BlackPearl Certification Test Plan

**Introduction**

The document describes the certification tests for a BlackPearl Client presenting a Spectra S3 compatible interface. Complete details of the BlackPearl Certification Program can be found in the **BlackPearl Certification Program** link in the Reference Information section below.

**Reference Information**

**Developer Website:** For information on the Spectra S3 interface and developing a Spectra S3 compatible interface, please refer to the Developer Website on Spectra Logic.com at: <https://developer.spectralogic.com/ds3/>

**BlackPearl:** For detailed information about BlackPearl, please refer to the Spectra Logic BlackPearl user documentation at: <https://support.spectralogic.com/documentation/user-guides/#BlackPearl_user_guides>

**BlackPearl Certification Program:** For information about the BlackPearl Certification Program refer to the Certification Program Website: <https://developer.spectralogic.com/certification/>

**Important Notice:** The remainder of this document assumes that the user is familiar with details of the Spectra S3 interface, the BlackPearl product, information contained on the Spectra Logic Developer Site, information contained on the BlackPearl Certification Program Site and other resources as listed in the Reference Information section of this document.

**Test Setup, Installation of the Host Client Software, Connection to BlackPearl and Configuration**

After you have complete development and testing of your Spectra S3 compatible Interface you may decide to pursue certification with Spectra Logic – Please refer to the **BlackPearl Certification Program** link shown above. If you choose to proceed, please have your answers to the BlackPearl Certification Program Questionnaire (<https://developer.spectralogic.com/client-questionnaire/>) completed and then contact BlackPearl Certification Program personnel (<https://developer.spectralogic.com/contact/> ). Spectra Certification Personnel will work with you to determine the appropriate test setup, test equipment requirements, test time, installation of host software and client, and other testing program details. Review the installation of your product and BlackPearl connection and configuration to verify that everything is working properly prior to commencing the testing.

Typically, the testing will be done in Spectra Logic's Testing and Certification Lab. In this case, Spectra Logic will work with you to have your software installed in the Testing Lab. You will have the option to access the Testing Lab remotely or by visiting the Lab in our Boulder, Colorado offices.

**Logging, Result Capture, and Live Demo Requirements for Certification**

* **Log files:** Please pull a log set daily from BlackPearl during certification testing. These log files are used to assist with confirming proper Interface behavior and debugging any failures that may occur. Instructions for downloading the BlackPearl logs can be found in the User Guide: Refer to the “AutoSupport” chapter and the section titled “Log Sets”.  
  In addition to daily log set, if there is an error please capture a log set for that error.
* **Screen Captures:** Screen captures will be required for several of the tests presented in this document to enable Spectra Logic to verify test results and certify a product. Please ensure that:
  1. The person performing the test understands how to capture a screen image of the information that is requested. In Windows, this can be accomplished by using the Windows Snipping Tool (<http://windows.microsoft.com/en-us/windows/use-snipping-tool-capture-screen-shots?src=ia&iaaid=50012900&ialnk=title#1TC=windows-7>)
  2. The screen images can be copied into this Test Plan document that is required to be submitted to Spectra Logic to complete the Certification Process.
* **Live Demo**: Once this test plan, along with test results, have been submitted to Spectra Logic, Spectra Logic will contact you to schedule a live demonstration of archive and restore operations by your BlackPearl client. This live demonstration can be done at Spectra Logic headquarters or remotely via WebEx or similar screen sharing technology. You will not receive certification until Spectra Logic determines that this live demonstration is successful.

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| --- |
| Company/Tester Information |
| Company name: |
| Product name: |
| Tester name: |
| Tester contact information (email and phone): |

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| --- |
| Product Information |
| Product software version: |
| BlackPearl Client software version: |
| Spectra SDK and version (i.e. Java version 3.0.0): |

