhancing the S3 GET Bucket Location as a corner case command that can work at any access pool will be addressed in a future release.  |
| COS-22990 | The S3 remote proxy implementation of vault proxy has a few limitations related to communicating with an Amazon S3 endpoint. The version of the AWS SDK used to communicate to Amazon will default to using V2 instead of V4 authentication, causing authentication issues when communicating with certain AWS endpoints.   | For further assistance in configuring a remote proxy for use with Amazon S3, contact IBM customer support.   |
| COS-23025 | SL 4U slicestor devices, LEDs are incorrectly set.  | Recovery Action: The user can use MegaCLI/storcli commands to issue LED actions before performing disk replacements. This will be fixed in a future release.   |
| COS-23962 | Vault quotas are static and do not update when storage pool capacities change. If a system expansion, set replacement, or set removal is performed on the storage pool, vault quotas for any vaults on that pool will not update to consider the new capacity.  | The user defined vault quotas will work as expected. However, they may not be consistent with the current storage pool capacity. For example, a vault quota may be higher than total storage pool capacity after a set removal.  |
| COS-22924 | When you upgrade the Manager to ClevOS 3.10.1 or newer for the first time, you might not be able to log in immediately. The Manager application might need an extra 20 - 30 minutes to become available due to database schema changes introduced in ClevOS 3.10.1. On systems with large databases, particularly systems with considerable historical event content, the time can be longer. | Contact Customer Support if it takes longer than 30 minutes to successfully log in to the Manager. Do not attempt to restart the Manager while it is upgrading.  |
| COS-26214 | Lack of documentation highlighting dependencies of Hadoop-connector package with GA releases.   | For legacy customers who are still using Hadoop connector for ClevOS software, please contact IBM customer support to install a new package compatible with latest build.  |

Table 6. Known issues (continued)

| Issue     | Failing Condition  | Disposition   |
|-----------|--|---|
| COS-27469 | When performing a PUT-COPY operation, a request header is used to specify the source of the copy operation. If this header is specified, but with an empty value, the request is expected to fail with a HTTP 400 - Bad Request. Instead, the object is being successfully created but with empty content. | This will be fixed in a future release.   |
| COS-29681 | When using the Microsoft IE9 web browser, certain Manager user interface elements like the left navigation tree and the vault capacity bar charts on the Monitor Vault page may not appear.  | Microsoft has ended support of IE9 and IE10. Users should upgrade to Microsoft IE11 or higher, or use an alternative browser, such as Firefox, Safari, or Chrome. |

## Upgrading and Installation

Table 7. Upgrading and Installation

| Issue     | Failing Condition   | Disposition  |
|-----------|---|--|
| COS-7126  | When extracting of upgrade file fails when a device is upgrading the failure message "The Selected File cannot be extracted while upgrades are in progress" continue to show if upload is restarted.                          | Only one upgrade file can be uploaded to the manager at a time. If another file is uploaded during an upgrade, an error message appears until the page is reloaded.          |
| COS-15372 | When upgrading from ClevOS 3.8.x, 3.9.x, or 3.10.0 to 3.10.1 or later, all drives not used for Slicestor data (e.g. OS drives) will be reported as newly discovered in the Manager event console.                             | No action is required.   |
| COS-15642 | When upgrading devices that contain logical RAID drives, the Manager event console will show a drive offline event immediately followed by a drive online event for each physical drive that is part of a logical RAID drive. | No action is necessary. These events are simply representative of a transition phase of the RAID drives during the startup sequence and will be removed in a future release. |

## Container

Table 8. Container

| Issue     | Failing Condition   | Disposition  |
|-----------|---|--|
| COS-1852  | When attempting to write an object to a container that does not exist, the Accesser appliance returns an HTTP 404 response with an error message of NoSuchKey instead of the appropriate NoSuchBucket. This includes cases where the container name includes a "/".   | Ensure that your vault or container is successfully created before attempting to write objects to it. If you receive an error message of NoSuchKey for an upload request, verify that the container you are addressing does exist. |
| COS-15401 | If a user attempts to create a management vault using "manual configuration" (accessed through the Configure Management Vault page) based on an existing vault template, management vault creation will fail with the following message: "Cannot create a management vault from this template. It is deployed to access pools with standard vaults" | Use the "automatic configuration" available on the Configure Management Vault page.  |
| COS-15218 | Container creation or deletion can sometimes result in 500 error responses when the requests are sent concurrently with other configuration requests to the same storage account.   | Retrying the request that received a 500 is a suggested recovery action. It's best to retry the request when not doing other operations on the same storage account.   |

