Cohasset Associates

SEC 17a-4(f), FINRA 4511(c) & CFTC 1.31(c)-(d) Compliance Assessment

IBM Cloud Object Storage

BENEFIT FROM COHASSET'S INDUSTRY INSIGHT AND EXPERIENCE

Core to Cohasset's practice is its delivery of records management and information governance professional consulting services, education and training. Cohasset's expert consulting services are tailored to support a multitude of regulated organizations, including those in the financial services industry. Cohasset serves both domestic and multi-national clients, aligning information lifecycle controls with their organizations' business priorities and facilitating regulatory compliance and risk mitigation, all the while generating measurable business efficiencies.

Cohasset has assessed the spectrum of storage technologies and systems designed to meet the requirements of the Securities and Exchange Commission (SEC) Rule 17a-4(f), (the "Rule"), as defined by 1) the No Action Letter in 1993 (allowing broker dealers to use non-erasable, non-rewriteable digital storage media); 2) the issuance of the Rule in 1997; and 3) the Interpretive Release in 2003, which authorizes the use of erasable storage, conditioned on integrated control codes, to prevent premature deletion of records.

Abstract

IBM Cloud Object Storage ("COS") is a platform for storing and accessing record objects. *Immutable Object Storage* features, which include, but are not limited to, the ability to apply a Retention Policy to a Bucket, are designed to meet securities industry requirements for preserving record objects in a non-rewriteable and non-erasable format for the applied retention period and legal holds.

This Assessment Report addresses IBM Cloud Object Storage, when Immutable Object Storage features are appropriately applied in the following deployments: (1) on-premises, (2) dedicated cloud hosted by IBM, and (3) IBM Public Cloud, relative to the electronic records recording, storage and retention requirements of the:

- Securities and Exchange Commission (SEC) in 17 CFR § 240.17a-4(f), which regulates exchange members, brokers or dealers.
- Financial Industry Regulatory Authority (FINRA) Rule 4511(c), which defers to the format and media requirements of SEC Rule 17a-4(f).
- Commodity Futures Trading Commission (CFTC) in regulation 17 CFR § 1.31(c)-(d), which regulates commodity futures trading.

It is Cohasset's opinion that IBM Cloud Object Storage, in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), when *Immutable Object Storage* features are appropriately configured and applied, retains records in a non-erasable and non-rewriteable format and meets the relevant storage requirements of SEC Rule 17a-4(f), and FINRA Rule 4511(c) and the principles-based requirements of CFTC Rule 1.31(c)-(d).

See Section 2 for details of Cohasset's assessment of SEC requirements, Section 3 for a summary assessment of CFTC requirements, Section 4 for conclusions, and Section 5 for an overview of the relevant Rules.

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1 | Introduction

The Securities and Exchange Commission (SEC) defines rigorous and explicit requirements for regulated entities[1] *that elect to retain books and records on electronic storage media. Additionally, effective August 28, 2017, the CFTC promulgated new principles-based requirements on the form and manner in which regulated entities retain and produce books and records, including provisions for electronic regulatory records.*

Given the prevalence of electronic retention of books and records, these requirements apply to most broker-dealer and commodity futures trading firms and other organizations with similarly regulated operations.

IBM Cloud Object Storage (COS) *with* Immutable Object Storage *features, which include, but are not limited to, the ability to apply a Retention Policy to a Bucket, were designed to support compliance with these stringent electronic records requirements for the recording, storage and retention of regulated books and records. To evaluate its compliance with SEC Rule 17a-4(f) and CFTC Rule 1.31(c)-(d), for specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), IBM engaged Cohasset to complete an independent and objective assessment of the capabilities of* IBM COS *with* Immutable Object Storage *features relative to these requirements.*

This Introduction *briefly summarizes the regulatory environment, explains the purpose and approach for Cohasset's assessment, and provides an overview of IBM COS.*

1.1 Overview of the Regulatory Requirements

1.1.1 SEC Rule 17a-4(f) Requirements

In 17 CFR §§ 240.17a-3 and 240.17a-4, the SEC stipulates recordkeeping requirements, including retention periods, for the securities broker-dealer industry. On February 12, 1997, the SEC adopted amendments to 17 CFR § 240.17a-4 (the "Rule" or "SEC Rule 17a-4"). These amendments to paragraph (f) expressly allow books and records[2] to be retained on electronic storage media, subject to explicit standards.

> *The Commission is adopting a rule today which, instead of specifying the type of storage technology that may be used, sets forth standards that the electronic storage media must satisfy to be considered an acceptable method of storage under Rule 17a–4. [emphasis added]*

Further, the SEC issued two Interpretive Releases (No. 34-44238 on May 1, 2001, and No. 34-47806 on May 7, 2003), which pertain specifically to the electronic storage media requirements of paragraph (f) of the Rule. This Assessment Report includes a summary of the current Rule and these two Interpretive Releases in Section 5.1, *Overview of SEC Rule 17a-4(f) Electronic Storage Requirements*.

[1] Throughout this report, Cohasset uses the phrase "*regulated entity*" to refer to organizations required to retain records in accordance with the media requirements of the SEC, FINRA or the CFTC. Accordingly, Cohasset uses "*regulated entity*" instead of "*records entity*," which the CFTC has defined as "any person required by the Act or Commission regulations in this chapter to keep regulatory records."

[2] Regulators use the phrase "*books and records"* to describe information about certain business transactions, customers, personnel and other administrative activities that must be retained under the Rules. Accordingly, Cohasset has chosen to use the term "record object" (versus "data," "file" or "object") to consistently recognize that the content is a required record.

1.1.2 FINRA Rule 4511(c) Requirements

Financial Industry Regulatory Authority (FINRA) Rule 4511(c) explicitly defers to the format and media requirements of SEC Rule 17a-4, for the books and records it requires.

> *All books and records required to be made pursuant to the FINRA rules shall be preserved in a format and media that complies with SEA [Securities Exchange Act] Rule 17a-4.*

1.1.3 CFTC Rule 1.31 Requirements

Effective August 28, 2017, 17 CFR § 1.31 (the "CFTC Rule"), the CFTC defines principles-based requirements for organizations electing to retain electronic regulatory records. These amendments modernize and establish technology-neutral requirements for the form and manner in which regulatory records must be retained and produced.

The definition of *regulatory records* s in 17 CFR § 1.31(a) is essential to the CFTC's electronic recordkeeping requirements.

> *Regulatory records means all books and records required to be kept by the Act or Commission regulations in this chapter, including any record of any correction or other amendment to such books and records, provided that, with respect to such books and records stored electronically, regulatory records shall also include:*
>
> > *(i) Any data necessary to access, search, or display any such books and records; and*
> > *(ii) All data produced and stored electronically describing how and when such books and records were created, formatted, or modified.* [emphasis added]

Paragraphs (i) and (ii) include information about how and when such record objects were created, formatted or modified. Similarly, the SEC Rule requires information in addition to the record content by establishing requirements for index data in paragraphs 17a-4(f)(2)(ii)(D), (f)(3)(iv) and (f)(3)(vi) and audit trail data in paragraphs 17a-4(f)(3)(v).

Refer to Section 3, *Summary Assessment of Compliance with CFTC Rule 1.31(c)-(d)*, which relates the CFTC principles-based requirements to the capabilities of IBM COS with *Immutable Object Storage* features, as described in Section 2. Additionally, refer to Section 5.2, *Overview of CFTC Rule 1.31(c)-(d) Electronic Storage Requirements*.

1.2 Purpose and Approach

To obtain an independent and objective assessment of the compliance capabilities of IBM COS in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), when *Immutable Object Storage* features are appropriately configured and applied, in comparison to the relevant storage-specific requirements set forth in SEC Rule 17a-4(f) and CFTC Rule 1.31(c)-(d), IBM engaged Cohasset Associates, Inc. ("Cohasset"). As a highly-respected consulting firm, Cohasset has recognized expertise and more than 40 years of experience with the legal, technical and operational issues associated with the records management practices of companies regulated by the SEC and the CFTC. Additional information about Cohasset is provided in the last section of this report.

