



SEC 17a-4(f) Compliance Assessment **EMC² Centera Compliance Edition Plus Storage Solution**

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Abstract

This Technical Report is a compliance assessment of the EMC² Centera Compliance Edition Plus storage solution relative to the requirements of SEC Rule 17a-4(f) that regulate the storage, retrieval and management of electronic records for members, brokers or dealers.

The conclusion of Cohasset Associates' assessment is that Centera CE+ meets all requirements that are its direct responsibility as it relates to the recording, identification, integrity, retention integrity protection, and availability of electronically stored records as specified in SEC Rule 17a-4(f).



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1. Introduction

Records retention requirements for the securities broker-dealer industry are stipulated in U.S. Securities and Exchange Commission (“SEC”) Regulation 17 CFR 240.17a-4 (the “Rule” or the “Regulation”). Within this regulation, Rule 17a-4(f),¹ adopted on February 12, 1997, expressly addresses the storage of electronic records. Specifically, it allows records to be retained on electronic storage media, subject to meeting certain requirements.

Rule 17a-4(f) and two subsequent interpretive releases:

- 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*, dated May 1, 2001 (the “2001 Release”), and
- SEC Interpretive Release No. 34-47806 *Electronic Storage of Broker-Dealer Records*, dated May 7, 2003 (the “2003 Release”),

specify and interpret the conditions that an electronic storage system must meet in order to be SEC compliant.

In the Rule and both Interpretive Releases, the SEC clearly states that the use of alternate electronic storage media and devices, to the extent that they meet the prescribed SEC defined conditions, is accepted.

The following statement in the 2003 Release further clarifies that certain implementations of rewriteable and erasable media, such as magnetic tape or magnetic disk, may meet the requirements of a non-erasable, non-rewriteable recording environment to the extent that they meet the SEC defined conditions:

1. Adopting Release 34-38245, 62 FR 6469 (Feb. 12, 1997).



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.

The key words of the above statement are “integrated” and “control codes.” “Integrated” means the method used to achieve a non-rewriteable, non-erasable recording environment must be an integral part of the recording hardware and software. “Control codes” mean the acceptability of using attribute codes (metadata) integral to the recording process for preventing overwriting or erasure of the records for the designated retention period. Accordingly, an erasable magnetic disk or magnetic tape storage system that provides for a non-rewriteable and non-erasable or write-once, read many (“WORM”) recording process using integrated control codes that meet the other relevant conditions of Rule 17a-4(f) is an acceptable electronic storage solution.

Related to this SEC record protection requirement is the extraordinary increase in legal and regulatory actions against broker-dealers in recent years. Court and regulatory imposed hold orders have resulted in significant growth in the volume of electronic records being retained in accordance with the Rule’s requirements. Relevant Rule 17a-4(f) procedures and functional system capabilities must protect these electronic records for the duration of their legal or regulatory hold – even when the designated retention period for the record has expired.



1.1 Centera Compliance Edition Plus

EMC Corporation (“EMC²”) designed the Centera Compliance Edition Plus (“Centera CE+”) Content Addressed Storage solution to meet or exceed all of the relevant technical and operational requirements of Rule 17a-4(f). To obtain an independent and objective assessment of Centera CE+ regarding its ability to meet the requirements for all electronically stored broker, dealer or member records as set forth in SEC Rule 17a-4(f) and follow-on SEC 2001 and 2003 Releases, EMC² retained Cohasset Associates, Inc. (“Cohasset”) to prepare this update of its March 2002 Centera Technical Report – and include an evaluation of new security and retention features now available in Centera CE+.

The information utilized by Cohasset to conduct this assessment consisted of oral discussions, detailed product functional descriptions and other directly related materials provided by EMC as well as information acquired by Cohasset from publicly available sources.

This assessment represents the professional opinion of Cohasset and should not be construed as an endorsement by Cohasset of the Centera Compliance Edition Plus Content Addressed Storage solution or other EMC products.

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



1.2 About Cohasset Associates, Inc.

Cohasset Associates, Inc. (www.cohasset.com) is widely recognized as one of the foremost consulting firms specializing in fixed content, document based information management. Now in its fourth decade of serving clients throughout the United States, Cohasset provides award-winning professional services in three areas: management consulting, education and publishing.

The focus of Cohasset's consulting practice is improving the programs, processes, and systems that manage document-based content. This ranges from establishing effective corporate records management programs to planning state-of-the-art electronic records systems. Using its unique combination of records management, legal, and technical skill sets, together with its extensive problem-solving experience, Cohasset works to provide its clients cost-effective solutions that achieve their business objectives and meet their legal and regulatory responsibilities.