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## Alerting and Reporting

Table 9. Alerting and reporting

| Issue    | Failing Condition   | Disposition   |
|----------|---|---|
| COS-1749 | After recovering from an unresponsive IPMI controller, the open incident in the Manager event console sometimes fails to clear. The open incident is misleading, but has no impact on the system operation. | Contact IBM Customer Support to confirm and correct the false incident. |
| COS-6490 | If a manager appliance is imaged with a degraded RAID array, no event is presented to the user in the event console. In some cases this can cause no warnings to be shown about a potential problem.        | Repair the RAID array by replacing the failing drive.                   |

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## System Behavior

Table 10. System behavior

| Issue    | Failing Condition   | Disposition   |
|----------|---|---|
| COS-2498 | The usage of a disk is counted while the disk is offline. However, its capacity is not counted.   | No action. Awareness of limitation. If necessary a restart of core would fix the usage values. Limit DLM events   |
| COS-2753 | Under certain circumstances involving a combination of high concurrency (100 s to 1000 s of threads) and large object uploads (GB and larger), it is possible that multiple Slicestor appliances might experience disks being quarantined due to IO timeouts simultaneously.  | This is a direct consequence of the workload being too high for the system and is likely to occur under certain test conditions but is much less likely to occur in a production environment. If this occurs, resume the disks and resume IO but reduce the workload on the system.   |
| COS-2128 | In a GDG configuration with high request latency to the remote stores and low latency to local stores, an Accesser Appliance will open multiple connections to the remote stores and a single connection to local stores. Large bursts of IO can overwhelm the single local connection, resulting in elevated response times and operation latencies. | Using the System Advanced Configuration framework, the Accesser Appliance can be configured to open multiple connections to local stores, allowing it to better handle burst of IO activity. The parameter to configure appropriately is <code>network.connection-profile</code> . Please refer to section 3 of the Advanced System Configuration guide for more details. |
| COS-1920 | Support for "encoding-type" header when performing xml-based listing requests is not currently provided.  | This feature is not currently supported   |

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## Storage Pools

Table 11. Storage pools

| Issue    | Failing Condition  | Disposition  |
|----------|--|--|
| COS-2642 | On the *Monitor Storage Pool Page, the <b>Reallocation Progress</b> graph, which displays historical data, is inaccurate when a device is down or statistics are not collected for a window of time. | The <b>Data Reallocation</b> progress bar, available at the top of the *Monitor Storage Pool Page, is always accurate. This view reflects the status and should be used to monitor progress of the data reallocation activity. |



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## Data Evacuation

Table 12. Data evacuation

| Issue | Failing Condition  | Disposition |
|-------|--------------------|-------------|
|       | Nothing to report. |             |

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## System Configuration

Table 13. System configuration

| Issue | Failing Condition  | Disposition |
|-------|--------------------|-------------|
|       | Nothing to report. |             |

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## Deleting objects

Table 14. Deleting objects

| Issue | Failing Condition   | Disposition  |
|-------|---|--|
| 9444  | If a system is 100% full, customers might encounter an HTTP 500 error if they attempt to delete objects larger than the embedded content threshold (<1MB S3, >4MB SOH for default segments size). This issue has existed since release 3.0. It occurs because deleting large objects causes an intermediate write that appears larger to a Slicestor <sup>®</sup> Node, causing that node to fail the request due to an insufficient space error. | Contact IBM Support. They must use a development-provided procedure to free up disk space. |

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## Manager Web Interface

Table 15. Manager Web Interface

| Issue     | Failing Condition  | Disposition   |
|-----------|--|---|
| COS-13189 | For drives that do not have a SCSI name, some Disk Lifecycle Management (DLM) actions, such as resume and fail, performed through the Manager User Interface (UI) will fail.   | Use drive serial number to perform the action from the command line.<br><br>Obtain drive serial number information by executing (see SERIAL column): # storage list<br><br>Perform the operation based on the drive serial number (Z29010L5), for example: # storage fail Z29010L5  |
| COS-10031 | When resuming a drive in the DIAGNOSTIC state from the Manager User Interface, it may take ~20 seconds to complete. The resume button is not disabled during this time.  | Do not hit the resume button until the operation completes. If the drive stays in the DIAGNOSTIC state for more than 20 seconds, perform a refresh of the page. If the drive continues to stay in this state, follow the recommended action provided in the Manager Administration Guide under disk lifecycle management. |
| COS-23764 | Upon network failure while going through the one time setup process in the manager, a network error page will appear. When the network comes back, re-load the page, at which point an internal server error page will appear in some scenarios. | Log out from the internal server error page and log back into the manager, which will take you through one time setup again.  |