1. Create a new bucket with data policy “Single LTO-6 Copy No Versioning”. This will force the chunk size to 100GB for the testing. If your program programmatically creates buckets, be sure to set the default policy for the user you are logging in with to the “Single LTO-6 Copy No Versioning”. If you manually create buckets using the BlackPearl Management GUI, set the data policy for the bucket to “Single LTO-6 Copy No Versioning”.
2. Attempt to access BlackPearl with invalid user credentials (invalid Access ID and Secret Key) and separately with invalid endpoint (invalid server name/IP address or port number).
   1. Capture the screen images that show the system status once the system reports an error, most likely when credentials/endpoint information is entered or when the application tries to PUT a file using the invalid credentials/endpoint. There should be one screen image to show invalid credentials and another screen image to show invalid endpoint. Your program should be able to provide information to the user to distinguish invalid credentials versus invalid endpoint. Paste the screenshots below:

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| --- |
| Invalid secret key screenshot |
|  |
| Invalid access ID screenshot |
|  |
| Invalid data endpoint screenshot |
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1. Attempt to access a bucket that does not exist or to which the user does not have access to (PUTs and GETs)
   1. Using the BlackPearl User Interface:
      1. Create a new user with credentials that are different from the credentials the application is currently using.
      2. Create a bucket with the user credentials created above.
   2. From the application, attempt to PUT data into the new bucket using the application's current user credentials (not the user created above). Capture a screen image that clearly shows the application error. Paste the screenshot below:

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| --- |
| Attempt to PUT to a bucket that does not exist or the user does not have access to screenshot |
|  |

* 1. From the host application, try to GET data from that bucket.
     1. Should report failure status of file not found – Capture a screenshot that clearly shows the application error. Paste the screenshot below:

|  |
| --- |
| Attempt to GET from a bucket that does not exist or the user does not have access to screenshot |
|  |

1. Attempt to GET an object from BlackPearl that does not exist.
   1. Open different Spectra client (Eon Browser or Java CLI)
   2. Capture a screenshot of Eon or CLI that clearly shows the list of files. Paste the screenshot below:

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| --- |
| Object Listing screenshot |
|  |

* 1. DELETE an object(s) using the Eon or CLI
  2. Attempt to restore deleted object(s) through application
  3. Capture a screen image that clearly shows the application status of “object does not exist” and gracefully return this error to end user. Paste the screenshot below:

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| --- |
| GET from Bucket that does not exist / User does not have access to screenshot |
|  |

1. Archive (i.e. Bulk Put) 3 objects larger than the chunk size to BlackPearl Simultaneously. **The 3 objects must be part of the same BlackPearl Job.**
   1. Ingest 3x 110GB files from Z:\Test\_Files\_110GB so that the ingested files are on the E drive. If your application does not need to ingest files, move the files to the E drive prior to starting this test.
   2. Issue a command to archive the 3 objects from the E drive to BlackPearl simultaneously (i.e. Bulk Put)
   3. Capture start time, START TIME MUST be in Epoch time from here: <https://www.epochconverter.com>

|  |
| --- |
| Epoch Time : |

* 1. Capture the start date

|  |
| --- |
| Month / Day / Year : |

* 1. Wait until the file transfers have completed before continuing.
  2. Capture a screen image that shows the application completed or error. Paste the screenshot below:

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| --- |
| Completed Archive of 3x 110GB objects screenshot |
|  |

* 1. Capture BlackPearl Performance - The system should be able to maintain transfer rates at 500MB/s or higher in order to meet requirements of certification testing.
     1. Open the BlackPearl User Interface Job screen (Status > S3 Jobs). Capture a screenshot that shows the one Active job that contains the 3 files. **There should only be one Job for all 3 files.** Paste the screen image below:

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| --- |
| BlackPearl Job screenshot |
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* + 1. Once the job has completed, Open the BlackPearl User Interface performance screen under Status > Performance. Set pool to cache and resolution to “60s (25hours)” and zoom in to the specific region of the test duration – then paste the screenshot below:

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| --- |
| BlackPearl Archive Performance screenshot |
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* + 1. Open the BlackPearl User Interface performance screen under Status > Performance. Set pool to cache and resolution to “60s (25hours)” – then download CSV. Save the file as PUT3x110GB.CSV.