Cohasset was engaged to:

- Assess the capabilities of IBM COS with *Immutable Object Storage* features, which include, but are not limited to, the ability to apply a Retention Policy to a Bucket, in comparison to the five relevant requirements of SEC Rule 17a-4(f) for recording, storage and retention of electronic record objects and system metadata (system index attributes); see Section 2, Assessment of Compliance with SEC Rule 17a-4(f);

- Associate the principles-based requirements of CFTC Rule 1.31(c)-(d) to the assessed capabilities of IBM COS with *Immutable Object Storage* features; see Section 3, Summary Assessment of Compliance with CFTC Rule 1.31(c)-(d); and
- Prepare this Assessment Report, enumerating the results of its assessment.

In addition to applying the information in this Assessment Report, regulated entities must ensure that the combination of its policies, procedures and regulatory submissions, in conjunction with the capabilities of implemented electronic recordkeeping solutions, meet all applicable requirements of SEC Rule 17a-4(f) and CFTC Rule 1.31.

This assessment represents the professional opinion of Cohasset and should not be construed as either an endorsement, or a rejection, by Cohasset of IBM COS and its capabilities or other IBM products or services. The information utilized by Cohasset to conduct this assessment consisted of: (a) oral discussions, (b) user and system administration documentation, and (c) other directly-related materials provided by IBM or obtained from publicly available resources.

The content and conclusions of this assessment are not intended, and must not be construed, as legal advice. Relevant laws and regulations constantly evolve; and, legal advice is tailored to the specific circumstances of the organization. Therefore, nothing stated herein should be substituted for the advice of competent legal counsel.

1.3 IBM Cloud Object Storage Overview

IBM Cloud Object Storage ("COS") is a multipurpose, distributed, object-based storage system designed to store and access unstructured documents. *This Assessment Report pertains to IBM Cloud Object Storage, when Immutable Object Storage features are appropriately applied in the following deployments: (1) on-premises, Release 3.14.1, (2) dedicated cloud hosted by IBM, and (3) IBM Public Cloud.*

To provide stringent retention protection and object management controls to meet the requirements of the Rule, *Immutable Object Storage* features, which include, but are not limited to, a Bucket Retention Policy, must be configured. When a Bucket Retention Policy is configured, record objects stored in the Bucket will be preserved as non-rewriteable, non-erasable for the applied retention period.

2 | Assessment of Compliance with SEC Rule 17a-4(f)

This section presents Cohasset's assessment of IBM Cloud Object Storage, when Immutable Object Storage *features are appropriately applied in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud) for compliance with the five (5) requirements related to recording, storage and retention of electronic records, as stipulated in SEC Rule 17a-4(f).*

For each of the five relevant requirements in SEC Rule 17a-4(f), this assessment is organized into the following four topics:

- ***Compliance Requirement*** – Excerpt of each electronic storage requirement in SEC Rule 17a-4(f) and Cohasset's interpretation of the requirement
- ***Compliance Assessment*** – Assessment of the relevant capabilities of IBM COS with *Immutable Object Storage* features in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud)
- ***Capabilities of IBM COS Bucket with Retention Policy*** – Description of relevant capabilities of IBM COS with *Immutable Object Storage* features in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud)
- ***Additional Considerations*** –Additional considerations related to meeting the specific requirement

The following subsections document Cohasset's assessment pertinent certain requirements of SEC Rule 17a-4(f).

2.1 Non-Rewriteable, Non-Erasable Record Format

2.1.1 Compliance Requirement [SEC 17a-4(f)(2)(ii)(A)]

As set forth in Section III (B) of the 2001 Interpretive Release, this requirement *"is designed to ensure that electronic records are capable of being accurately reproduced for later reference by maintaining the records in an unalterable form [for the required retention period]."*

SEC 17a-4(f)(2)(ii)(A): Preserve the records exclusively in a non-rewriteable, non-erasable format.

The following statement in the 2003 Interpretive Release further clarifies that certain implementations of rewriteable and erasable media, such as magnetic disk or magnetic tape, meet the requirements of a non-erasable and non-rewriteable recording environment provided: (a) the storage solution delivers the prescribed functionality and (b) the functionality is delivered via appropriate integrated control codes for the SEC designated retention period associated with the stored records.

> *A broker-dealer would not violate the requirement in paragraph (f)(2)(ii)(A) of the rule if it used an electronic storage system that prevents the overwriting, erasing or otherwise altering of a record during its required retention period through the use of integrated hardware and software control codes.* [emphasis added]

Further, Section IV of the 2003 Interpretive Release places requirements on the storage system for retaining records beyond the SEC-established retention period when certain circumstances occur, such as a subpoena or legal hold:

> *Moreover, there may be circumstances (such as receipt of a subpoena) where a broker-dealer is required to maintain records beyond the retention periods specified in Rule 17a-4 or other applicable Commission rules. Accordingly, a*

> *broker-dealer must take appropriate steps to ensure that records are not deleted during periods when the regulatory retention period has lapsed but other legal requirements mandate that the records continue to be maintained, and the broker-dealer's storage system must allow records to be retained beyond the retentions periods specified in Commission rules.* [emphasis added]

This statement by the SEC clarifies that the storage system must have the capability to retain records beyond the retention period established at the time of initial recording when required for legal matters, external investigations or audits, or other similar circumstances.

2.1.2 Compliance Assessment

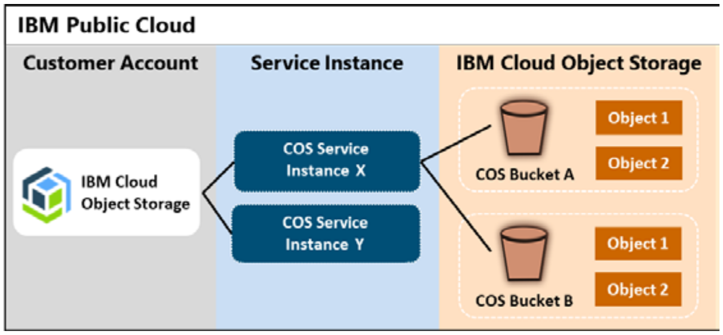
It is Cohasset's opinion that the current capabilities of IBM COS with *Immutable Object Storage* features, in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), meet this requirement of the Rule to retain record objects in a non-erasable and non-rewriteable format for the applied retention period when: (a) IBM COS Buckets are properly configured, (b) time-based[3] and event-based[4] retention attributes are properly managed for the each record object, (c) identifiers for legal holds are appropriately applied to each record object, and (d) the additional considerations identified in Section 2.1.4 are satisfied.

2.1.3 Capabilities of IBM COS Bucket with Immutable Object Storage Features

The capabilities of IBM COS with *Immutable Object Storage* features, in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), that are directly related to preserving record objects for the required retention period on non-rewritable and non-erasable media are presented in this subsection.

System Overview

- IBM COS uses Vaults and Containers, depending on the configurations for the deployment. Both Vaults and Containers are referred to as Buckets, which are logical containers in IBM COS for storing record objects.
- Specific to the IBM public cloud, the relevant components are as follows:
  - The **Customer Account** manages billing and other account-level activities. A single Customer Account may have many Service Instances, such as storage, compute, other services.
  - A **Service Instance** is a logical construct to manage permissions. Initiating the IBM COS Service Instance provides object storage.



  - **IBM Cloud Object Storage** provides object storage services, which may contain many Buckets, which retain individual objects (hereinafter "record objects[5]").

[3] Time-based retention periods require the record object to be retained for a specified contiguous period of time from the date and time the file is created and stored.

[4] Event-based or event-time-based retention periods require the record object to be retained indefinitely until a specified event occurs (e.g., a contract expires or an employee terminates), after which the record object must be retained for a fixed final retention period.

