Mailers' Technical Advisory Committee
Address Quality Methodologies

Anchor ComputerMTAC Workgroup 97
Addressing Quality Methodology

Preface

Undeliverable-as-Addressed (UAA) mail costs the United States Postal Service® approximately $2 billion each year, as likely twice that amount to the industry. The amount of mail pieces that contribute to this cost exceed five billion annually and that number is expected to rise unless proactive measures are put in place to reduce the volume and cost of this UAA mail.

The Postmaster General, John Potter, has called for a 50 percent reduction in UAA mail by 2010. In response to this challenge, the Mailers Technical Advisory Committee created a workgroup to focus on address methodologies and to present a list of best practices that would aid in the reduction of UAA mail. This document represents the effort of this workgroup and its thirty contributing members.

The following twenty-seven best practices represent short, medium, and longterm approaches to improving address quality. Where applicable, efforts have been made to provide a quantitative approach to identifying the tangible benefit of applying these best practices.

It is the suggestion of this workgroup that these best practices be shared with the industry at large via several suggested methods including educational venues as well as marketing efforts. It is further suggested that, where noted, some of these best practices should evolve into larger recommendations for adoption by the industry and/or the USPS®.

The co-chairs for this workgroup would like to thank the members for their outstanding contributions in creating this document. We suggest that MTAC members review the contents of this document and implement the short-term suggest practices immediately as well as continue research and implementation into some of the long-term solutions.

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USPS Co-chairs: Jim Wilson, Wayne Orbke

The implementation of best practices in address quality can range from low impact to high impact and with an associated cost of low to high. The following graph is intended to illustrate the impact of implementing the various best practices provided in this document.

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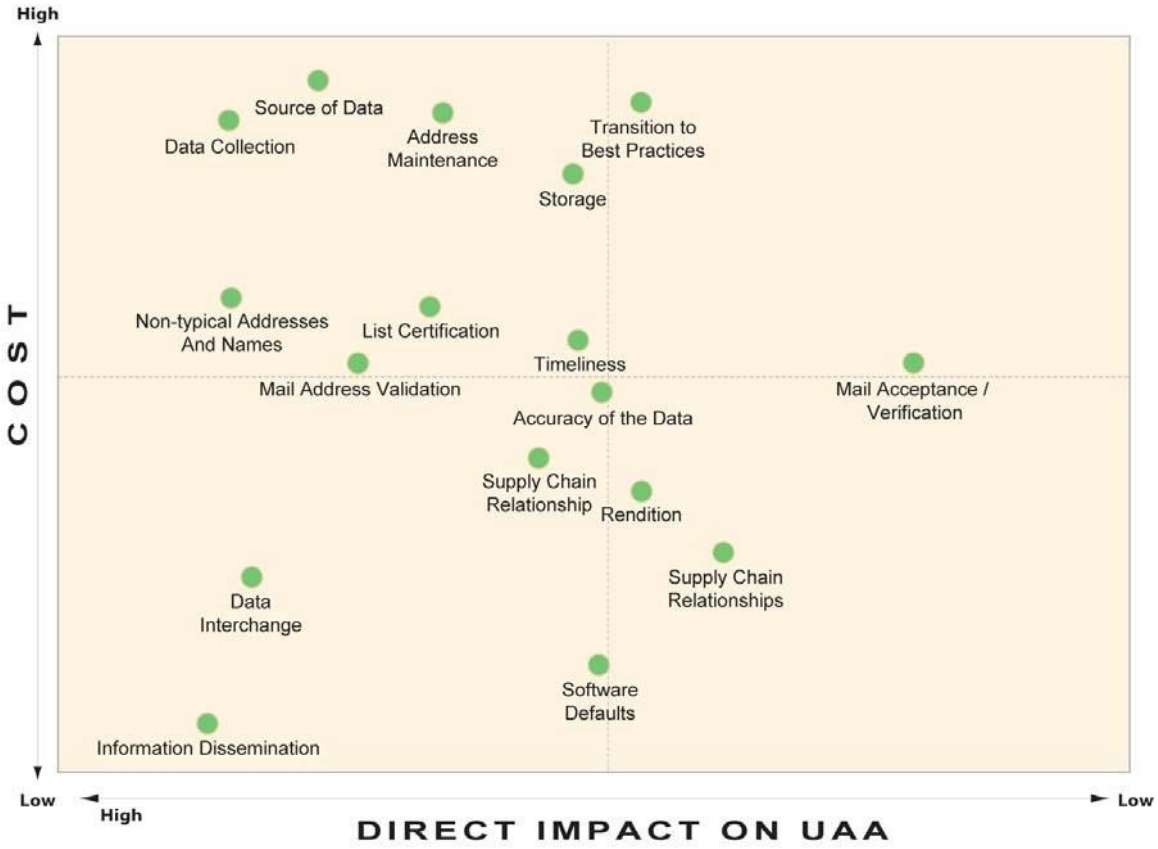

The following items have been identified by this workgroup as best practices for address quality. Each best practice has been assigned a category, a definition, identification of current practices within the industry, and suggested best practices for improved address quality.

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1. Rendition

Category: Standards

Definition: The process through which the address data is formatted for presentation for a specific medium (which may be a mail piece). This includes abbreviation, order and placement of address elements. An industry standard of 30 characters per line exists with 99.2% of current addresses fitting into this space.

Current Practice: Mailers are concerned about their ability to provide fully standardized addresses. Addresses in existing legacy systems may have a ZIP + 4® code but not necessarily meet the USPS definition of “complete and correct address". Many mailers have difficulty in modifying individual address elements or adding missing elements to addresses in an existing file. Many mailers do not allow the output from the CASS™ validation to be presented into the physical address components presented onto the mail.

Best Practice: Use the output from the CASS validation tool to present the corrected address and standardized address onto the physical mail piece. Use the postal standardized address whenever possible. CASS certified software should follow the guidelines established in PUB 28 (https://pe.usps.com/cpim/ftp/pubs/Pub28/pub28.pdf) for abbreviation of address components in order to accommodate the address space specified by the user. If a significant number of addresses require abbreviations it is indicative that the space allocated for the address component is inadequate. This is most common when databases have been designed to meet the constraints of an address labels.

Recommendation: The USPS and the industry should continue their progress toward standardizing on a 30-character output for all address related products. Five lines of customer name & address data are recommended to ensure all data components can be presented. CASS software vendors should develop abbreviation logic to be certified by the USPS for addresses that have been shortened to fit in fields less than 30 characters per line.

2. Data Storage

Category: Storage

Definition: Data storage refers to how name and address elements and related information such as documentation of address hygiene performance, are stored in a persistent manner, so as to be available for various task related to mailing and mail production.