1. Restore (i.e. Bulk Get) 3 objects larger than the chunk size simultaneously. **The 3 objects must be part of the same BlackPearl Job.**
   1. Delete the original files from their original or online location if appropriate.
   2. Clear cache by executing the instructions located here: <https://developer.spectralogic.com/how-to-clear-blackpearl-cache/>
   3. Issue a command to simultaneously recover (i.e. Bulk Get) the 3 files archived above back to their original or online location.
   4. Capture start time, START TIME MUST be in Epoch time from here: https://www.epochconverter.com

|  |
| --- |
| Epoch Time : |

* 1. Capture the start date (Month/Day/Year)

|  |
| --- |
| Month / Day / Year : |

* 1. Capture a screen image that clearly shows the application completed or error. Paste the screen image below:
  2. Capture BlackPearl Performance
     1. Open the BlackPearl User Interface performance screen (see the **BlackPearl User Guide** section titled “View Performance Metrics”). Set pool to cache and resolution to “60s (25hours)” – then download CSV. Save the file as GET3x110GB.CSV.
     2. The system should be able to maintain transfer rates at 200MB/s or higher in order to meet requirements of certification testing.
     3. Open the BlackPearl User Interface Job screen (Status > S3 Jobs). Capture a screen image that shows the one Active job that contains the 3 files. **There should only be one Job for all 3 files.** Paste the screen image below.

1. Archive (i.e. Bulk Put) 250 objects of approximately 1GB size to BlackPearl. **The 250 objects must be part of the same BlackPearl Job.**
   1. Ingest 250 1GB files from Z:\Test\_Files\_1GB so that the ingested files are on the E drive. If your application does not need to ingest files, move the files to the E drive prior to starting this test.
   2. Issue a command to archive the 250 objects from the E drive to BlackPearl simultaneously (i.e. Bulk Put)
   3. Capture start time, START TIME MUST be in Epoch time from here: <https://www.epochconverter.com>

|  |
| --- |
| Epoch Time : |

* 1. Capture the start date (Month/Day/Year)

|  |
| --- |
| Month / Day / Year : |

* 1. Capture a screen image that shows the application completed or error. Paste the screen image below:

|  |
| --- |
| BlackPearl Archive Performance screenshot |
|  |

* 1. Capture BlackPearl Performance
     1. Open the BlackPearl User Interface performance screen (see the **BlackPearl User Guide** section titled “View Performance Metrics”). Set pool to cache and resolution to “60s (25hours)” – then download CSV. Save the file as PUT250.CSV.
     2. The system should be able to maintain transfer rates at 500MB/s or higher in order to meet requirements of certification testing.
     3. Open the BlackPearl User Interface Job screen (Status > S3 Jobs). Capture a screen image that shows the one Active job that contains the 250 files. **There should only be one Job for all 250 files.** Paste the screen image below.

1. Restore (i.e. Bulk Get) 250 objects of approximately 1GB size from BlackPearl. **The 250 objects must be part of the same BlackPearl Job.**
   1. Delete the original files from their original location if appropriate.
   2. Clear cache: by executing the instructions located here: <https://developer.spectralogic.com/how-to-clear-blackpearl-cache/>
   3. Issue a command to simultaneously recover (i.e. Bulk Get) the 250 files archived above back to the E drive
   4. Capture start time, START TIME MUST be in Epoch time from here: <https://www.epochconverter.com>

|  |
| --- |
| Epoch Time : |

* 1. Capture the start date (Month/Day/Year)

|  |
| --- |
| Month / Day / Year : |

* 1. Capture a screen image that shows the application completed or error. Paste the screen image below:

|  |
| --- |
| Application restore screenshot |
|  |

* 1. Capture BlackPearl Performance
     1. Open the BlackPearl User Interface performance screen (see the **BlackPearl User Guide** section titled “View Performance Metrics”). Set pool to cache and resolution to “60s (25hours)” – then download CSV. Save the file as “GET250.csv”.
     2. The system should be able to maintain transfer rate 200MB/s or higher in order to meet requirements of certification testing.
     3. Open the BlackPearl User Interface Job screen (Status > S3 Jobs). Capture a screen image that shows the one Active job that contains the 250 files. **There should only be one Job for all 250 files.** Paste the screenshot below.