[5] In this report, the term *record object* is used to reflect that certain files are *books and records* that are required to be maintained for a specific period of time (the retention period), as stated in regulations, such as SEC Rules 17a-3 and 17a-4 and CFTC Rule 1.31.

- *Immutable Object Storage* features were designed to meet the SEC Rule 17a-4(f) requirements to preserve electronic record objects as non-rewriteable and non-erasable for the required retention period and any applicable legal holds. The primary configurations for *Immutable Object Storage* features are:
  - Enable the protection mode for the IBM COS Bucket, which sets it to *Retention*. (The *Retention* protection mode can only be set if the Bucket is empty.)
  - Set indexing to *On,* for the IBM COS Bucket. (This configuration is defaulted in the IBM Public Cloud.)
  - Set versioning to *Off*. (This configuration is only required for on-premises deployments and dedicated cloud deployments hosted by IBM.)
  - Configure the IBM COS Bucket with a retention policy. (This assures that a retention period is applied to all record objects.)
  - Apply a retention period to each record object, by inheriting the *Default retention period* or explicitly applying a retention period, when the record object is stored. (See *Retention* subsection, below, for additional information.)
  - Apply legal holds to individual record objects when needed for litigation, government inspection or other similar circumstances. (See *Legal Holds* subsection, below, for additional information.)
- With the above configurations and settings, the record object, and its immutability metadata, cannot be changed, overwritten or deleted until both (a) the applied retention period has expired and (b) all *Legal Holds* are cleared. Further, the Bucket cannot be deleted, unless it is empty.
- In the IBM Public Cloud, *Immutable Object Storage* features apply across all storage classes, including Standard, Vault, Cold Vault and Flex tiers. Therefore, archive policies may be used to tier record objects into IBM Public Cloud storage classes.

Record Object Definition and Controls

- Each record object, stored in an IBM COS Bucket with appropriate *Immutable Object Storage* features, is comprised of two components:
  1. The complete content of the record object, and
  2. The object metadata attributes, including both:
     - Immutable (unchangeable) object metadata attributes, e.g., object name, creation/storage date and time, retention period, object checksums (MD5 or SHA256 Hash), and user-specified metadata tags (which are a custom collection of name-value pairs that describe various object qualities).
     - Changeable (mutable) object metadata attributes, e.g., legal hold identifiers and access control lists.
- All attempts to modify, overwrite or delete a record object (by users or source applications), prior to the expiration of the retention period and the removal of all associated legal holds, are rejected and added to the audit log.
  - After the retention expiration date and removal of all legal holds, the record object may be modified, overwritten or deleted. If a record object is overwritten, it is a new record object with new retention attributes applied to it.

- The record object name must be unique for the Bucket in which it is stored. If it is not unique, the record object is not stored, and an error message is reported through the IBM Cloud Object Storage Application Programming Interface (IBM COS API).
- A record object may be *copied* between Buckets.
  - The creation date and time of the copy reflects the date and time that the copy is stored in the destination Bucket (not the date and time the object was originally stored in the source Bucket).
  - Either the *Default retention period* or an explicit retention period may be applied to the new copy. Any specified retention period must be valid, according to the *Minimum and Maximum retention periods* of the destination Bucket; otherwise, the copy process will *fail* (meaning that the record object is not stored) and an error message is returned. (See the *Time-Based Retention* subsection, below for more information on retention policies.)
- A record object *cannot* be *moved* between Buckets. In the event that *moves* were allowed, the retention period applied to the record object could be shortened, if the new Bucket had a shorter retention period applied to it. Therefore, moves are <u>not</u> allowed.

Retention

- As a one-time configuration, a *<u>System</u> Maximum retention period* must be set. (For the IBM Public Cloud, the parameter is set by IBM.) The *Maximum retention period* applied to a Bucket must be equal to or shorter than the *<u>System</u> Maximum retention period*.
- Setting the protection mode to *Retention* and configuring a retention policy for a Bucket assures that a retention period is applied to all record objects.
- Both time-based and event-based retention periods are supported.
- The Bucket retention policy is comprised of the following parameters:
  1. Bucket *Default retention period*: If the source application does not send a specific retention period, with the object to be stored, then the Bucket *Default retention period* is stored as the retention period for the record object.
  2. Bucket *Minimum retention period*: If the source application specifies a retention period when writing an object to be stored, the specified retention period must be greater than or equal to the Minimum Retention Period configured for the bucket. For retention extension operations, the requested extension must be greater than or equal to the <u>current</u> Bucket *Minimum Retention Period*, added to the record object's creation/storage date.
     - When the retention period specified for the record object is less than the minimum retention period, the record object is not stored, and an error message is returned.
  3. Bucket *Maximum retention period*: If the source application specifies a retention period when writing an object, the specified retention period must be less than or equal to the *Maximum Retention Period* configured for the Bucket. For retention extension operations, the requested extension must be less than or equal to the <u>current</u> Bucket *Maximum Retention Period*, added to the date/time of the extension.
     - The Bucket *Maximum retention period* must be shorter than the *<u>System</u> Maximum retention period*.

4. Bucket *Enable permanent retention*: When enabled, this parameter allows a permanent retention period to be applied to record objects stored in the Bucket. NOTE: A permanent retention period results in the record object being retained forever.

- The *Default, Minimum and Maximum retention periods*, can be administratively changed at any time after initial configuration. However, these changes are <u>not</u> applied to previously stored record objects. Rather, the updated periods only apply to record objects stored after the policy is revised. Additionally, the current Minimum and Maximum retention periods apply when a record object's retention period is being extended.

- **Time-based retention periods** require the record object to be retained for a specified contiguous period of time from the date and time the file is created and stored.

  - A time-based retention period is applied to a record object, using one of two methods:

    1. The Bucket *Default retention period* is applied, if the source application does not transmit an explicit retention value.

    2. If an explicit retention period or retention expiration date is transmitted with the record object when it is created (stored) and if the explicit retention value is within the min/max range, it is applied to the record object.

- **Event-based retention periods** or event-time-based retention periods require the record object to be retained indefinitely until a specified event occurs (e.g., a contract expires or an employee terminates), after which the record object must be retained for a fixed final retention period.

  - For event-based retention, the *Indefinite* retention value (-1) is applied when the record object is stored. This *Indefinite* retention setting protects the record object from modification, overwrite or deletion.

  - When the retention will be converted to a fixed period (e.g., after the "triggering" event occurs), a retention period may be specified using the *Extend from Current Time* method. This causes the record object's retention period to be set to the <u>current</u> date/time, plus the specified retention period. (Alternatively, a retention period may be extended using either the *New Retention Period* or *Additional Retention Period* methods in the IBM COS API.) With any retention extension, the current Minimum and Maximum retention periods for the Bucket are used to validate the retention period:

    - The specified retention period must be equal to or less than the current *Maximum retention period* for the Bucket.

- In addition, a record object's retention period may be extended using one of four methods: (1) specifying a new retention time period, (2) adding time to the current retention time period, (3) specifying a new retention expiration date, or (4) specifying a retention period that is added to the current date/time.

  - The new retention period is compared to the current retention period and is stored only if it is greater than the current retention period.

- When a delete request is received for an individual record object, the record object's retention period is added to the creation/storage date and time to determine if the retention period has expired.

- Neither the record object, nor its immutable metadata, can be changed, overwritten or deleted as long as the retention period is in effect (or while a Legal Hold is applied; see the next subsection). Updates to certain mutable metadata attributes are allowed (such as record access (read) date and time, access permissions, and file owner). These updates do not affect the retention period.

- To aid the system administrator, when object metadata is retrieved, the response includes: (a) retention period, (b) calculated retention expiration date, (c) retention legal hold count (number of legal hold identifiers) applied to the record object, and (d) content-length.

Legal Holds

When a record object is subject to preservation requirements for subpoena, litigation, regulatory investigation or other special circumstances, it must be retained (preserved) as immutable; i.e., any deletion and overwrites must be prohibited until the hold is removed.