Current Practice: Presently, strung with defined line content is the best and most supported format. In using any format adequate space should be reserved for the field or line to contain at least the fully standardized field or line. Confusion currently exists around secondary data elements storage and presentation when an address length does not allow the complete address line. Secondary address components are many times stored on a line below the primary address line due to limitations or business practices.

Best Practice: Best practices for data storage is to include the ability to store the data at levels of granularity sufficient to meet practical needs such as rendition, comparison, matching and detection of missing items. The ability to store data at multiple levels of granularity is also desirable provided that business rules concerning which data values depend upon other data values have been defined. For example, changing address elements may require changing the ZIP Code, and that in turn may require changing the documentation of when and how the address was updated, or specifically how the ZIP Code was obtained. The data about the names and addresses, not actually name and address data itself can be referred to as metadata.

Also, data storage systems should permit file updates to be permanently retained. If there is a need to retain original input data, then this should also be available as a feature of the systems. In addition to storing

elements, there may be a benefit from storing composites, even whole renditions provided that they have a "freshness" date attached.

Recommendation: For new system development, use the ADIS specification (Address Data Interchange Specification as outlined by the IDEAlliance at http://www.idealliance.org/adis/) for recommendations on the finest depth of data storage needs.

3. Data interchange

Category: Exchange

Definition: Data interchange pertains to the exchange of name and address data among parties in the mailing industry or between mailers and the postal service using an agreed upon format.

Current Practice: Address lists have traditionally been exchanged without reliable information concerning the quality of address lists, even on the basis of characteristics of the list as a whole. Correct and complete positioning of data elements becomes a challenge due to the various formatting requirements between mailers, vendors & USPS.

Best Practice and Recommendation: Best practices in this area include the ability to exchange name and address elements as well as full renditions, the ability to exchange metadata concerning names and addresses, including data identifying the address quality performances and the resulting quality status, and the tagging or other means of identifying element by element information using standardized naming conventions.

Best practices also include the ability to exchange data quickly and efficiently without the need for the receiver to convert the data to another format and with some degree of protection against transmission errors.

A better practice is to have available documentation of quality characteristics of the list as a whole, including NDI ratings or the information available from Form 3553. A best practice is to have this data stored on an address by address basis as well as on a list by list basis, so that each address carries its own quality portfolio documenting the status of the address as complete and correct or otherwise, dates of move updating, and dates and sources of postal codes such as the DPBC and carrier route code. This would allow renting lists on a "ready to go" basis so that they could be directly incorporated into mail production, at least

prior to some specified expiration date, without the need for further address hygiene activities.

4. Data collection

Category: Data Collection and Acquisition

Definition: Data collection refers to the initial acquisition of name and address data, whether through the Internet, telephone, fax, hard copy, mail, or other means. The data may be acquired directly from the potential recipient of mail, or indirectly through third parties.

Current Practice: Failure to capture a complete and accurate address is a problem for the USPS and Mailing Companies. Mailers often only use batch versions of address cleansing tools after the data has been acquired, and thus are losing the opportunity to query the data provider for corrections or missing information.

Best Practice: Best practices in data collection depend upon introducing at the earliest possible stage, and preferably in real time (first-time), a means to validate and confirm the name and address elements. This includes the ability to make any necessary changes or additions, based on information from the primary source, and before the name and address elements are placed in persistent storage. This should include a DPVbased Address Validation interface for all address capture systems, which is currently considered best practice.

Recommendation: Clarify existing standards for abbreviations. DPV and other transactional address cleansing tools should also be leveraged at the point of data acquisition, where feasible. Records that cannot be coded should be flagged for further additional action.

5. Mail Address Validation

Category: Verification

Definition: Mail address validation involves using an approved industry process or tool to validate the correctness of the address prior to submitting it to the USPS for verification.

Current Practice: The current practice for validating mail addresses involves using only CASS certified software. This is often done days, weeks, or even months before submitting the addresses for USPS

verification. The lapse in time and limited application of data cleansing often results in addresses that are non-deliverable.

Best Practice: Best practices for mail validation would include implementing a just-in-time approach to validating mail addresses. This would involve CASS certified software, Delivery Point Validation (DPV), and LACS^{Link}.

6. Mail Acceptance and Address Verification

Category: Verification

Definition: Mail acceptance and address verification refers to the activities of a postal service or other agency in receiving items with names and addresses, making sure that the physical and informational properties of the items meet requirements, and if relevant, determining rate eligibility.

Current Practice: No current USPS practice can validate an address to ensure that name and address components are complete and correct, that the Delivery Point Bar Code corresponds to the address components, and that timely move updating has been performed.

Best Practice: Best practices include the ability to examine the name and address data for each mailpiece, to detect errors both in content and in procedures followed, to minimize any unneeded efforts in delivery and to ensure that any preferential rates have been earned.

Since it may be difficult or impossible to physically examine all of the submissions, sampling may be used to gather data. Within the category of sampling, in-line sampling may be more efficient than off-line sampling, and automatic sampling may be more consistent than manual sampling. No matter what sampling method is used, mailers want to be assured that if their entire mailing meets standards, they are not at risk of penalties due to accidental characteristics of the sample.

To meet these requirements, the capability should be developed for the USPS to compare an address on a mailpiece to a securely coded representation of the address data and related data such as processing dates, database dates, and freshness dates. This can ensure that the certified address quality processes have been followed, that alterations have not been made and that timeliness requirements have been met.

The USPS should ensure that tools are available either directly or through vendors for use by mailers to evaluate address quality of their own files in a certified environment. This capability should be available prior to implementation of any USPS requirement for complete and correct addresses.

The issue of mailer risk from sampling could be eliminated if a means were developed to include secure codes in a four-state or two-dimensional barcode on each mailpiece that would verify that the address used was exactly the same as the address obtained in a certified environment, and also that the date was within range in terms of freshness. The issue would center not upon what the USPS considers correct at the time of verification, but only on whether the mailer faithfully reproduced what was defined as correct as part of a certified address quality process performed in a timely manner. However, mailers may be concerned with the need for a second four-state code or a two-dimensional barcode to be included on the mailpiece.

The mailer or agent could send names and addresses through a certified process and create a mailing which is submitted to the USPS, while at the same time placing an electronic standardized address file in escrow. In the event a MERLIN type device or any USPS equipment detects address errors, the four state barcode on the mailpiece need only identify the mailer and agent uniquely, and this enables an optional process to verify address quality. The mailer asks the USPS to verify that the escrowed file does match the physical mail, and if it does, verify that the escrowed file has not been altered in any way, and if it has not, check to see if the entire file meets applicable criteria including any tolerances. If the entire file meets the applicable criteria, the address quality for the mailing is then proven to meet standards. This model does not require that data be sent to the USPS but only that it be made available for inspection.