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## Vaults

Table 16. Vaults

| Issue | Failing Condition | Disposition |
|-------|-------------------|-------------|
|       | Nothing to report |             |

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## Vault Mirrors

Table 17. Vault mirrors

| Issue     | Failing Condition  | Disposition   |
|-----------|--|---|
| COS-7019  | When performing IO against a vault mirror with synchronous writes disable, HEAD requests performed against a successfully written object may return an HTTP 404 response.          | If an HTTP 404 is returned for a HEAD request for a recently written object, please retry your request.               |
| COS-13370 | Through the Manager User Interface (UI), after creating a mirror from a mirror template that has Authorized IP Addresses populated, the mirror does not contain the specified IPs. | Perform the following workaround. After the mirror is created, add the IPs using the Edit Mirror Access Control page. |

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## Vault migration

Table 18. Vault migration

| Issue     | Failing Condition   | Disposition  |
|-----------|---|--|
| 14450     | In cases where the target vault of an active vault migration goes below threshold or becomes unavailable, the migration progress bar displayed in the manager might erroneously jump to 100% completed. In this condition, the migration will still be active, and any unmigrated objects will still be migrated.                           | The migration completion event in the manager will only trigger once the migration has fully completed, irrespective of the status reported in the progress bar. Therefore, the completion of a migration should be judged by the migration completion event in the manager. |
| COS-12442 | When a vault migration finishes the work contained in its TODO queue, it kicks off a process to calculate the exact count of the number of objects migrated as part of the migration. This process of calculating the exact size is performed by each device in the target pool, and can take a long time to complete for large migrations. |  |

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## Native File

Table 19. Native File

| Issue    | Failing Condition  | Disposition   |
|----------|--|---|
| COS-5896 | File Accesser devices only support hardware Accesser devices. Docker Accesser installations are not supported.   | Deploy F5100 devices for use only with physical Accesser devices.   |
| COS-6851 | Using Filesystem or Share names with capital letters might prevent some S3 clients from accessing content properly by using the File Accesser device REST API. | Create Filesystems and Shares by using only lower case letters or avoid use of S3 clients that force lowercase referencing of bucket names. |
| COS-7497 | When performing large file writes in excess of 1TB through the NFS gateway appliance, the write operation will fail to complete and return an error.           | Avoid writing files in excess of 1TB, and break up large files into multiple smaller files.   |

Table 19. Native File (continued)

| Issue     | Failing Condition   | Disposition  |
|-----------|---|--|
| COS-7898  | An abrupt shutdown of a File Accesser device can cause issues with the storage database (Cassandra) upon restart.   | Contact IBM Customer Support and run "nodetool repair" on the effected device.<br><br>Use a graceful shutdown of a File Accesser device whenever possible. |
| COS-10195 | Extended Characters in filename do not convert properly between windows and linux clients.  | Do not set character encoding from default (UTF-8). Transformations may not work properly.   |
| COS-7783  | In process I/O may fail in the event of any File Accesser device going off line if that File Accesser is receiving a metadata update at the time of the outage. | Resend of failed data write.   |



## Chapter 5. Supported Hardware Platforms

### IBM Cloud Object Storage Appliances

Table 20. Minimum Version of ClevOS Compatible with Cleversafe Hardware Platforms

| Appliance                             | Product | Minimum ClevOS |
|---------------------------------------|---------|----------------|
| System Manager Appliance              | M2100   | ≤2.7.0         |
| System Manager Appliance              | M2105   | 3.2.2          |
| System Manager Appliance              | M3100   | 2.7.0          |
| IBM COS Accesser <sup>®</sup> Device  | A2100   | ≤2.7.0         |
| IBM COS Accesser <sup>®</sup> Device  | A3100   | ≤2.7.0         |
| IBM COS Slicestor <sup>®</sup> Device | S1440   | ≤2.7.0         |
| IBM COS Slicestor <sup>®</sup> Device | S2104   | 3.2.1          |
| IBM COS Slicestor <sup>®</sup> Device | S2212   | 3.2.1          |
| IBM COS Slicestor <sup>®</sup> Device | S2440   | 3.0.1          |
| IBM COS Slicestor <sup>®</sup> Device | S4100   | 3.1.0          |