- Legal holds may be applied to individual record objects in Buckets with *Immutable Object Storage* features.
- For each applied legal hold, the identifier (specified by the client) and the timestamp (when applied) are stored for each record object.
  - Up to 100 legal holds may be applied to an individual record object.
  - When one or more legal hold identifiers are applied to the record object, immutability is enforced, and modification, overwrite and deletion of the record object is prohibited, even if the retention expiration date has expired.
  - When all legal hold identifiers are removed, preservation of the record object is no longer mandated by the legal hold identifier(s); however, *the retention period* may continue to protect the record object from being modified, overwritten or deleted.
- The legal hold identifiers applied to a record object are displayed with the GET (list) Object Legal Hold operation.

Deletion

- The record object content, together with its metadata, are eligible for deletion only after the three following conditions are met:
  1. The record objects' retention period is a positive integer. NOTE: Minus one (-1) is utilized for an indefinite retention period and minus two (-2) is utilized for a permanent retention period.
  2. Retention expiration date has passed. NOTE: The retention expiration date is calculated by adding the record object retention period, when it is a positive integer, to the creation/storage date and time.
  3. No legal hold identifiers are applied to the record object.
- A Bucket with *Immutable Object Storage* features must be empty before it can be deleted. Therefore, all record objects in the Bucket must be deleted before the Bucket can be deleted. Accordingly, deleting a Bucket to effectuate the premature deletion of record objects is prohibited.
- For the IBM Public Cloud, deletion of the COS Service Instance is prohibited, if *Immutable Object Storage* features are applied to one or more Buckets.

Clock Management

- IBM COS synchronizes time with a network protocol clock (NTP) to ensure that the local clock is within a 1000 second threshold.
  - If the clock is off by less than 1000 seconds the NTP daemon begins adjusting the local clock toward the remote clock time, using drifting (slow, very small adjustments of approximately 1-2 seconds per hour) until the clocks are synchronized.
  - If the clock is off by more than 1000 seconds, the server is taken off-line and adjusted to match the remote clock and an entry is created in the audit log.
- This process ensures that timestamps are accurately recorded when the record object and metadata are written. In addition, it ensures that the clock cannot be temporarily advanced to enable the ability to prematurely delete record objects.

Security

In addition to the stringent retention protection and management controls described above, IBM COS provides the following security capabilities, which support the authenticity and reliability of the record objects.

- Role-Based Access Control security provides the means to create, delete, and maintain accounts and control user permissions.
- Encryption options for record objects and metadata include:
  - Transport Layer Security (TLS) is applied for network connections *within* IBM Cloud Object Storage and is supported between the upstream application and COS import operations. When used, confidentiality of data in motion is ensured.
  - Record objects and metadata are encrypted as the data is stored, ensuring confidentiality of data at rest.
- Authentication is required (anonymous access is *not* supported) when *Immutable Object Storage* features are applied to the Buckets.
- The regulated entity may also choose to encrypt record objects prior to uploading to IBM COS. The regulated entity is responsible for maintaining its encryption keys.
- Independent third-party audits and internal IBM audits of IBM Cloud infrastructure, services and operations are undertaken on a regular basis to verify security, privacy and compliance controls. More information is available at https://www.ibm.com/cloud/security

2.1.4 Additional Considerations

The following additional considerations for configuring *Immutable Object Storage* features are provided to support compliance with the non-erasure and non-rewritable requirement of the Rule. The regulated entity is responsible for:

- Enabling the protection mode of *Retention* for IBM COS Buckets that will be used to store record objects required by the Rule.
- Configuring Bucket retention policies with *Default, Minimum,* and *Maximum retention periods* that meet regulatory requirements, and monitoring these attributes, since changes are allowed, and the current Bucket

settings are utilized to enforce retention protections when record objects are written and when retention periods are extended.

- NOTE: For event-based retention, when the triggering event occurs (e.g., contract expiration), the retention period is extended from minus one (-1) to a fixed retention period. The validation of the new retention period is based on the current *Minimum retention period.* Therefore, the regulated entity must establish **procedural controls** to ensure that the *Minimum retention period* is not reset (temporarily changed) to a short *Minimum retention period*, as a method to allow a short retention period to be applied after the event has occurred.

- Applying an appropriate retention period to the record objects, when stored, managing event-based retention attributes, and extending the retention period, when necessary.
- Applying Legal Holds to record objects that require preservation for legal matters, government investigations, external audits and other similar circumstances.
- Ensuring all record objects required to be retained for compliance with the Rule are successfully stored in a Bucket, with *Immutable Object Storage* features, preferably within 24 hours of creation, or are stored in an SEC-compliant protected storage system until they are uploaded to a Bucket, with *Immutable Object Storage* features.
- Establishing and maintaining appropriate security controls and protocols.
- Ensuring that NTP servers are appropriately configured on IBM COS.

Additionally, a regulated entity using IBM Cloud Services for Buckets with *Immutable Object Storage* features is responsible for maintaining its IBM Cloud Account and paying for appropriate services until their retention periods have expired or until the record objects have been transferred to another compliant storage system. In the event of non-payment, write access is prohibited and read access is restricted to essential access for regulatory requests, only.

2.2 Accurate Recording Process

2.2.1 Compliance Requirement [SEC 17a-4(f)(2)(ii)(B)]

The intent of this requirement is to ensure both the accuracy and quality of the recording process such that the records read from the storage media are precisely the same as those that were recorded. This requirement includes both a quality verification of the recording process and post-recording verification processes.

SEC 17a-4(f)(2)(ii)(B): Verify automatically the quality and accuracy of the storage media recording process.

2.2.2 Compliance Assessment

It is Cohasset's opinion that Buckets with *Immutable Object Storage* features use checksums and validation processes in conjunction with the inherent capabilities of advanced electronic recording technology to meet this requirement of the Rule to verify the accuracy and quality of the recording process.

2.2.3 Capabilities of IBM COS Bucket with Immutable Object Storage Features

The recording and the post-recording verification processes for Buckets with *Immutable Object Storage* features are described below.

Recording Process:

- As part of the record object upload process, the regulated entity's source application must provide a checksum (MD5 or SHA256 Hash) of the record content. The record object is only stored if the checksum calculated by the IBM COS Bucket, with *Immutable Object Storage* features, matches the checksum provided by the source application. If it does not match, the record object is rejected, and an error is reported to the regulated entity (via the audit log). The record object must be re-uploaded.
- When a record object is successfully uploaded to the IBM COS Bucket, with *Immutable Object Storage* features, an *Ok* response is sent to the source application.
- The checksum is stored in the record object metadata. The checksum is immutable and is used in the post-recording period to verify the integrity of the record object.
- IBM COS Bucket storage utilizes advanced electronic recording technology which applies a combination of checks and balances, such as inter-component and inter-step cyclical redundancy checks (CRCs) and write-error detection and correction, to assure that record objects are written in a high quality and accurate manner.

Post-Recording Verification Process:

- Buckets with *Immutable Object Storage* features employ intelligent background processes that continuously scan the storage environment to identify and correct errors. In addition, the integrity of the record object is validated, on each read, to ensure that an accurate record object is delivered.
  - If corruption is identified (i.e., the integrity check value is invalid), other non-corrupt data is used to regenerate the record object.

2.2.4 Additional Considerations

There are no additional considerations related to this requirement.

2.3 Serialize the Original and Duplicate Units of Storage Media

2.3.1 Compliance Requirement [SEC 17a-4(f)(2)(ii)(C)]

> **SEC 17a-4(f)(2)(ii)(C):** Serialize the original and, if applicable, duplicate units of storage media, and time-date for the required period of retention the information placed on such electronic storage media.

This requirement, according to Section III(B) of the SEC's 2001 Interpretive Release, *"is intended to ensure both the accuracy and accessibility of the records by indicating the order in which records are stored, thereby making specific records easier to locate and authenticating the storage process."*

When the SEC Rule was issued in 1997, this requirement was thought to be more pertinent to tracking the individual units of removable media related to micrographic or optical storage. This requirement for non-unitized electronic storage may be satisfied by capturing and storing immutable metadata, associated with each electronic record, to *uniquely* identify the record and the *date and time of recording*.