This process can also be designed in such a way as to prevent statistical risk for mailers and eliminate the need to argue about individual cases. This can be done by storing the security codes along with the name and address in the electronic file that has been placed in a 90-day escrow. Then there is no need for a second four-state code on the mailpiece just to carry along the information needed to confirm that the name and address has not been altered.

As a further enhancement, if the mailer is able to place an electronic standardized address file in escrow, this can normally be accomplished prior to mailing. That makes the information available slightly ahead of real time. In this option, the USPS at its discretion scans the mailing file in

escrow and may detect address quality defects prior to mailing. This could be part of verification within the PostalOne! environment. It would not prevent the need for supplementary validation of physical mail, but by using just one four state barcode on the mailpiece with unique identifiers, the physical and electronic processes can be linked together.

7. Non-typical addresses and names

Category: Management

Definition: These are address types that include multicultural, dual, military, multiple secondary, firms, dual use, colleges and universities, prestige, and geographic addresses that have attributes such as leading zeros. These non-typical addresses can complicate issues including collection, matching, storage, and rendition.

Current Practice: Although it appears that both USPS and private software company data files have been enhanced to improve coding results for addresses in Puerto Rico, mailer files are still coding significantly less than the code rate for continental addresses.

Inclusion of Extraneous or Inaccurate Information: Problem: Business addresses tend to have more address elements as well as extraneous (non official postal delivery) data in the address database fields. The presence or absence of these additional data as well as the absence of additional space to house this extraneous data inhibits proper coding. Businesses are reluctant to change current practice and remove elements that are considered important for internal mail delivery practices.

Best Practice: Best practices in this area include storing name and address elements using a methodology that retains positional information, such as pre-directional and post-directional. Additional fields may need to be defined, such as multiple surnames and surname prefixes. It may then be necessary to concatenate fields in order to match to databases that may combine multiple elements into a single field, but this is easier than parsing a single field to match to multiple elements.

With parsed address elements it is possible to validate an address and render it in the customer-preferred manner or the postal preferred manner. However, today most addresses are not presented in a parsed manner so the best practice is to use the address as returned by address matching software. As for names, the best practice reserves sufficient space to

store longer names and store them in the order of their cultural preference (not all cultures put the given name first).

Recommendation: All additional data elements, not used to match for the address records, should be maintained by the CASS vendor products in an auxiliary file. This data should be allowed to be presented onto the physical mail if the mailer deems this necessary for internal mailing delivery. Puerto Rico: Education, awareness and additional space in the address database for the extra elements (such as Urbanization codes) critical to PR addresses.

8. Timeliness of the data / just in time processes

Category: Management

Definition: This topic includes meeting and exceeding the requirements for updating name and address files with respect to coding, address accuracy, and move updating.

Current Practice: When most CASS certified systems were installed, the intent of this requirement was to place the ZIP + 4 and Delivery Point Barcode onto a physical mail piece. With the improved understanding of addressing – it has been determined that the frequency and process for performing CASS updates has increased. In addition, other tools to enable improved addressing capabilities have been developed and provided to the mailing community.

Best Practice: Best practices include performing address hygiene activities as close as possible to the time of mailing. Based on move update statistics, 400 to 500 of every 1,000,000 names and address records can be expected to be recorded as moves, on average, each day of the year. So if the file is updated three weeks before the date of mailing, 10,000 out of a million may require additional work to deliver. While requirements may be 90 or 180 days before mailing, mailers may be able with special efforts to do much better than this.

Addressing updates need to be validated and communicated timely. USPS AMS/CASS Database updates need to be provided with greater immediacy and in an electronic download could allow for quicker dissemination of updates into mailer systems. New or removed addresses added to the AMS database need to be validated. As ZIP Codes or other address data elements are added or deleted, these need to be communicated in a more timely fashion to mailers.

Ensuring the quality and all required components of address data, as it is passed through various systems to the downstream production, is critical.

Recommendation: It is important that if address data components are changed at the back-end process, just prior to mailing, that the corrected elements are provided back to the source database for correct updating of the customer address data.

9. Transition to best practices

Category: Management

Definition: This topic reflects the difficulties of making changes all at once to existing procedures in name and address quality in an environment with many interacting suppliers and frequent mailing events.

Current Practice: Implementing a data quality solution, in this case an address cleansing solution is often done with only an upfront cost in mind. The budget for the address cleansing solution is often placed solely upon the IT department or the mail center rather than considering the impact data quality will have on the entire organization. As such, implementations are often rushed with crucial steps overlooked or forgotten. This ultimately results in more costs and further delays.

Best Practice: Best practices in this area may include developing timelines to meet expected increases in postal requirements, establishing new methodologies outside of legacy systems, and gradually moving applications to the new approach. In some cases, a cutover from an old to a new system may be accomplished, but in this situation, the ability to roll back should be provided for.

The return on investment (ROI) needs to be considered for transitioning to best practices. Both the industry and the USPS need to be mindful of where the key areas of costs and returns are related to transitioning to a best practice,

10. Accuracy of the data

Category: Management

Definition: Address accuracy is best defined as the application of address cleansing tools, including move update, to yield a complete and correct

address. Address accuracy includes ensuring all address components, critical for mail delivery are presented on the physical mail piece.

Current Practice: The postal database must satisfy criteria including internal consistency, unique definition of each delivery point, and timely addition of new delivery points. Further, there may be non-postal delivery addresses that are not necessarily defined in any database outside of proprietary applications.

Accuracy of move updates can be verified by reference to postal databases, but this is subject to earlier availability of information through direct customer communications or commercial databases. Postal databases should be maintained by checking moves both at the old and new address.

Best Practice: Best practices in this area include using delivery point matching (DPV or DSF^2) to verify address accuracy and both pre-move tools such as NCOA^{Link} and post-move tools such as ACS to verify move updates.

Recommendation: At the initiation of a new address, capturing of the address data between the municipalities and the USPS needs to be strengthened so new address data points are consistently validated and updated in all areas.

11. Information dissemination

Category: Management

Definition: This topic relates to how and when information is disseminated throughout the industry and the USPS. It includes such subtopics as disaster response, new addresses, never delivered addresses, vendor communication, and other issues.

Current Practice: Currently the mailing industry is not provided information on non-delivery points or temporary moves during times of disasters or massive address changes.

Best Practice: The best practice is where the mailers and the USPS work together to minimize the impediments to mail delivery. This would include the sharing of crucial information in a timely manner for expedited updates to the industry. Consistency in the message is vital here to prevent further disruptions.

Recommendation: An MTAC workgroup should be formed to focus on the methodology and implementation of best practices in information dissemination for both intermittent, emergency situations such as hurricanes, as well as continual communication, non-emergency issues such as network alignments.