Cohasset also provides strategic planning related to the management of electronic records and regularly authors thought-leadership White Papers and Technical Reports.

Cohasset is known internationally for its excellence in education and publishing. Cohasset's educational work is centered on its annual national conference on Managing Electronic Records (MER) – with its special focus on the legal, technical and operational issues associated with managing the complete life cycle of electronic records (www.merconference.com).

Together with co-sponsors ARMA International (www.arma.org) and AIIM International (www.aiim.org), Cohasset conducts the definitive bi-annual survey on the state of electronic records management. The results of Cohasset's research manifest a compelling need for improved lifecycle control over recorded information assets (www.merresource.com/whitepapers/survey.htm).



2. Executive Summary

Centera CE+ is a non-rewriteable and non-erasable solution for recording, protecting and providing access to “fixed content” information, i.e., content that is not intended to be and should not be revised or deleted prior to its authorized retention period and, where applicable, its release from a legal or regulatory hold.

The majority of fixed content information generated by broker-dealers must be retained as the official record resulting from business transactions and events – as defined in the record definition and retention requirements of SEC Rules 17a-3 and 17a-4. These Rules specify either time-based² or event-based³ retention periods, depending on the type of record.

The results of Cohasset’s assessment are that:

- Centera CE+ meets all requirements that are the direct responsibility of Centera CE+ as it relates to the recording, identification, retention protection and availability of electronic records as specified in SEC Rule 17a-4(f);
- Recent enhancements provide retention protection for the complete spectrum of broker-dealer records, including event-based and time-based records, specified under Rules 17a-3 and 17a-4; and
- In addition to meeting the requirements of the Rule, Centera CE+ provides the capability to place and release a hold – including multiple holds – on individual records in order to accommodate hold orders resulting from legal or regulatory actions.

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2. Time-based retention periods are fixed in length and start at the time the record is created or stored. Examples of time-based records are operational transaction-oriented records such as confirms, brokerage orders, ledgers, etc.
 3. Event-based retention periods are variable in length with an initial period running continuously from the time the record is created or stored until a specific event occurs (closing of an account, termination of employment), then retained for an additional, typically fixed period of time after the event. Examples of event-based broker-dealer records are customer account records (six years after closing the account) and broker-dealer personnel records (three years after termination of employment).



3. Requirements of the Rule Directly Relevant to Centera CE+

This section presents Cohasset's assessment regarding the capabilities of Centera CE+ relative to meeting the SEC Rule 17a-4(f) requirements that are considered to be the responsibility of the recording and storage solution.

Certain other requirements of the Rule, that are the primary responsibility of either the broker-dealer or the application software and which are supported by capabilities of Centera CE+, are addressed in Section Four.

The assessment of each relevant requirement in Rule 17a-4(f) is structured into four parts:

Compliance Requirement

Definition of the SEC specific regulatory requirement that must be met in order to utilize electronic records storage media in the retention of 17a-3 and 17a-4 records;

Compliance Assessment

Cohasset's Assessment of the degree to which Centera CE+ complies with the Rule;

Centera CE+ Capabilities

Description of the Centera CE+ capabilities that enable it to meet the specific 17a-4(f) requirements addressed in that section;⁴ and

Other Considerations

Identification of actions (if any exist) that may need to be performed in order to meet the requirements of the Rule.

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4. Cohasset Associates relied exclusively upon information supplied by EMC² regarding the functionality and operation of Centera. This information was made available in the form of written explanations, marketing materials, technical specifications, as well as from meetings and oral presentations. Cohasset did not consider any information provided by EMC² regarding their opinion of whether or not Centera complied with SEC Rule 17a-4(f).



3.1 Non-rewriteable, Non-erasable Format

Compliance Requirement 17a4(f)(2)(ii)(A)

Preserve the records exclusively in a non-rewriteable, non-erasable format.

As set forth in Section III(B) of the 2001 Release, this requirement “is designed to ensure that electronic records are capable of being accurately reproduced for later reference by maintaining the records in unalterable form.”

The following statement in the 2003 Release further clarifies that certain implementations of rewriteable and erasable media, such as magnetic disk or magnetic tape, would meet the requirements of a non-erasable, non-rewriteable recording environment provided they deliver a) the prescribed functionality, and b) that functionality is delivered via appropriate integrated control codes for the SEC designated retention schedule associated with the stored record:

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.