2.3.2 Compliance Assessment

Cohasset believes that Buckets with *Immutable Object Storage* features meet this requirement of the Rule for serializing the original and duplicate record objects by storing a unique ObjectID (record object name) and a creation/storage date and time, as immutable metadata for the record object.

2.3.3 Capabilities of IBM COS Bucket with Immutable Object Storage Features

- Record object names are a unique identifier (ObjectID) and the creation of duplicate record object names is prohibited within a Bucket.
  - If the source application attempts to store a new object with the same name as a previously stored record object in the same Bucket, the write for the new object is rejected and an error message is returned.
- Further, the creation/storage date and time is stored with each record object in the Bucket, with *Immutable Object Storage* features, and is immutable.
- The combination of the unique record object name (ObjectID) and the creation/storage date and time provide a serialization of each record object in both space and time.

2.3.4 Additional Considerations

There are no additional considerations related to this requirement.

2.4 Capacity to Download Indexes and Records

2.4.1 Compliance Requirement [SEC 17a-4(f)(2)(ii)(D)]

This requirement necessitates an adequate capacity to readily download records and associated indexes, in a format and on a medium acceptable under the Rule and as specified by the SEC or self-regulatory organization. This allows the SEC or self-regulatory organizations to take possession of the downloaded records and indexes.

SEC 17a-4(f)(2)(ii)(D): Have the capacity to readily download indexes and records preserved on the electronic storage media to any medium acceptable under this paragraph (f) as required by the Commission or the self-regulatory organizations of which the member, broker, or dealer is a member.

2.4.2 Compliance Assessment

It is Cohasset's opinion that Buckets with *Immutable Object Storage* features support the regulated entity in meeting this requirement by providing LIST and GET tools for authorized users to readily download the record objects and metadata (index) attributes. These record objects and metadata (index) attributes can then be transferred by the regulated entity to a compliant media, as required.

2.4.3 Capabilities of IBM COS Bucket with Immutable Object Storage Features

Record objects and metadata (index) attributes stored in Buckets with *Immutable Object Storage* features may be downloaded using the COS API. The following capabilities support the capacity to download record objects and metadata (index) attributes:

- IBM COS provides GET and LIST tools to access the record objects and metadata (index) attributes stored in Buckets.

- With the COS API, authorized users can: (a) list record objects and their associated metadata, (b) search the object name, and (c) download the record object and associated metadata (index) attributes to a designated storage location. Record object metadata (index) attributes, include:
  - Immutable object metadata, e.g., object name, creation/storage date and time, and size.
  - Changeable object metadata, e.g., Legal Hold identifiers and access control lists.

2.4.4 *Additional Considerations*

The regulated entity is responsible for authorizing user access, maintaining IBM COS Bucket settings, and assuring that the SEC, CFTC, self-regulatory organization or designated examining authority receive downloads of the record objects and metadata (index) attributes, in the requested form and medium.

Additionally, a regulated entity using IBM Cloud Services for Buckets with *Immutable Object Storage* features is responsible for (a) maintaining its IBM Cloud Account in good standing, (b) authorizing user access, (c) maintaining hardware and software to access the IBM cloud services, (d) maintaining its encryption keys that have been used, and (e) assuring that the regulator, self-regulatory organization or designated examining authority receive downloads of the record objects and metadata (index) attributes, in the requested format and medium. In the event of non-payment, write access is prohibited and read access is restricted to essential access for regulatory requests, only.

2.5 Duplicate Copy of the Records Stored Separately

2.5.1 *Compliance Requirement [SEC 17a-4(f)(3)(iii)]*

The intent of this requirement is to provide an alternate storage source for accessing the records, should the primary source be compromised, i.e., lost or damaged.

SEC 17a-4(f)(3)(iii): Store separately from the original, a duplicate copy of the record stored on any medium acceptable under §240.17a-4 for the time required.

Note: A *duplicate copy* allows for the complete and accurate record to be reestablished from data stored on a compliant storage system or media. Whereas, a *backup copy* is defined as a non-persistent copy that is overwritten as it is *rotated* on a periodic basis, resulting in a much shorter retention period than the original.

2.5.2 *Compliance Assessment*

It is Cohasset's opinion that Buckets with *Immutable Object Storage* features meet this SEC requirement for a duplicate copy using *erasure coding* to store record objects across three or more data centers and to regenerate the stored record object, in the event of an error. Additionally, on-premises deployments and dedicated cloud deployments hosted by IBM, with Buckets in Vault mode, may be configured to *synchronously mirror,* to replicate the data across a two-site Protected Mirror.

2.5.3 *Capabilities of IBM COS Bucket with Immutable Object Storage Features*

Duplicate Using Erasure Coding

- The record object and associated metadata (index) attributes are recoverable by regenerating a duplicate of the original from erasure encoded data.

  - The erasure encoded data can be spread across multiple data centers that are geographically distant from one another.

- The erasure coded data is retained for the full retention period of the record object and any applied Legal Holds.
- For on-premises deployments utilizing *Immutable Object Storage* features, a minimum of two data centers are required for replication and a minimum of three data centers are required for geo-dispersed cross-region storage.

Duplicate Using Protected Mirrors

The **Protected Mirror** feature is available for on-premises deployments and dedicated cloud deployments hosted by IBM, when Buckets are in Vault mode. The Protected Mirror feature is not available for the IBM Public Cloud.

- A Protected Mirror utilizes two separate Buckets, each with *Immutable Object Storage* features, and creates and manages duplicate copies of the record objects and metadata attributes.
  - One of the Buckets in the Protected Mirror is designated as the *primary* Bucket and the other is designated as the *secondary* Bucket.
  - The two Buckets cannot be deleted while they are part of the Protected Mirror.
- With the **Protected Mirror** configuration, each record object, and its metadata, are written *synchronously* to a primary and secondary Bucket in the Protected Mirror.
- Read requests are handled by the primary Bucket unless it is unavailable or the user specifically identifies the secondary Bucket in the request.

2.5.4 Additional Considerations

- When relying exclusively on erasure coding for the duplicate copy, Cohasset *recommends* the regulated entity configure the system such that the storage pools are equally distributed across three or more geographically dispersed data centers.
- When using Protected Mirrors, where each mirror is recorded in a separate Bucket, the mirrors must remain connected and must not be disassociated. If the disconnection is temporary, the secondary vault will synchronize when reconnected.

3 | Summary Assessment of Compliance with CFTC Rule 1.31(c)-(d)

The objective of this section is to document Cohasset's assessment of the capabilities of Buckets with *Immutable Object Storage* features, in comparison to the CFTC requirements.

The individual relevant requirements cited in Section 2, *Assessment of Compliance with SEC Rule 17a-4(f)*, are based on the wording in SEC Rule 17a-4(f) and Cohasset's interpretation of the requirements, given the associated SEC Interpretive Releases. Specifically, the SEC's 2003 Interpretive Release reiterates that the Rule sets forth standards that the electronic storage media must satisfy to be considered an acceptable method of storage under Rule 17a-4:

> *A broker-dealer would not violate the requirement in paragraph (f)(2)(ii)(A) of the rule if it used an electronic storage system that prevents the overwriting, erasing or otherwise altering of a record during its required retention period through the use of <u>integrated</u> hardware and software <u>control codes</u>.* [emphasis added]

Accordingly, it is Cohasset's opinion that the requirements set forth in SEC Rule 17a-4(f) are *technology-neutral* and apply to any electronic solution with (a) integrated control codes that extend to the electronic storage system and (b) features that deliver capabilities that meet the requirements of the Rule.

The August 28, 2017, amendments to CFTC Rule 1.31 establish *technology-neutral*, *principle-based* requirements. As illustrated in the table in this section, it is Cohasset's opinion that the requirements of the modernized CFTC Rule may be achieved by meeting the SEC requirements.