11.1 Disaster response (ex. hurricanes Katrina and Rita)

Category: Management (Information dissemination)

Definition: The dissemination of information during a disaster is crucial to the mailing industry as well as the Postal Service. The application of best practices here will not only ensure timely mail deliverability, but also help prevent additional costs incurred with routing of mail to avoid the disaster areas.

Current Practice: Presently, information related to disasters is provided through various methods and from numerous sources. These include the USPS web sites, mailers newsletters, vendor notifications, and industry association web sites and list servers. With information coming from so many sources, there are issues related to timeliness and accuracy of the data, particularly in rapidly developing disasters such as a major hurricane.

Best Practice: Provide the industry with information, via a flag, related to temporary moves filed for customers within NCOA^{Link}. This will enable the ability for mailers to proactively manage customers that may have a temporary move on file. Provide the industry with information regarding a non-delivery point, following any known disaster. This enables mailers to clearly identify those locations where mail can no longer be delivered.

11.2 Measurement / metrics

Category: Management (Information Dissemination)

Definition: Measurement and metrics are a part of the software process (for CASS and PAVE certified products) and the Postal validation procedures. This may also be expanded to include either mailers software procedures or address lists.

Current Practice: As discussed above with regard to data interchange, address lists have traditionally been acquired without reliable information

concerning overall list address quality. A basic metric is to document quality characteristics of the list as a whole, including NDI ratings or the information available from Form 3553. This can be compared with various system-wide or segment-wide averages to gain an index of relative quality.

Information on CASS and PAVE certified product changes should be more readily available for mailer management teams regarding the vendorrequired changes imposed by the USPS for future cycle releases.

Best Practice: USPS and the industry should develop an improved communication strategy regarding CASS & PAVE certification changes – to ensure that mailers can accurately test and validate measurement changes within products to ensure data integrity and accuracy of match assignments. Disaster related metrics should also be shared with the industry as a means to provide context to the information provided.

12. Supply chain relationships

Category: Management

Definition: The Supply chain relationship encompasses the entire value chain of entities involved in order to produce a complete and correct address. This includes entities such as list providers, service bureaus, mailers, the USPS, and software vendors.

Current Practice: There are often many different entities that touch, store, or move address information throughout the supply chain. Often, there is a false assumption that the address is correct as it travels from one entity to another.

Best Practice: A best practice approach to supply chain relationships is to understand which entities handle the address and what processes are involved at each step. PS Form 6014 is a good example of a statement that identifies which company performed an approved move update on the address and at what date.

Other best practices include software evaluation when selecting a new address quality solution and software testing when applying an update to address quality software.

12.1 Software Evaluation

Category: Management

Definition: Software evaluation best practices may be developed both for assisting customers in purchase decisions among products with similar capabilities, and in using other developed best practices to identify products with more relevant capabilities than others.

Current Practice: The current practice for software evaluation is often done through word-of-mouth recommendations via forums such as list serves, postal customer councils, or industry associations. Software selection can also be done by contacting companies listed on the RIBBS web site (http://ribbs.usps.gov).

Unfortunately, while there are many certified software products available, there can be significant differences in their features, functionality, price, and support. Often, price is the only factor considered with little or no thought toward growth opportunities for future expansion.

Best Practice: A software company and the solution they provide needs to be thoroughly evaluated prior to licensing and implementing their solution. Appendix A provides a list of questions that should be considered when evaluating software.

12.2 Software Testing

Category: Management

Definition: Software testing in this document refers to understanding the impact a software update may have on your current addresses.

Current Practice: The current practice is to simply install software updates without fully understanding the impact it may have on the overall address quality.

Best Practice: A best practice would be to carefully review the software update release notes and follow a process of evaluating the update prior to implementing. Appendix B provides a thorough list of points to consider for software testing.

13. Address maintenance process

Category: Management

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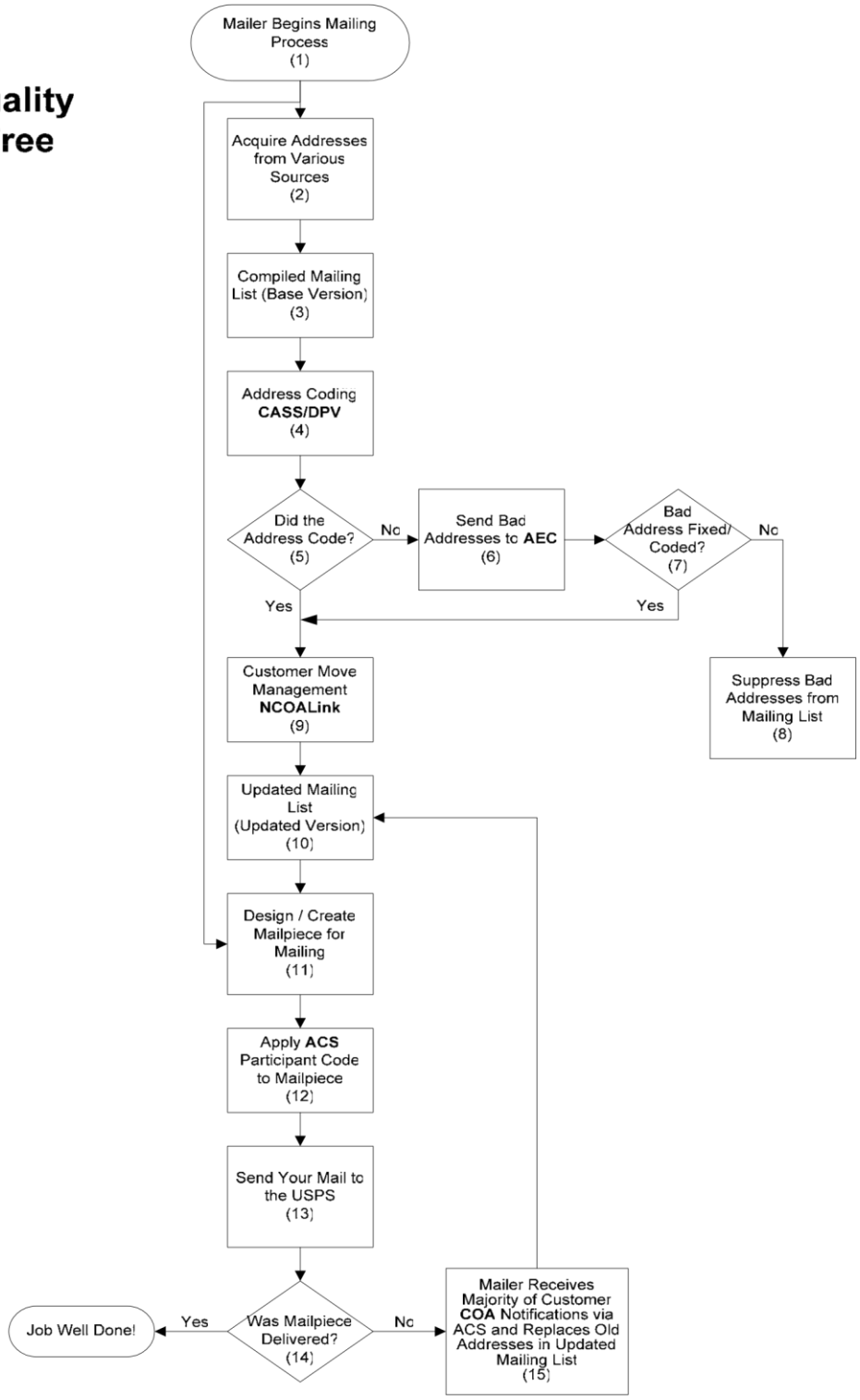
Definition: The process by which previously collected information is kept current.