Compliance Assessment

Cohasset believes that Centera CE+ meets the SEC requirement for preserving records in a non-rewriteable and non-erasable format by protecting each record from being overwritten or erased, either permanently or in accordance with the longest time-based or event-based retention period specified in any Content Descriptor File (“C-Clip”⁵) associated with a record. Centera CE+ also protects each record, where a hold command has been issued, until the hold command has been released – even if it is after the longest retention period for that record has expired.

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5. The Content Descriptor File, also called the CDF and referred to herein as the “C-Clip”, is a metadata file intrinsically linked to an associated electronic record. The C-Clip contains the integrated control codes, such as the unique content address, date stored, retention period, etc. that allows the Centera Content Management System to protect each record against overwrite or erasure for the duration of the designated retention and legal hold period.



Centera CE+ Capabilities

Centera CE+ is a non-rewriteable storage solution where each record stored is identified with a unique content address that ensures, through the system's special content management software, that the record cannot be overwritten. Centera CE+ protects the records using the unique identifier and the retention period – both of which are stored as integrated control codes in the C-Clip. Each record is protected against erasure, overwrite or alteration throughout its designated retention period, whether that retention is time-based or event-based.⁶

To fully understand the non-rewriteable and non-erasable capabilities of Centera CE+, seven key points need to be taken into account:

1. Centera CE+ ensures, through its specialized content addressed storage management software, that electronic records and their associated C-Clips cannot be overwritten prior to the expiration of the specified retention period. For each record submitted to Centera CE+, the content address⁷ in the C-Clip uniquely identifies that record. Should a duplicate identifier be found (such as an attempt to store the same e-mail attachment twice), Centera CE+ does not overwrite the original file. Rather, only the C-Clip submitted with the duplicate is stored, and Centera CE+ links it to the originally written record. Multiple C-Clips can be linked to one unique record – and each C-Clip potentially can have a different retention period.
2. Centera CE+ protects against the erasure of each record by automatically retaining the record for the longest retention period specified in all associated C-Clips. Only after the longest retention period for a record has expired will Centera CE+ accept an erase command from the software application. Centera CE+ never proactively initiates erasure of a record. If the specified retention period for a record sent to Centera by the controlling software application is blank or zero in any related C-Clip, the retention period is set to permanent and Centera CE+ will never allow the record to be erased.⁸

6. This assumes that the software application has provided the correct retention period for the record specified in the regulations as part of the C-Clip submitted to Centera.

7. The content address for each individual record in Centera CE+ is a hash digest of the record that is computed using either an MD5 hash or a combination of MD5 and SHA256 hash technologies, called an M++ hash.

8. This default to “infinite” retention should serve to not only protect records, but also to encourage users to establish a retention for all their records or, contrary to good records management principles, they will build up vast volumes of potentially unnecessary electronic records that, in turn, will incur added storage costs.



3. In addition to the original capability for protecting records with time-based retention, Centera CE+ provides for event-based records retention. For records with event-based retention periods, the controlling application sends an initial command indicating it is storing an event-based record, and then Centera CE+ protects the record continuously until it receives a command from the application signaling that the event related to this record has occurred along with an associated fixed, final retention period. The record then is further protected by Centera CE+ for the final retention period specified by the application software.
4. The length of a retention period cannot be shortened in Centera CE+, but it can be extended by having the software application submit an additional C-Clip containing a retention period that is longer than any C-Clip currently associated with the record. This feature allows retention periods to be extended in the event that regulations change.
5. The ability to establish a minimum and maximum retention period is an added feature in Centera CE+. The Min/Max retention period range is established during the administrative configuration and setup of a storage pool. A storage pool is a logical area of a Centera CE+ storage system that typically relates to the records stored by a particular application. The Min/Max capability provides enhanced retention policy management in that it assures that no records are stored in Centera CE+ with a retention period shorter than the minimum specified or longer than the maximum specified for any application's storage pool.
6. Centera CE+ has the ability to place a hold on individual stored records in order to ensure the continued protection and management of records that are defined to be relevant to a specific legal or regulatory hold order. Multiple holds can be placed against each record where the record is relevant to multiple legal or regulatory actions. A record placed on hold cannot be deleted by the controlling application until all holds associated with the record have expired, even if the retention period for the record has expired.
7. Records stored in Centera CE+ cannot be altered by users, including system administrators, because the entire system is configured at the factory to be non-rewriteable. Additionally, Centera CE+ hardware cabinets are physically locked and specifications call for the entire system to be housed in a security-controlled, climate-conditioned computer center. The only two interfacing functions available to a system administrator are: a) configure Centera CE+ on the network, and b) obtain reports regarding the system's capacity status.



Other Considerations

Centera CE+ is dependent on the software application to submit the correct time-based or event-based retention period for each record based on the retention requirements specified for certain record types in Rules 17-a3 and 17a-4.