When comparing the capabilities of Buckets with *Immutable Object Storage* features that align with the SEC requirements to the *principles-based* CFTC requirements, it is essential to recognize that the SEC Rule separately describes requirements for index data and audit trail, whereas the CFTC in 17 CFR § 1.31(a) establishes an expanded definition of an electronic regulatory record to include the information as specified in paragraph (i) and (ii) below.

> ***Definitions**. For purposes of this section:*
> *<u>Electronic regulatory records</u> means all regulatory records other than regulatory records exclusively created and maintained by a records entity on paper.*
> *<u>Records entity</u> means any person required by the Act or Commission regulations in this chapter to keep regulatory records.*
> *<u>Regulatory records</u> means all books and records required to be kept by the Act or Commission regulations in this chapter, including any record of any correction or other amendment to such books and records, provided that, <u>with respect to such books and records stored electronically, regulatory records shall also include:</u>*
> *<u>(i) Any data necessary to access, search, or display any such books and records; and</u>*
> *<u>(ii) All data produced and stored electronically describing how and when such books and records were created, formatted, or modified</u>.* [emphasis added]

The table below lists the *principles-based* CFTC requirements related to the *form and manner of retention* and the *inspection and production of regulatory records*. The middle column also provides Cohasset's analysis and opinion regarding the ability of Buckets with *Immutable Object Storage* features to meet the requirements for electronic regulatory records in CFTC Rule 1.31(c)-(d). In addition, for ease of reference the SEC requirements described in the sections referenced in the middle column are listed.

CFTC 1.31(c)-(d) Requirement	Compliance Assessment Relative to CFTC 1.31(c)-(d)	SEC 17a-4(f) Requirements Listed in the Referenced Sections
(c) Form and manner of retention. Unless specified elsewhere in the Act or Commission regulations in this chapter, all regulatory records must be created and retained by a records entity in accordance with the following requirements: (1) **Generally**. Each records entity shall retain regulatory records in a form and manner that ensures the *authenticity and reliability* of such regulatory records in accordance with the Act and Commission regulations in this chapter. (2) **Electronic regulatory records**. Each records entity maintaining electronic regulatory records shall establish appropriate systems and controls that ensure the *authenticity and reliability* of electronic regulatory records, including, without limitation: (i) Systems that *maintain* the security, signature, and data as necessary to ensure the *authenticity* of the information contained in electronic regulatory records and to monitor compliance with the Act and Commission regulations in this chapter;	It is Cohasset's opinion that the capabilities described in Sections 2.1 through 2.4 meet CFTC requirements (c)(1) and (c)(2)(i) for record objects. Additionally, for *records stored electronically*, the CFTC has expanded the definition of *regulatory records* in 17 CFR § 1.31(a) to include metadata: *Regulatory records means all books and records required to be kept by the Act or Commission regulations in this chapter, including any record of any correction or other amendment to such books and records, provided that, with respect to such books and records stored electronically, regulatory records shall also include:* *(i) Any data necessary to access, search, or display any such books and records; and* *(ii) All data produced and stored electronically describing how and when such books and records were created, formatted, or modified.* [emphasis added] It is Cohasset's opinion that Buckets with *Immutable Object Storage* features retain the immutable metadata (index attributes) as an integral part of the record object; and, therefore are subject to the same retention protections as the associated record object. Immutable record object metadata includes *object name, creation/storage date and time, retention period and object checksums (MD5 or SHA256 Hash) and user-specified metadata tags (which are a custom collection of name-value pairs that describe various object qualities).* Additionally, mutable (changeable) metadata attributes stored for a record object include *legal hold identifier(s) and access control lists. The most recent values of mutable metadata are retained for the same time period as the associated record object.* To satisfy this requirement for other essential data related to how and when the record objects were created, formatted, or modified, the regulated entity must retain this data in a compliant manner.	Section 2.1 *Non-Rewriteable, Non-Erasable Record Format* *Preserve the records exclusively in a non-rewriteable, non-erasable format.* [SEC 17a-4(f)(2)(ii)(A)] Section 2.2 *Accurate Recording Process* *Verify automatically the quality and accuracy of the storage media recording process.* [SEC 17a-4(f)(2)(ii)(B)] Section 2.3 Serialize the Original and Duplicate Units of Storage Media *Serialize the original and, if applicable, duplicate units of storage media, and time-date for the required period of retention the information placed on such electronic storage media.* [SEC 17a-4(f)(2)(ii)(C)] *Section 2.4 Capacity to Download Indexes and Records* *Have the capacity to readily download indexes and records preserved on the electronic storage media to any medium acceptable under this paragraph (f) as required by the Commission or the self-regulatory organizations of which the member, broker, or dealer is a member.* [SEC 17a-4(f)(2)(ii)(D)]

CFTC 1.31(c)-(d) Requirement	Compliance Assessment Relative to CFTC 1.31(c)-(d)	SEC 17a-4(f) Requirements Listed in the Referenced Sections
(ii) Systems that ensure the records entity is able to produce electronic regulatory records[6] in accordance with this section, and *ensure the availability of such regulatory records in the event of an emergency or other disruption* of the records entity's electronic record retention systems; and	It is Cohasset's opinion that the capabilities of Buckets with *Immutable Object Storage* features, as described in Section 2.5, *Duplicate Copy of the Records Stored Separately*, meet the CFTC requirements (c)(2)(ii) to *ensure the availability of such regulatory records in the event of an emergency or other disruption of the records entity's electronic record retention systems*. Specifically, section 2.5 explains that durability is achieved through erasure coding for Buckets, with *Immutable Object Storage* features, that are configured to store erasure coded record object and associated immutable and mutable metadata across three or more data centers. Further, for certain IBM COS deployments that are on-premises or dedicated cloud hosted by IBM, Buckets may be configured for Protected Mirroring, to create and manage duplicate copies of the record objects and metadata attributes. To satisfy this requirement for other essential data related to how and when the record objects were created, formatted, or modified, the regulated entity must retain this data in a compliant manner.	*Section 2.5 Duplicate Copy of the Records Stored Separately* *Store separately from the original, a duplicate copy of the record stored on any medium acceptable under §240.17a-4 for the time required.* [SEC 17a-4(f)(3)(iii)]
(iii) The creation and maintenance of an *up-to-date inventory* that identifies and describes each system that maintains information necessary for accessing or producing electronic regulatory records.	The regulated entity is required to create and retain an *up-to-date inventory,* as required for compliance with 17 CFR § 1.31(c)(iii).	N/A
(d) Inspection and production of regulatory records. Unless specified elsewhere in the Act or Commission regulations in this chapter, a records entity, at its own expense, must *produce or make accessible for inspection* all regulatory records in accordance with the following requirements: (1) *Inspection*. All regulatory records shall be open to inspection by any representative of the Commission or the United States Department of Justice. (2) *Production of paper regulatory records*. ***. (3) *Production of electronic regulatory records*. (i) A request from a Commission representative for electronic regulatory records will specify a *reasonable form and medium* in which a records entity must produce such regulatory records. (ii) A records entity must *produce such regulatory records in the form and medium requested promptly*, upon request, unless otherwise directed by the Commission representative. *(4) Production of original regulatory records.* ***	It is Cohasset's opinion that Buckets with *Immutable Object Storage* features support the regulated entity's efforts to comply with requests for inspection or production of record objects and associated system metadata (i.e., index attributes). Specifically, it is Cohasset's opinion that Section 2.4, *Capacity to Download Indexes and Records*, describes the capabilities for retrieving and downloading the record objects and the associated metadata retained by Buckets with *Immutable Object Storage* features. Further, as noted in the *Additional Considerations* in Section 2.4.4, the regulated entity is obligated to produce the record objects and associated metadata, in the form and medium requested. If the regulator requests additional data related to how and when the record objects were created, formatted, or modified, the regulated entity will need to provide this information from appropriate source systems.	*Section 2.4 Capacity to Download Indexes and Records* *Have the capacity to readily download indexes and records preserved on the electronic storage media to any medium acceptable under this paragraph (f) as required by the Commission or the self-regulatory organizations of which the member, broker, or dealer is a member.* [SEC 17a-4(f)(2)(ii)(D)]

[6] 17 CFR § 1.31(a) includes indices (*Any data necessary to access, search, or display any such books and records*) in the definition of regulatory records.