Current Practice: The current practice for address maintenance varies considerably throughout the mailing industry. For mailers who rent lists, often the only maintenance applied is running the addresses through a CASS certified product and applying Address Correction Services during the mailings. In these instances, the updates are often not sent back to the list owner.

Best Practice: Data should be run through CASS/DPV/NCOA^{Link} immediately prior to any mailing. Keep the original address if it is still needed, but as a matter of best practices, you need to keep the new information. Consider the application of the following flow chart.

Recommendation: It is important that if address data components are changed at the back-end process, just prior to mailing, that the corrected elements are provided back to the source database for correct updating of the customer address data

Basic Address Quality Decision Tree



13.1 Management of un-assignable addresses

Category: Management (Address Maintenance)

Definition: Un-assignable addresses are defined as those addresses that have gone through a CASS certified and DPV validation process without finding a match, no ZIP + 4 assigned, no delivery point validation, or not considered a valid address. CASS will look at the address, but can't take any action.

Current Practice: There is no widespread Industry best practice in place at a transactional or batch level for assignable addresses. It's unknown what mailers do to evaluate un-assignable addresses. It's assumed that they mail at full rate or pre-sort at the full rate or determine not to mail. Most mailers don't know what level of evaluation their company does to identify root cause for un-assignable addresses. As a last resort, the Mailer initiates customer contact to get resolution.

Best Practice: Address accuracy should start at the first inception of the address – and when it doesn't CASS & DPV code it should be highly questioned before allowing posting to a mailer database.

The primary objective is never to have an un-assignable. All mail is run through a CASS certified/ DPV validation process. An assignable address is defined as an address that goes through a CASS certified and DPV validation process, which results in a ZIP + 4 and an 11-digit delivery point barcode.

Appendix C of this document provides suggestions for mailers, the USPS, and vendors to consider for management of un-assignable addresses.

13.1.1 Selection of quality addresses

Category: Verification

Definition: The process of selecting and assessing the accuracy, currency and value of addresses from a given source.

Current Practice: The current process of selecting quality addresses is often left to those addresses that can be assigned a ZIP + 4 Code through CASS certified software. This provides a false assumption that the address is truly deliverable and current.

Best Practice: The best practice in quality address selection involves processing the list through a data profiling tool, identifying those addresses that meet a particular business need based upon defined rules and are truly deliverable (pass DPV) by the USPS.

13.1.2 Carry through address matching dates and return codes

Category: Management (management of address qualification information)

Definition: Data carry through is the practice of carrying address information, return codes and dates from the CASS address matching process so that it is possible to distinguish addresses that have met the postage discount requirements from those which do not meet these requirements.

This topic applies particularly for unassignable addresses where the combination of data elements is not complete and correct. It also applies to addresses that may not meet the processing date restrictions for postage discounts.

Current Practice: Today address data may be passed through CASS address matching software and both good and bad addresses may be written to a single output file containing all of the addresses(both good and bad). This output file is then carried through to another software package for mail sortation and some of this address data may be incorrect but there is no process by which the bad addresses can be detected.

In CASS software there are available both dates and return codes that indicate when addresses were CASS processed and what happened during this process. These dates and return codes would identify corrected/confirmed or rejected address information. However, this information is not retained on the database or on address files. Therefore, the mail sorting software is unable to determine whether a given address is good and actually qualifies for a class of mail or a postage discount.

Best Practice: Dates and return codes are a way of tattooing data so that each time it goes through a certification process it carries indicators of when it was processed and of the quality of the address data. This would have implications for the NCOA^{Link} output, as well.

PAVE software could be modified to require the date of processing and return codes from CASS software to properly sort for postal discounts. Therefore, the dates and return codes would have to be passed on each address record from CASS on into PAVE. The actual counts of good and bad return codes and dates within the qualification period could even be a

required field on the 3600/3602s so that there would be human readable support for discounts claimed.

Knowing the number of addresses that cannot be mailed at a discounted rate would facilitate determining an ROI for the cost of improving the address quality. The return code information could also be leveraged for other uses such as creating a do not mail file. These identifiable addresses could be included in first class mailings at a single piece rate to solicit correct address information from the addressee or by using ACS to further address clean-up efforts. The return codes information could also be used to facilitate resolving unmatched addresses by identifying the missing or incorrect address elements.

13.1.3 Carry through of additional supporting address data

Category: Data Management

Definition: Carrying through information can also include additional address information that is not necessarily needed to match or assign the delivery point barcode. This would include such items as additional or supporting secondary information. An example would be having both a building number and a suite number or both a floor and a suite.

Current Practice: The CASS system does not allow for using or carrying through any additional secondary unit information. The result is that if your address contains both a building number and a suite number only one would be retained in the address and the other piece of information is dropped.

Best Practice: CASS software should be able to detect when the additional information meets the criteria for secondary information, then there ought to be a separate field for secondary information instead of just a general field for unidentified additional information. So if we choose to display it in the address lines, we'll know where it would be appropriate to put it.

13.2 Management of undeliverable addresses

Category: Management

Definition: This includes the return of the mail piece to the mail owner for various reasons: address quality, customer moved, error by company, customer, or postal service. Management of the process includes actively

reviewing, investigating, and resolving addresses to move from an undeliverable to deliverable state. This includes evaluating specific types of mailing, specific outcomes and available feedback.

Current Practice: There is no known industry-wide practice to manage UAA by identifying root causes and/or determining actionable items to reduce UAA.

Best Practice: Best practices for managing undeliverable addresses should include pre-mailing and post-mailing move update processing. It should not be limited to software processes, but also should discuss possible human intervention, which could mean additional processes such as phone calls, and/or criteria for human interpretation of unclear outcomes.