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| --- |
| BlackPearl Restore Performance screenshot |
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1. Test BlackPearl "cache full" condition by writing files and reducing the size of the BlackPearl Cache. The cache full test is performed to simulate a case where the BlackPearl’s tape backend is not available and the BlackPearl’s cache hard drives have reached their maximum capacity for storage. If a job were to be received by the BlackPearl, which it cannot commit to tape and will not fit in the cache due to these constraints, the application should present the user a message to notify them about these conditions. After some time period (~60 minutes) the application should give the user a helpful message that the cache may be full. In the end, if the BlackPearl is able to reconnect to tape backend or regain cache space before the time period, the user will not need to be presented with any notifications. If the time period is reached and the job has not made it to BlackPearl cache, then the user needs a message to help them investigate the issue.
   1. [Contact the Spectra Logic Developer Program](https://developer.spectralogic.com/contact/). Ask them to reduce the cache size for the BlackPearl you are using for testing.
   2. Put the tape library backend in standby. Login to the BlackPearl Management GUI and on the Advanced Bucket Management Screen – select the tape partition, then select Action > “Put Tape Partition in Standby”.
   3. Transfer 175 1GB files
      1. Keep transferring objects until a Cache Full condition is reached.
      2. Cache can be monitored from the BlackPearl Web Management Interface Dashboard
   4. Capture screen images that clearly show the application response:
      1. Once cache is full, the application should wait patiently for the condition to clear and not hang. Paste the screenshot of the condition or the jobs waiting in the application:

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| Application cache wait state screenshot |
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* + 1. Paste a screenshot of the Dashboard Screen on BlackPearl User Interface

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| BlackPearl Dashboard screenshot |
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* + 1. At some point the application should provide a message to the user that the BlackPearl cache has been full for an extended period of time and the user should investigate the issue. Paste the screenshot below

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| --- |
| Application cache full message screenshot |
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* + 1. Put the tape library backend in active mode: Login to the BlackPearl Management GUI and on the Advanced Bucket Management Screen – select the tape partition, then select Action > “Activate Tape Partition”.
    2. Paste below the screen image of the Applications Jobs screen showing the job complete:

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| --- |
| Application showing job complete screenshot |
|  |

* 1. **Important:** Once testing is complete, [Contact the Spectra Logic Developer Program](https://developer.spectralogic.com/contact/) to reverse the cache reduction that was performed above

1. Testing your configurable timeout setting for file restores.  
   Per our [SDK design best practices](https://developer.spectralogic.com/tips/), your application should have a user-configurable timeout setting.
   1. Set the restore timeout on your application to 1 minute. Show screen image of this setting in your application below:

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| --- |
| Application session timeout setting |
|  |

* 1. Clear BlackPearl cache by executing the instructions located here: <https://developer.spectralogic.com/how-to-clear-blackpearl-cache/>. Clearing the cache will ensure that the files are downloaded from tape.
  2. Put the BlackPearl’s tape partition in Standby (this will ensure that there are no tapes in the tape drives). In the web management interface, go Configuration > Advanced Bucket Management > Storage & Policy Management. Single click on the tape partition record you will be using. Go to Action > Put Tape Partition in Standby. Click on Deactivate button in dialog. Wait until tape partition’s “Standby” column has a value of “Yes”. Then single click on the tape partition again and go to Action > Activate Tape Partition. Confirm activating tape partition. Wait until tape partition’s “Standby” column has a value of “No”.
  3. Attempt to restore a file using your application. Your application should reach the timeout because 1 minute will not be enough time to restore a file from tape. Paste screen image of message from your application due to timeout:

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| --- |
| Application Message due to 1-minute timeout |
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* 1. Change the restore timeout on your application to 60 minutes
  2. Attempt to restore a different file from the one above using your application. You application should be able to restore the file because 60 minutes is enough time to restore a file from tape. Paste screen image from your application showing successful restore:

|  |
| --- |
| Application Message showing successful restore |
|  |

1. Request data from BlackPearl that is on tape(s) which were ejected from the tape library. See blog post [Managing Ejected Tapes in BlackPearl](https://developer.spectralogic.com/managing-ejected-tapes/)
   1. Use a Bucket that has data written by your application. It can be from a previous test.
   2. Eject the tape(s) containing the data
      1. From BlackPearl User Interface, on the Buckets screen (Configuration > Buckets) – select the bucket, then Action -> Show Physical Placement. Identify and remember the barcodes of the tape(s) associated with the bucket.
      2. From the Tape Management screen (Status > Tape Management), find the bucket's tape(s) using the barcodes from above. Select each tape and then go to Action > Eject Tape (you can leave the "Eject Label" and "Eject Location" fields blank if prompted. This will place the tape(s) in the Entry Exit pool.
   3. Clear the cache. Login to the management port from the SSH console using credentials spectra / spectra or Administrator / spectra (for BlackPearl version 4.0 or later).
   4. Run the following command:   
      **config s3cachefilesystem reclaim**
   5. Attempt to GET/restore the data in that bucket that has now been ejected. The application should alert the user that the data is only on ejected tape(s) and should provide the user with the tape barcodes. Capture screenshot that shows the application response. Paste the screenshot below:

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| --- |
| Application tape eject message screenshot |
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* 1. Reimport the tape(s): From the Tape Management screen, go to Action -> Online All Tapes.
  2. Attempt again to GET/restore the data. The application should now be able to restore the data. Capture screen images that shows the application response. Paste the screenshot below:

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| --- |
| Application tape reimport screenshot |
|  |

1. **Perform the Following Tests if These Commands are Supported in the Application**

These tests must be completed if you use any of the features described below.

1. Updating an existing object in BlackPearl - test object overwrite (Atomic rewrite, keep latest version)
   1. Setup: In BlackPearl User Interface, create a new bucket and select a data policy with versioning (Data Policy "Versioning" set to "Keep Latest").
      1. Optionally: create a new data policy, in "Versioning" select “Keep Latest”, and pick a tape storage domain.
      2. To check for versioning, from BlackPearl User Interface on the Advanced Bucket Management screen at the bottom Data Policies are listed. Select the Single Copy on Tape, then click action Edit.
   2. PUT a file into that bucket,
   3. Modify file in application and then upload a new version of the file to BlackPearl using the same object name.
   4. PUT of same file again with the same file name/GUID, it should succeed. Please record your answer: (Succeed or Fail):\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Then, test a GET of the new/modified file recently sent, is it the modified file? Please record your answer: (Modified or Original):\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. Capture a screen image that clearly shows the application completed or error. Paste the screen image below:
2. If the application supports restore of partial files from BlackPearl
   1. Archive file to BlackPearl
      1. Capture a screen image that shows the file archived to BlackPearl. Paste the screen image into below:
   2. Clear BlackPearl cache by executing the instructions located here: [https://developer.spectralogic.com/how-to-clear-blackpearl-cache/](https://developer.spectralogic.com/how-to-clear-blackpearl-cache/%20)
      1. Capture a screen image that shows the BlackPearl web management interface dashboard with zero bytes in cache. Paste the screen image below:
   3. Retrieve partial file
      1. Capture a screen image that shows successful retrieval of partial file. Paste the screen image below:
3. If the application supports multiple buckets or multiple storage targets that can be mapped to a bucket
   1. Create two buckets (if the client supports bucket creation)
      1. Capture a screen image that shows how to create the additional buckets. Paste the screen image into below:
   2. PUT data to both buckets
      1. Capture a screen image that shows the application completed with objects in both buckets. Paste the screen image below:
   3. GET data from both buckets
      1. Capture a screen image that shows the application completed with no objects in either bucket. Paste the screen image below:
4. If the application supports LTFS Foreign Tape Import functionality
   1. Import single tape
      1. Import a single foreign tape into a bucket.
      2. Verify tape’s status changes from “foreign” to “normal”.
      3. Verify number and size of recovered objects/files matches expected contents of the tape. Capture screen images that shows before and after status of tape, along with contents of a new bucket. Paste the screen image into below:
   2. Import multiple tapes
      1. Import multiple foreign tapes into designated buckets based on TapeID.
      2. Verify tapes’ status changes from “foreign” to “normal”.
      3. Verify number and size of recovered objects/files matches expected contents of the tapes. Capture screen images that shows before and after status of tapes, along with contents of the new buckets. Paste the screen images below:
5. Optional: Manually change job priorities
   1. List all active jobs in BP – capture screen shot of your application:
   2. In BlackPearl GUI, on S3 Jobs – capture screen shot showing the job with the priority:
   3. Select and change a jobs priority – capture in screen shot of your application:
   4. In BlackPearl GUI, on S3 Jobs – capture screen shot showing the job with the *new* priority:
6. Eject a bucket or tape
   1. Edit Tape Eject information: If supported by the application, enter information about the eject location of a tape cartridge and assign it a label
      1. Capture a screen image that shows how to edit the eject information. Paste the screen image below:
   2. Eject a bucket or a tape
      1. Capture a screen image of the Tape Management screen on BlackPearl showing the tape(s) status as offline/ejected:

1. Host application showing a job is fully persisted to tape or disk archive location:
   1. If application can show whether an object is fully persisted or not by using job polling or using notifications:
      1. PUT data into a bucket
      2. Capture a screen image that shows the BlackPearl Job Status complete in the BlackPearl S3 Jobs Screen. Paste the screen image below:
      3. Capture a screen image from the application showing the same job is not complete/persisted. Paste the screen image below:
      4. After the job is completed/persisted to tape, capture a screen image from the application showing the same job is complete/persisted. Paste the screen image below:
2. If application can list objects in a bucket, show that it can handle (paginate) a large list
   1. PUT 500 objects of 1GB size to BlackPearl (can use objects from prior tests above)
   2. Capture a screen image from the application showing user interface with objects displayed in a first page. Paste the screen image below:
   3. Display the second page of objects in the application.
   4. Capture a screen image from the application showing user interface with objects displayed in a second page. Paste the screen image below:
3. **Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Author** | **Changes** |
| 0.1 | 11/9/15 | GSJ | Initial format and content. Designed for BlackPearl Software V1.2 |
| 0.2 | 11/11/15 | SDE | Updates for Cache Reclamation – Cache size reduction – Atomic Replacement. |
| 0.3 | 11/19/15 | GSJ | Consolidate feedback into single document, update to include test results directly in the document. Clean up all tests |
| 0.4 | 11/30/15 | GSJ | Revised tests to simplify, shorten. |
| 0.5 | 12/1/15 | GSJ | Consolidated BlackPearl documentation to single web link and misc. cleanup. |
| 0.6 | 1/28/16 | GSJ | Updates to reduce file sizes, modify plan after initial testing |
| 0.7 | 2/17/16 | GSJ | Moved create bucket step, added note to contact Spectra before beginning test |
| 0.8 | 3/15/16 | GSJ | Add space for company and tester information for easy identification. Move revision history to end. |
| 0.9 | 3/24/16 | GSJ | Modified program name. Modified section 6, item 10 – resuming a job where a connection has failed. |
| 1.0 | 5/24/16 | GSJ | Added entries for Product, Client and SDK type and version number. Fixed numbering and spelling corrections. |
| 1.1 | 6/28/16 | JLB | Added requirement to test for invalid end point. Added both short term and long term cache full and network disruption tests. |
| 1.2 | 8/10/2016 | JLB | Made mandatory the ability to request data from BlackPearl that is on tape(s) that have been ejected from the tape library |
| 1.3 | 11/7/2016 | JLB | Updated network interruption test to give more flexibility to client on how to handle long-term network interruptions; added optional partial file recovery test |
| 1.4 | 02/09/2017 | PP | Added performance requirements to put and get test sections.  Added optional test section for LTFS Import functionality. |
| 1.5 | 05/02/2017 | JLB | Added requirement to have archive and restore operations verified live by Spectra; added requirement to paste Jobs screen in transfer operations; clarified requirement that all transfer operations must be in one job |
| 1.6 | 05/30/2017 | JLB | Added description for cache full test. Cache resizing is now done by Spectra. |
| 1.7 | 8/8/2017 | SG | Changed references to ‘DSB’ to Eon Browser.  Added boxes to insert screenshots. Added page numbers. |
| 1.8 | 3/9/2019 | JLB | Removed network interrupt test; changed cache full test to not require that job fail after 1 hour; added configurable timeout restore test |