For each individual legal or regulatory hold, the application must send a hold command to Centera CE+ for every record subject to the hold order, and a release command for each record once the hold has expired.



3.2 Verify Automatically the Quality and Accuracy of Recording Process

Compliance Requirement 17a-4(f)(2)(ii)(B)

Verify automatically the quality and accuracy of the storage media recording process.

The intent of SEC Rule 17a-4(f)(2)(ii)(B) is to ensure that the media recording process is accurate to a very high degree and, therefore, the recorded information is of the highest quality. The objective of this subsection of the Rule is to provide the utmost confidence that all records read from the storage media are precisely the same as those recorded.

Compliance Assessment

Cohasset believes that Centera CE+ meets the SEC requirement to verify the accuracy and completeness of the recording process immediately – at the time of the recording. Beyond what is required in the SEC regulation, Centera CE+ verifies the accuracy and completeness of the recording whenever any record is retrieved as well as periodically throughout the record's retained life in the system.

Centera CE+ Capabilities

The quality and accuracy of the Centera CE+ recording process is verified as follows:

- The unique content address identifier (a hash digest⁹) is initially calculated by the software application,
- The content address identifier then is recalculated and verified three more times; once upon receipt from the software application, and twice more during the writing process to the magnetic disk media.

9. A hashing algorithm is a formula used to calculate a value based on every digital bit (a one or zero) that represents the full content of a record. The change of a single bit in a record would change the resulting value of the hash, thereby indicating that something had changed in the record. Centera CE+ can be configured to utilize the de facto industry standard MD5 hashing algorithm to calculate the unique file identifier or a combination of MD5 and the SHA256 hashing technologies (called M++ by EMC²).



These multiple verification steps ensure that each record is accurately and completely recorded by Centera CE+. Centera CE+ further ensures that the integrity and accuracy of each record is maintained over time by:

- Verifying automatically the accuracy of the record at the time of each retrieval, and
- Recalculating periodically the unique hash digest identifier from the content of the record and comparing it to the original hash digest identifier to ensure that the integrity of the record is being maintained throughout the record's retention life in the system.

Should there be a situation where the recalculated and original values do not match, the record in question would be restored from the mirrored copy (whose accuracy also is being checked automatically by recalculating the hash digest on a regular basis).

Other Considerations

There are no other considerations related to this requirement.



3.3 Serialize the Original and Duplicate Units of Storage Media

Compliance Requirement 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 2001 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.”

While this requirement is thought to be more pertinent to tracking the individual units of media related to micrographic storage, the Rule may be satisfied for electronic records by capturing index or metadata associated with each electronic record that: a) “uniquely” identifies the record, and b) associates a “date of recording” with each record.

Compliance Assessment

Cohasset believes that Centera CE+ meets the SEC requirement to serialize both the original record located in a primary system as well as each disaster recovery record located in a geographically separate location.

Centera CE+ Capabilities

Each record written to Centera CE+ has a date/time stamp and a unique identifier that is contained in the C-Clip. In addition, each record that is copied to a second Centera CE+ system or to compliant disaster recovery media, such as non-rewriteable magnetic tape, has its own unique identifier and date/time stamp.

Other Considerations

There are no other considerations related to this requirement.



3.4 Store Separately a Duplicate Copy

Compliance Requirement 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.

The intent of this requirement is to provide an alternate storage source for accessing the record should the primary source be compromised.

Note: A “duplicate copy” is different from a backup copy in the sense that the duplicate copy is the recording of a real-time copy of the record or recording a one-for-one “journal” copy of the record that is never overwritten or erased. Backup copies, on the other hand, may be overwritten as they are “rotated” on a periodic basis.

Compliance Assessment

Cohasset believes that Centera CE+ complies with this SEC requirement by providing the capability to automatically write a copy of the records to a second, geographically separate Centera CE+ system.

Centera CE+ also supports having the records copied to another compliant media that can serve as a “disaster recovery copy.”

Centera CE+ Capabilities

As an internal means of providing a duplicate copy for disaster recovery purposes, Centera CE+ automatically mirrors each object or record within every Centera CE+ system.

Centera CE+ also provides for the automatic copying of records to a second, geographically separate Centera CE+ unit to maintain “on-line” availability across multiple sites. Should a second Centera CE+ unit not be employed, the records and associated C-Clips can be copied to “off-line” compliant media, such as write-once magnetic tape, which can then be stored in a geographically separate location from the primary Centera CE+ storage system. To retrieve these records, however, the records and related C-Clips first must be restored to Centera CE+.