Best Practice UAA Management Processes include:

Mailers:

- CASS/DPV software is incorporated in front-end processes that identifies an address as undeliverable, prior to mailing, and captures only valid, USPS compliant deliverable addresses.
- Move-Update processing used with both pre and post mailing processes to ensure customer moves are updated appropriately.
- Mailers actively participate with the USPS and mailing industry to understand UAA root causes and develop strategies for resolution.
- Mailers report reason codes and % of UAA so common approaches to UAA management and tracking is supported industry-wide.
- Automated returned mail processes allow for easily tracked and reported UAA to customer care systems, as appropriate.
- Electronic use of various address products and other sourcing data enables high resolution of customer address information.
- Investigation and customer contact for resolution of UAA may be required.
- Address resolutions are updated to source data points.

USPS:

- ③ USPS has established policies for Delivery Offices on how to appropriately handle undeliverable-as-addressed mail.
- ③ USPS performs quality reviews of Carrier Throwback Cases to ensure consistent and accurate mail delivery. Management incentives include quality of delivery indicators to drive improved measurement and delivery quality.

- ③ USPS provides UAA reason codes that are meaningful and accurately reflect the reason for the return.
- ③ USPS provides Mailers with feedback information on problems related to unique mailing or addressing issues.
- ③ USPS actively works with mailing industry to understand UAA root causes and develop further strategies for resolutions. USPS performs studies and assists Mailers with investigation of UAA root causes.

Vendors:

- ③ Create more robust solutions that will reduce the number of software applications required to address un-assignables.
- ③ Develop products that can be utilized in a transactional-based format, over just batch formats.

Recommendations:

- ③ Whenever feasible, Industry Mailers need to incorporate software into their front-end processes that identifies undeliverable addresses, prior to mailing, and moves to capture valid addresses.
- ③ USPS needs to develop procedures, with Industry Mailers, aimed at reducing UAA.
- ③ Include USPS Delivery Office personnel on creating policies so carriers and other postal employees know what policies to follow.
- ③ Throwback case quality review should occur to ensure USPS carriers are accurately delivering mail that is deliverable.
- ③ USPS and the Industry Mailers need to further define the reasons for returns codes.
- ③ USPS needs to provide defined processes with marking return reason codes and ensure appropriate discipline to ensure accuracy of reason codes are used.
- ③ USPS and Mailers need to develop and utilize the feedback loop to improve methodologies and procedures around return mail.
- ③ The sub-team encourages the USPS and Industry Mailers to work towards mutual goals to enable improvement in the return process. Use of commonly defined return mail categories can assist mailers in quantifying UAA return reasons. Additional support by the USPS is required to investigate unknown causes of UAA.
- ③ Mailers and USPS to study and evaluate UAA based on common characteristics and provide details on root causes. Use of the attached tool should be evaluated:
- ③ Identify “Best of Class” mailers to further educate and level set other mailers on where their performance stands on returns. We

recommend that USPS conduct an industry survey to evaluate what is “Best of Class”.

- ③ One saturation mailer noted 3.4% returns due to vacancy rates

13.3 Management of un-assignable addresses due to change of address

Category: Management (Address Maintenance)

Definition: This can be characterized as a workflow for managing addresses through a Move Update process including both pre-mailing solutions like NCOA^{Link} and post-mailing solutions like ACS.

Current Practice: There is no widespread common industry practice in place. Some mailers may choose to mail at full rate, others initiate a direct customer contact to obtain current information.

Best Practice:

- ③ In the best of scenarios, the mailer will send all addresses through a CASS certified software with DPV integrated and use the return codes to further investigate and analyze non-coded records.
- ③ Utilize Address Element Correction (AEC) software, where legally applicable.
- ③ USPS needs to consider all possible methods of communicating the need of Change of Address (COA) filing for citizens and business. Suggested channels include: existing advertising, special arrangements with developers and politicians, Internet and other media.
    - Example of a good practice was the disaster planning between industry and USPS to remind customers to complete a COA
    - Consider allowing citizens to file a move more than 30 days in advance
- ③ Other consideration is to ensure that the COA forms are available in various languages for those customers that don’t speak English. Offer education in numerous languages.
- ③ The workgroup noted that there is the absence of a COA that creates a return but also an additional layer, where the original person who lived at a delivery point moves and files a COA, but the person that moves in with the same last name fails to file a COA. (High-density ethnic areas.) The USPS needs to address with customers the importance of filing COA in both instances.

13.4 Use all available data resources to correct "broken" addresses

Category: Management (Address Maintenance)

Definition: The process of identifying addresses that are not code-able or not deliverable and correcting them using all postal and industry resources available.

Current Practice: In addition to the USPS Address Element Correction Service (AEC), a limited number of service bureaus provide address correction using proprietary lists. The price for this service varies as does the source of the data used to cleanse the list. It is presumed that few mailers leverage this service either due to price, time to process, or lack of knowledge.

Best Practice: A suggested best practice in this area would be greater industry awareness of the anticipated results in address cleansing by leveraging these services.

14. Software Defaults

Category: Policy

Definition: This refers to the use of software option settings or license options to ensure that the selection most suited to promote overall systemwide address quality is used unless there is a specific reason to do otherwise. As an example, if DPV processing is considered to be a best practice, the USPS could sign up all software users for DPV processing and then allow users to opt out of it, rather than making it an additional option which requires the user to meet requirements above those for CASS or NCOA^{Link} alone.

Current Practice: The current practice is to set the software defaulted to the options used when the product was CASS certified. Unfortunately, many of these settings are not understood. For example, enabling Early Warning System (EWS) is one option that is rarely enabled and yet can assist in preventing misassignment for new addresses.

Best Practice: Best practices in this area include defaults to user options that promote overall system-wide address quality while preserving user choice. For example, best practices on parameter settings would include enabling Early Warning System (EWS), Delivery Point Validation (DPV), LACS^{Link} processing, and producing return codes for those addresses unassigned.

Some barriers to achieving best practices in software defaults include balancing business needs for improved address assignment with the implications to the overall information technology processing required. There is also the problem of simplifying the understanding of parameter sets while maintaining a competitive advantage across software products.

The USPS has not yet produced a final rule regarding the extension of move update requirements to other mail classes. If there are some reasons to hold back from a class wide requirement in this area, the USPS should consider using a policy default to encourage Standard Mail users to perform move update processing, coupled with options to allow users to forego this processing, which could in turn result in certain consequences based on USPS policies then in force.

15. Source Of The Data

Category: Management

Definition: Source of the data can reflect not only an external list source but also the method of data collection for an internal source.