4 | Conclusions

Cohasset assessed the capabilities of IBM COS, in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), when *Immutable Object Storage* features are appropriately configured and applied, in comparison to the five requirements related to recording, storage and retention of record objects and associated metadata, set forth in SEC Rule 17a-4(f) and its associated Interpretive Releases. Cohasset also correlated the principles-based requirements in CFTC Rule 1.31(c)-(d) to the assessed capabilities.

Cohasset determined that a Bucket with *Immutable Object Storage* features has the following capabilities, which support the ability to meet the recording, storage and retention requirements:

- Maintains record objects and immutable record object metadata in a non-erasable and non-rewriteable format for time-based and event-based retention periods.
- Allows legal holds to be applied to record objects subject to preservation requirements, which retains (preserves) the record object as immutable and prohibits deletion or overwrites until the Legal Hold identifiers are removed.
- Prohibits deletion of a record object and its immutable metadata until the associated retention period has expired.
- Encrypts record objects at rest and within the IBM network and supports encryption for record objects transmitted for storage.
- Verifies the accuracy and quality of the recording process automatically utilizing (a) advanced storage recording technology, and (b) a checksum (MD5 or SHA256 Hash), which is received from the source application during the recording process and is stored as a metadata attribute and utilized for post-recording verification.
- Uniquely identifies and chronologically serializes each stored record object.
- Allows access to record objects and metadata for local reproduction or transfer to a format and medium acceptable under the Rule.
- Meets the requirement for a duplicate copy by:
  - *Erasure coding* stored record objects and metadata attributes across three or more data centers, which regenerates an accurate replica from valid erasure coded data, should an error be encountered.
  - Optionally, configuring a Protected Mirror environment for deployments in Vault Mode (available on-premises and in dedicated cloud deployments hosted by IBM). Protected Mirror replicates (mirrors) record objects on separate primary and secondary vaults and allows a duplicate copy to be read from a secondary vault, in the event the primary vault is unavailable.

Accordingly, Cohasset concludes that IBM Cloud Object Storage, in specific deployments (on-premises, dedicated cloud hosted by IBM, and IBM Public Cloud), when *Immutable Object Storage* features are appropriately configured and utilized to store records, meets the requirements that relate directly to the recording, storage and retention of record objects and system metadata.

5 | Overview of Relevant Regulatory Requirements

This section establishes the context for the regulatory requirements that are the subject of this assessment by providing an overview of the regulatory foundation for allowing electronic records to be retained on a variety of compliant electronic storage media.

5.1 Overview of SEC Rule 17a-4(f) Electronic Records Storage Requirements

Recordkeeping requirements for the securities broker-dealer industry are stipulated by the United States Securities and Exchange Commission ("SEC") Regulations, including 17 CFR §§ 240.17a-3 and 240.17a-4. Specifically, SEC Rule 17a-4(f), when adopted on February 12, 1997, expressly allow books and records to be retained on electronic storage media, subject to meeting certain conditions.

Three separate foundational documents collectively define and interpret the specific regulatory requirements that must be met for an electronic storage system to be compliant with SEC Rule 17a-4(f). These are:

- The Rule itself, as modified over time by the SEC. These modifications to the original Rule have not affected the requirements for electronic storage media, which are the basis of this assessment. However, certain Interpretive Releases have clarified the context and meaning of certain requirements and conditions of the Rule.
- SEC Interpretive Release No. 34-44238, *Commission Guidance to Broker-Dealers on the Use of Electronic Storage Media under the Electronic Signatures in Global and National Commerce Act of 2000 with Respect to Rule 17a-4(f)*, dated May 1, 2001 (the "2001 Interpretive Release").
- SEC Interpretive Release No. 34-47806, *Electronic Storage of Broker-Dealer Records*, dated May 7, 2003 (the "2003 Interpretive Release").

In the Rule and in the two subsequent interpretative releases, the SEC authorizes the use of electronic storage media and devices to satisfy the recordkeeping requirements of Rules 17a-3 and 17a-4, when the system delivers the prescribed functionality. Specifically, Rule 17a-4(f)(1)(ii) states:

> *(f) The records required to be maintained and preserved pursuant to §§ 240.17a-3 and 240.17a-4 may be immediately produced or reproduced on "micrographic media" (as defined in this section) or by means of "electronic storage media" (as defined in this section) that meet the conditions set forth in this paragraph and be maintained and preserved for the required time in that form.*
> *(1) For purposes of this section:*
> *(ii) The term electronic storage media means any digital storage medium or system and, in the case of both paragraphs (f)(1)(i) and (f)(1)(ii) of this section, that meets the applicable conditions set forth in this paragraph (f). [emphasis added]*

The February 12, 1997, Federal Register issued the final rule allowing broker-dealers to use electronic storage media. When issuing the rule, the SEC recognized that technology evolves and it set forth standards that the electronic storage media must satisfy, rather than prescribing specific technology, as specified in the following excerpts:

> ***SUMMARY:*** *The Securities and Exchange Commission (''Commission'') is amending its broker-dealer record preservation rule to allow broker-dealers to employ, under certain conditions, electronic storage media to maintain records required*

> *to be retained. The amendments reflect a recognition of technological developments that will provide economic as well as time-saving advantages for broker-dealers by expanding the scope of recordkeeping options while at the same time continuing to require broker-dealers to maintain records in a manner that preserves their integrity. The Commission is also issuing an interpretation of its record preservation rule relating to the treatment of electronically generated communications.*
>
> *****
>
> ***II. Description of Rule Amendments***
>
> ***A. Scope of Permissible Electronic***
>
> ***Storage Media***
>
> ****The Commission is adopting a rule today which, instead of specifying the type of storage technology that may be used, sets forth standards that the electronic storage media must satisfy to be considered an acceptable method of storage under Rule 17a–4. Specifically, because optical tape, CD–ROM, and certain other methods of electronic storage are available in WORM and can provide the same safeguards against data manipulation and erasure that optical disk provides, the final rule clarifies that broker-dealers may employ any electronic storage media that meets the conditions set forth in the final rule.*[7] [emphasis added]

The 2003 Interpretive Release further clarifies that implementation of rewriteable and erasable media, such as magnetic tape or magnetic disk, meets the requirements of a non-erasable and non-rewriteable recording environment, if the system delivers the prescribed functionality and appropriate **integrated control codes** are in place. The 2003 Interpretive Release states:

> *A broker-dealer would not violate the requirement in paragraph (f)(2)(ii)(A) of the rule if it used an electronic storage system that prevents the overwriting, erasing or otherwise altering of a record during its required retention period through the use of integrated hardware and software control codes.* [emphasis added]

The key words within this statement are "integrated" and "control codes." The term "integrated" means that the method used to achieve a non-rewriteable, non-erasable recording environment must be an integral part of the recording hardware and software. The term "control codes" indicates the acceptability of using attribute codes (metadata), which are integral to the hardware and software of the recording process, to protect against overwriting or erasure of any records.

Examples of integrated control codes relevant to a non-rewriteable and non-erasable recording process are:

- A retention period during which the record object cannot be erased, overwritten or otherwise modified;
- A unique record identifier that differentiates each record from all other records; and
- The date and time of recording, which in combination with the unique identifier "serializes" the record.

The 2003 Interpretive Release specifically notes that recording processes or applications which merely mitigate the risk of overwrite or erasure (rather than prevent them), such as relying solely on access control security, will not satisfy the requirements of SEC Rule 17a-4(f).