Table 21. Minimum Version of ClevOS Compatible with IBM Hardware Platforms

| Product Name                         | Machine Type (1Yr/3Yr Warranty) | Model | Minimum ClevOS |
|--------------------------------------|---------------------------------|-------|----------------|
| IBM COS Accesser <sup>®</sup> 3105   | 3401/3403                       | A00   | 3.8.1          |
| IBM COS Accesser <sup>®</sup> 4105   | 3401/3403                       | A01   | 3.8.1          |
| IBM COS Accesser <sup>®</sup> F5100  | 3401/3403                       | A02   | 3.8.3          |
| IBM COS Accesser <sup>®</sup> T5100  | 3401/3403                       | A02   | 3.10.1△        |
| IBM COS Manager <sup>™</sup> 2105    | 3401/3403                       | M00   | 3.8.1          |
| IBM COS Manager <sup>™</sup> 3105    | 3401/3403                       | M01   | 3.8.1          |
| IBM COS Slicestor <sup>®</sup> 2212  | 3401/3403                       | S00   | 3.8.1          |
| IBM COS Slicestor <sup>®</sup> 2448  | 3401/3403                       | S01   | 3.8.1          |
| IBM COS Slicestor <sup>®</sup> 3448  | 3401/3403                       | S02   | 3.8.3          |
| IBM COS Slicestor <sup>®</sup> 2584  | 3401/3403                       | S03   | 3.8.1          |
| IBM COS Slicestor <sup>®</sup> 2212A | 3401/3403                       | S10   | 3.10.0         |

Note: △ Requires RPQ

### Hewlett Packard

Table 22. Minimum Version of ClevOS Compatible with Hewlett Packard Hardware

| Appliance                    | Model       | Minimum ClevOS |
|------------------------------|-------------|----------------|
| Manager Appliance            | DL360P Gen8 | 3.2.1          |
| Manager Appliance            | DL360 Gen9  | 3.5.0          |
| Manager Appliance            | DL380 Gen9  | 3.5.0          |
| Accesser <sup>®</sup> Device | DL360P Gen8 | 3.2.1          |

Table 22. Minimum Version of ClevOS Compatible with Hewlett Packard Hardware (continued)

| Appliance         | Model       | Minimum ClevOS |
|-------------------|-------------|----------------|
| Accesser® Device  | DL360 Gen9  | 3.5.0          |
| Accesser® Device  | DL380 Gen9  | 3.5.0          |
| Slicestor® Device | SL4540 Gen8 | 2.9.0          |
| Slicestor® Device | DL380 Gen9  | 3.5.0          |
| Slicestor® Device | Apollo 4200 | 3.6.0          |
| Slicestor® Device | Apollo 4510 | 3.6.0          |
| Slicestor® Device | Apollo 4530 | 3.6.0          |

## Seagate

Table 23. Minimum Version of ClevOS Compatible with Seagate Hardware

| Appliance        | Model             | Minimum ClevOS |
|------------------|-------------------|----------------|
| Seagate OneStor® | AP-2584 1 AP-TL-1 | 3.4.2          |

## Cisco

Table 24. Minimum Version of ClevOS Compatible with Cisco Hardware

| Appliance               | Model                   | Minimum ClevOS |
|-------------------------|-------------------------|----------------|
| Cisco Slicestor® Device | UCS C3260               | 3.7.4          |
| Cisco Slicestor® Device | UCS S3260 (Single Node) | 3.12.0         |
| Cisco Slicestor® Device | UCS S3260 (Dual Node)   | 3.12.0         |
| Cisco Manager Appliance | UCS C220 M4             | 3.12.0         |
| Cisco Accesser® Device  | UCS C220 M4             | 3.12.0         |

## Dell

Table 25. Minimum Version of ClevOS Compatible with Dell Hardware

| Appliance              | Model    | Minimum ClevOS |
|------------------------|----------|----------------|
| Dell Slicestor® Device | DSS 7000 | 3.10.1         |

## Lenovo

Table 26. Minimum Version of ClevOS Compatible with Lenovo Hardware

| Appliance                | Model    | Minimum ClevOS |
|--------------------------|----------|----------------|
| Lenovo Manager Appliance | X3550 M5 | 3.10.1         |
| Lenovo Accesser® Device  | X3550 M5 | 3.10.1         |
| Lenovo Manager Appliance | X3650 M5 | 3.10.1         |

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