Current Practice: In some cases, the source of the data used to create or update a name and address record can assist either in verification or even in determining what sort of processing to undertake. For example, knowing that a move update came from the recipient or from NCOA^{Link} might be relevant. In addition, knowing that address data is originated from users directly rather than having gone through validation software may affect the kind of processing needed to match it to name and address databases.

Best Practice: A suggested best practice for data source would be the implementation of a data tag that identifies the source. The tag could include information such as the source provider, contact information, and date.

16. List Certification

Category: Management

Definition: A process by which an individual mailing list and also a list maintenance process can be certified and maintain certification.

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Current Practice: The USPS currently does not certify mailing lists, nor does it certify a list maintenance process.

Best Practice: List Certification refers to a proposed program in which the USPS would certify lists, which meet the highest standards of address hygiene based on current technology and procedures. Other requirements may be added as new address quality tools come on line.

As a best practice, the certified list should be made up entirely of certified addresses with the appropriate performance and status indicators carried within the record as part of the portfolio for the address. To ensure that the highest quality is achieved, certified addresses should be those with no detected deficiencies Non-certified addresses with deficiencies identified during the certification process could be included in a separate list that would not be certified. The separation into distinct files of certified and uncertified addresses provides maximum differentiation based on quality while not restraining commerce.

The certified list would be accompanied by a date of certification, a database date, and a freshness date that would state the last date on which the list could still be mailed without updating the address hygiene. This would constitute the ready-to-go attribute that is part of the work group issue statement. The USPS would determine how many days the list would remain fresh, such as 90 days.

In one sense, a certified list, which is by definition made up entirely of complete and correct addresses that have been recently checked against available databases as specified by postal regulations, stands on its own merits. An address record verified as correct against some set of processes such as CASS, DPV, NCOA^{Link}, and others which can occur concurrently with those listed meets the quality standards. What about the addresses, which end up in the uncertified category? They can be mailed anyway, but may be subject to higher rates or delivery delays, and may be candidates for UAA status. They could be suppressed from mailing. Or they could be sent to further processing steps, not concurrent but off-line processes, which may correct the defects and qualify the resulting, corrected addresses as certified addresses.

As a best practice, a list maintenance system should incorporate such a remedial capability including but not restricted to using AEC I and AEC II and taking a period of months to complete its cycle. This is a best practice in list maintenance because it can produce the largest number of addresses reaching a certifiable status. The certified list maintenance

process may include steps to independently confirm name and address information, and review updates before applying them to the main list. Following is a further explanation of National Delivery Process Certification (NDPC).

Requirements for List Broker to obtain NDPC list certification of mailing list for future sale or rent:

1. DPV process all addresses in the mailing and apply the obtained information to the address list.
2. AEC I and II process all non-matched addresses in step 1.
3. Apply AEC address corrections prior to mailing; delete addresses that cannot be repaired from mailing list. Addresses with defects cannot remain on a certified list, but can be mailed as uncertified.
4. If mailing list contains names, NCOA^{Link} process and update addresses that resulted from first three steps for moves prior to mailing. **
5. To further improve the quality of lists that contain names, List Brokers should also apply Address Change Service (ACS) capability to the lists that they sell or rent and apply the updates received from this post-mailing correction process prior to future sale or rental.

To maintain NDPC certification, no additions or changes, that have not be subjected to all 4 steps, may be made to the list either between steps or after step 4 prior to sale or rent. Date for Move Update and CASS processing for rate qualification purposes would commence on completion of step 4. In addition to NDPC documentation, List Broker will provide buyer/renter USPS Form 3553 (CASS summary report) showing processing results of step 4.

Requirements for Mailers to obtain NDPC mailing certification for the mail that they are presenting to the Postal Service:

In addition to all four steps identified in the List Broker section and applicable DMM requirements for the mailing:

6. If mailing is to be presorted, PAVE-certified software is used.
7. Utilize MQC standards for mailpiece design.
8. Utilize AREP*-based address information representation on mailpieces.

9. If more that 30 days will have passed since NCOA^{Link} processing, when compared to the actual mailing date, reprocess the mailing list via NCOA^{Link} for moves prior to mailing and most recent ZIP + 4 information.
10. Apply ACS to all mail and apply changes as soon as received to address list(s) for use in subsequent mailings.

*AREP – "All Required Elements Present" approach as defined in Product Redesign. **All Required Elements Present (AREP):** All address elements needed to obtain the specific Enhanced ZIP + 4 /DPV match via USPS CASS-Certified Address Matching Software and are represented by the Delivery Point Barcode on the mailpiece will be completely and accurately printed on the mail piece. The use of USPS approved abbreviations to meet this requirement is allowable and must be supported by software vendors.

** NCOA^{Link} processing includes a CASS-certified Address matching process, mailing addresses will be updated with this most recent information.

NOTE: Mailers who have obtained the 99% Annual Internal Move Update process certification will satisfy the requirements of both Pre (NCOA^{Link}) and Post (ACS) Move Update Processes.

The Postal Service will verify List Broker or mailers processes as meeting the highest standards of address quality practices for address hygiene and/or mail preparation (NDPC) and certify them for 1 year. List Brokers may then advertise that they offer lists that have met the NDPC standard.

Mailer will attest on the mailing statement (or on separate USPS form in job jacket) that all of the NDPC requirements have been met for the mailing submitted.

The features of a list certification program should consider one or more of the following alternatives, which involve differing degrees of USPS involvement and differing levels of technical capabilities:

Mailer Self-Certification: This is the minimum level of USPS involvement. The mailer or agent carries out the address quality procedures as defined above, including those that can be done through direct computer processing, and those that require offline activity such as

sending files to an offline process and integrating return data, using vendor software licensed by the USPS and/or USPS products and services. The mailer or agent then affirms to the USPS, in hard copy or electronically, that the procedures have been carried out. This selfcertification is done in such a manner as to serve as a basis for incentives for compliance and/or penalties for noncompliance.

USPS Physical Audit: The mailer or agent carries out the required procedures and creates a mailing, which is processed by the USPS. The USPS at its discretion uses a MERLIN type device to physically verify the address quality. In one approach, the address can be checked to see if it is complete and correct according to USPS information. This could include access to NCOA^{Link} and DPV. Discrepancies in excess of a tolerance level could result in loss of postage discounts. This method has the advantages of being an extension of existing approaches, which have been tested in practice. On the other hand, mailers may be expected to complain that they are assuming statistical risk and might argue about individual cases.

Enhanced USPS Physical Audit: The mailer risk could be alleviated if a means were developed to include security codes in a four-state or other barcode on each mailpiece that would verify that the address used was exactly the same as the address certified, and also that the date was within range in terms of freshness. This is a second approach to the verification. It provides a valid defense to any statistical discrepancies in excess of tolerance that may be detected by a MERLIN type device. However, it may require a second four-state code or a two-dimensional barcode to store the security codes which show that none of the name and address data has been altered.