Other Considerations

There are no other considerations related to this requirement.



4. Requirements of the Rule that are Supported by Centera CE+ Capabilities

The following requirements of Rule 17a-4(f) are not the direct responsibility of Centera CE+. These requirements are, instead, the responsibility of either the application software or certain broker-dealer processes and procedures. Meeting these requirements, however, is supported by applying the capabilities of Centera CE+.



4.1 Readily Download Indexes and Records to Any Acceptable Medium

Compliance Requirement 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 Commissioner or the self-regulatory organizations ["SRO"] of which the member, broker, or dealer is a member.

The intent of this requirement for downloading indexes and records to an acceptable medium is designed to provide the SEC with the ability to request a broker-dealer to offload the records and associated indexes from the primary storage medium to a medium acceptable under the Rule, e.g., micrographics or electronic storage media. This would allow the SEC or an SRO to take possession of the downloaded records and indexes and thereby retrieve and view them as they desire.

Compliance Assessment

The responsibility for meeting this requirement lies with the software application, which traditionally contains extensive indexes that are utilized for searching and identifying records to be retrieved. With an EMC approved software application, Cohasset believes that Centera CE+ meets the requirements of the Rule for indexes and records identified during the search process to be downloaded to an acceptable media under the Rule.

Centera CE+ Capabilities

Centera CE+ can support meeting this requirement. This is accomplished via a separate software application, Centera Seek, which provides the capability to create a catalog of indexes based on the C-Clip attributes of each record. In turn, this catalog can be utilized to search for and identify the indexes for selected or all records that are stored in Centera CE+.

Other Considerations

Meeting this requirement is the responsibility of the broker, dealer or member in conjunction with a third party service organization.



4.2 Third Party Requirement

Compliance Requirement 17a-4(f)(3)(vii)

For every member, broker, or dealer using electronic storage media for some or all of its record preservation under this section, at least one third party (“the undersigned”), who has access to and the ability to download information from the member’s, broker’s, or dealer’s electronic storage media to any acceptable medium under this section, shall file with the designated examining authority for the member, broker, or dealer the following undertakings with respect to such records:

The undersigned hereby undertakes to furnish promptly to the U.S. Securities and Exchange Commission (“Commission”), its designees or representatives, upon reasonable request, such information as is deemed necessary by the Commission’s or designee’s staff to download information kept on the broker’s or dealer’s electronic storage media to any medium acceptable under Rule 17a-4.

Furthermore, the undersigned hereby undertakes to take reasonable steps to provide access to information contained on the broker’s or dealer’s electronic storage media, including, as appropriate, arrangements for the downloading of any record required to be maintained and preserved by the broker or dealer pursuant to Rules 17a-3 and 17a-4 under the Securities Exchange Act of 1934 in a format acceptable to the Commission’s staff or its designee. Such arrangements will provide specifically that in the event of a failure on the part of a broker or dealer to download the record into a readable format and after reasonable notice to the broker or dealer, upon being provided with the appropriate electronic storage medium, the undersigned will undertake to do so, as the Commission’s staff or its designee may request.

The SEC’s proposed language for the escrow and Third Party requirements of Rule 17a-4(f) was copied virtually unchanged from the original No-Action Letter issued in 1993. In the No-Action Letter, the SEC noted:

The proposed conditions also are designed to provide access to information preserved in optical disks [or other compliant electronic media] when the broker-dealer is no longer operational, when the broker-dealer refuses to cooperate with the investigative efforts of the Commission or the SROs, or when the optical disk [or other compliant electronic media] has not been properly indexed as to its entire contents.



Compliance Assessment

The responsibility for meeting this requirement lies with procedures of the broker, dealer or member and their contracted third party organization to represent to the SEC or SRO that it can provide the required services.

In a disaster situation where the software application and associated indexes provided to the third party are not available, or where the third party was not able to respond with their normal recovery services, Centera CE+ provides an alternative capability, Centera Seek, which can support meeting this requirement, as described below.

Cohasset believes that, given proper notification to the SEC or SRO by a broker, dealer or member and their contracted third party organization of their planned utilization of Centera CE+ at some time more than 90 days in the future, this requirement of the Rule will be satisfied.

Centera CE+ Capabilities

A separate software application, Centera Seek, provides the capability to create a searchable database using the attribute information stored in Centera CE+ C-Clips. Once the search database has been created, records stored on Centera CE+ can be searched and retrieved for viewing or reproduction purposes, independent of the business application that originally stored the records on Centera CE+.

Other Considerations

Meeting this requirement is the responsibility of the broker, dealer or member in conjunction with a third party service organization.