Further, the 2003 Interpretive Release requires the storage system to be capable of retaining records beyond the SEC-established retention period, when required by a subpoena, legal hold or other similar circumstances. In *Section IV. Discussion*, the 2003 Interpretive Release states:

[7] Exchange Act Release No. 38245 (Feb. 5, 1997), 62 FR 6469 (Feb. 12, 1997) ("Adopting Release").

> *Moreover, there may be circumstances (such as receipt of a subpoena) where a broker-dealer is required to maintain records beyond the retention periods specified in Rule 17a-4 or other applicable Commission rules. Accordingly, a broker-dealer must take appropriate steps to ensure that records are not deleted during periods when the regulatory retention period has lapsed but other legal requirements mandate that the records continue to be maintained, and the broker-dealer's storage system must allow records to be retained beyond the retentions periods specified in Commission rules. [emphasis added]*

An important associated requirement of SEC Rule 17a-4(f)(2)(i) is that a member, broker or dealer electing to electronically store its records required by SEC Rules 17a-3 or 17a-4, must notify its designated examining authority at least ninety (90) days prior to employing any technology other than write-once read-many ("WORM") optical media. Examining authorities are self-regulatory organizations (SROs) or designated examining authorities (DEAs) under the jurisdiction of the SEC, such as the Financial Industry Regulatory Authority (FINRA).

See Section 2, Assessment of Compliance with SEC Rule 17a-4(f), for a list of the *five* SEC requirements relevant to the recording, storage and retention of electronic records and a description of the capabilities of IBM Cloud Object Storage related to each requirement, when retention is enabled on the Bucket and when IBM COS is deployed on-premises or in the IBM public cloud.

5.2 Overview of FINRA Rule 4511(c) Electronic Records Storage Requirements

Financial Industry Regulatory Authority (FINRA) Rule 4511(c) explicitly defers to SEC Rule 17a-4(f), by stipulating:

> *(c) All books and records required to be made pursuant to the FINRA rules shall be preserved in a format and media that complies with SEA Rule 17a-4.*

5.3 Overview of CFTC Rule 1.31 Electronic Regulatory Records Requirements

Effective August 28, 2017, the Commodity Futures Trading Commission (CFTC) amended 17 CFR § 1.31 ("CFTC Rule") to define principles-based requirements for organizations electing to retain electronic regulatory records. The CFTC requirements for electronic regulatory records evolved through amendments to Rule 1.31. The most substantive changes included:

- The June 28, 1999, amendment first implemented the technical provisions regarding the use of electronic storage media for required books and records.
- The November 2, 2012, amendment clarified the retention period for certain oral communications.
- The August 28, 2017, amendments modernize and make technology-neutral the form and manner in which regulatory records, including electronic regulatory records, must be retained and produced.

To address the transition to electronic regulatory records, the CFTC amended and modernized its recordkeeping regulation to adopt principles-based standards that are less prescriptive. This resulted in rephrasing and modernizing the requirements previously defined in 1999, as explained in the August 28, 2017, Federal Register in *III. Final Rules, D. Regulation 1.31(c): Form and Manner of Retention:*

> *Consistent with the Commission's emphasis on a less-prescriptive, principles-based approach, proposed § 1.31(d)(1) would rephrase the existing requirements in the form of a general standard for each records entity to retain all regulatory records in a form and manner necessary to ensure the records' and recordkeeping systems' authenticity and reliability. The Commission proposed to adopt § 1.31(d)(2) to set forth additional controls for records entities retaining electronic regulatory records.*

> *The Commission emphasized in the Proposal that the proposed regulatory text does not create new requirements, but rather updates the existing requirements so that they are set out in a way that appropriately reflects technological advancements and changes to recordkeeping methods since the prior amendments of § 1.31 in 1999.* [emphasis added]

The definitions established in 17 CFR § 1.31(a) are paramount to applying the CFTC requirements.

> *Electronic regulatory records means all regulatory records other than regulatory records exclusively created and maintained by a records entity on paper.*
> *Records entity means any person required by the Act or Commission regulations in this chapter to keep regulatory records.*
> *Regulatory records means all books and records required to be kept by the Act or Commission regulations in this chapter, including any record of any correction or other amendment to such books and records, provided that, with respect to such books and records stored electronically, regulatory records shall also include:*
>> *(i) Any data necessary to access, search, or display any such books and records; and*
>> *(ii) All data produced and stored electronically describing how and when such books and records were created, formatted, or modified.* [emphasis added]

These definitions establish that recordkeeping obligations apply to (a) all *records entities*, without exception, and (b) all *regulatory records*. Further, for *electronic regulatory records*, paragraphs (i) and (ii) establish an expanded definition of an electronic regulatory record to include information describing data necessary to access, search and display record objects, as well as information describing how and when such books and records were created, formatted, or modified.

The retention time periods for regulated records includes both time-based[8] and event-time-based[9] retention periods. Specifically, 17 CFR § 1.31 (b)(1)-(b)(3) states:

> ***Duration of retention****. Unless specified elsewhere in the Act or Commission regulations in this chapter:*
> *(1) A records entity shall keep regulatory records of any swap or related cash or forward transaction (as defined in § 23.200(i) of this chapter), other than regulatory records required by § 23.202(a)(1) and (b)(1)-(3) of this chapter, from the date the regulatory record was created until the termination, maturity, expiration, transfer, assignment, or novation date of the transaction and for a period of not less than five years after such date.*
> *(2) A records entity that is required to retain oral communications, shall keep regulatory records of oral communications for a period of not less than one year from the date of such communication.*
> *(3) A records entity shall keep each regulatory record other than the records described in paragraphs (b)(1) or (b)(2) of this section for a period of not less than five years from the date on which the record was created.* [emphasis added]

For a list of the CFTC principles-based requirements and a summary assessment of the capabilities of Buckets with *Immutable Object Storage* features for each requirement, see Section 3, *Summary Assessment of Compliance with CFTC Rule 1.31(c)-(d)*.

[8] Time-based retention periods require the record object to be retained for a specified contiguous period of time from the date and time the record object is created and stored.

[9] Event-based or event-time-based retention periods require the record object to be retained indefinitely until a specified event occurs (e.g., a contract expires, or an employee terminates), after which the record object must be retained for a fixed final retention period.

About Cohasset Associates, Inc.

Cohasset Associates, Inc. (www.cohasset.com) is recognized as a leading professional consulting firm, specializing in records management and information governance. Drawing on more than forty years of experience, Cohasset provides its clients with innovative advice on managing their electronic information as the digital age creates operational paradigms, complex technical challenges and unprecedented legal issues.

Cohasset provides award-winning professional services in four areas: management consulting, education, thought-leadership and legal research.

Management Consulting: Cohasset strategizes with its multi-national and domestic clients, engaging in implementation activities to promote interdisciplinary information governance, achieve business objectives, optimize information value, improve compliance, and mitigate information-related risk.

Cohasset has been described as *the only management consulting firm in its field with its feet in the trenches and its eye on the horizon*. This fusion of practical experience and vision, combined with a commitment to excellence, results in Cohasset's extraordinary record of accomplishments.

Education: Cohasset is distinguished through its delivery of exceptional and timely education and training on records and information lifecycle management and information governance.

For domestic and international clients, Cohasset:

- *Formulates information governance implementation strategies*
- *Develops policies and standards for records management and information governance*
- *Creates clear and streamlined retention schedules*
- *Prepares training and communications for executives, the RIM network and all employees*
- *Leverages content analytics to improve lifecycle controls for large volumes of eligible information, enabling clients to classify information, separate high-value information and delete what has expired*
- *Designs and assists with the implementation of information lifecycle practices that avoid the cost and risk associated with over-retention*
- *Defines technical and functional requirements and assists with the deployment of enterprise content management and collaboration tools*

Thought-leadership: Cohasset regularly publishes thought-leadership white papers and surveys to promote the continuous improvement of information lifecycle management practices.

Legal Research: Cohasset is nationally respected for its direction on information governance legal issues – from retention schedules to compliance with the regulatory requirements associated with the use of electronic or digital storage media.