USPS Electronic Audit: The mailer or agent carries out the required procedures and creates a mailing, which is processed by the USPS, while at the same time placing an electronic standardized address file in escrow. In the event a MERLIN type device or any USPS equipment detects address errors, the four state code on the mailpiece need only identify the mailer and agent uniquely, and that sets up an optional process to verify address quality. The mailer asks the USPS to verify that the escrowed file does match the physical mail, and if it does, verify that the escrowed file has not been altered in any way, and if it has not, check to see if the entire file meets applicable criteria including any tolerances. If the entire file meets the applicable criteria, the address quality for the mailing is then proven to meet standards. This is a third way for verification to work. This model does not require that data be sent to the USPS but only that it be made available for inspection.

As with the Physical Audit, the Electronic Audit can be designed in such a way as to prevent statistical risk for mailers and eliminate the need to argue about individual cases. The security codes generated at the time the list was certified can function in the same way that a twenty-dollar bill can be torn in two pieces with a jagged border and reunited with an assurance that it is the original bill that has been reassembled. In the Enhanced Physical Audit, the security codes were included on the mailpiece in a second four-state code or a two-dimensional barcode. When there is an electronic file in escrow, the security codes can be stored in that file. Then there is no need for a second four-state code on the mailpiece just to carry along the information needed to confirm that the name and address has not been altered.

Enhanced USPS Electronic Audit: As before, the mailer or agent creates a mailing which is processed by the USPS, while at the same time placing an electronic standardized address file in escrow. Normally this can be accomplished prior to mailing, and this enhancement depends upon the information being available slightly ahead of time. In this option, the USPS at its discretion scans the mailing file in escrow and may detect address quality defects prior to mailing. This could be part of a method of verification within the PostalOne! environment. It would not prevent the need for supplementary validation of physical mail, but by using just one four state barcode on the mailpiece with unique identifiers, the physical and electronic processes can be linked together.

USPS Direct Certification: In this approach, the USPS itself performs the list certification, using all its current address hygiene processes and gaining the ability to test other processes while doing certification. Additional security codes are added to the certified addresses to ensure that information cannot be altered. Dates of performance, database dates, and freshness dates may be added as well. The mailer would have to return these security codes either on the mailpiece or in an electronic file and this would have to be verified by one of the methods described above. Although additional computing resources would be needed, this activity could make a contribution to USPS revenue, adding to cost savings from improved address quality. However, industry complaints could be expected calling for this activity to be done by the industry in a market based framework rather than by the USPS. The combination of the USPS putting in new address quality requirements and then making mailers buy processing services to meet those requirements may in the end prove infeasible on other than technical grounds.

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Enhancement to USPS Direct Certification: The most essential thing for USPS is not getting revenue from certification processing but getting the results in terms of cost savings in operations. So the USPS could subsidize the direct certification processing and still come out ahead if that meant that more mailers followed the discipline. Here the market-based framework is not used and instead the model is that of a subsidized public service. However, that may be unpalatable in terms of USPS financial practices as it means a budgeted loss in one area to produce gains elsewhere. If that is the case, the USPS could return to the tested model of setting licensing fees and letting licensees perform the list certification in a competitive environment. That is how NCOA^{Link} is currently handled.

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Appendix A: Best Practice in Software Evaluation

The purpose of this section is to describe the types of information one needs to gather to assess a software vendor and the appropriateness of their product for your company.

The following suggested software vendor considerations are broken down by the following categories:

- Things You Need to Know About Your Own Environment
- Things You Need to Know About the Vendor
- Product Support
- Application
- Industry Knowledge
- Fulfillment
- Testing and Implementation
- Performance
- Price
- Other Company Information

Things You Need To Know About Your Own Environment:

It is important for mailers to evaluate their current business needs and practices to determine whether all of the following questions are appropriate to evaluate their address software product needs.

Providing a system diagram and testing requirements documentation may be helpful in the discussions with the vendor. Some of the things a software vendor will need to know about your company:

1. The Platform/s (work station, mainframe) on which you expect to operate the software.
2. The operating system/s on which you expect this software to run
3. The number of sites at which you expect to run this software
4. The number of CPUs on which you will run this software
5. If you are considering NCOA^{Link} you will have to secure an authorization code from the USPS before approaching a vendor.

Things You Will Want to Know About the Vendor:

1. What platform/s does this software run under and how much experience does your company have with our company's platforms.
2. Have you done prior work with our company? Do you have an existing Master Purchase Agreement/Non-Disclosure Agreement?
3. How many other customers do you provide similar services for? What is their approximate size? How is your software used by the other companies? How many use the software?
4. List four references by contact name, company, and telephone number (or other contact method). Please specify any companies of a similar size that are processing in a similar environment.
5. Would any of the work required be subcontracted and/or produced through partnerships with other companies? What is your current level of dependency on this mode of operation?
6. What USPS processes are required in order to meet address product certification?
7. If your product is certified, please provide the results / scores from your most recent test/s.
8. What is your company's annual expenditure in R&D (Research and Development)? Please express as a total dollar value, as well as a percentage of annual expenses.
9. Many companies require software vendors to have a third party maintain a copy of their source code in 'escrow'. What company does your company use to store escrow code/programs? Has the code escrow ever been exercised?

Product Support:

1. What are your guaranteed support metrics? Please detail your support options (on call, 1 day availability, etc.) and the associated cost. Do you provide help on a time and material basis as an alternative to full maintenance?

2. What is the turnaround time for sending out data updates? What is the method of distribution?
3. What is included in your maintenance (e.g., helpdesk, software upgrades and enhancements, fixes, etc.)?
4. If you are evaluating a DPV product (or any other product with a programmed "halt"), in case of a possible (erroneous) address or condition that triggers the product to halt (per the USPS security requirements), what are the procedures and turnaround times established for contact, restarting the product, notification to the USPS - etc?
5. Provide detail on any business continuity plans you have for resumption of normal business after a disaster. Specifically, provide information related to how our company can continue to receive data updates in the case of a disaster at your primary development site.
6. What types of related services does your company offer, such as consulting, training, installation, etc.? Which of those are included in your standard price? Please include the price for any which are non-standard in the pricing section.

Application:

1. Provide detail (method and results) on any security audits done in the past 12 months on your code base.
2. Describe your application's typical response time for the various platforms your products support. Is there anything that our company can do with the product to further improve response time from your product?
3. Is your software available for a free trial? And how long is it available? Can the product be installed on our system or must we send the data to you?
4. What is necessary to run this product? Can the product work in our environment/s without additional software (GUIs, Scripts, etc...)?
5. What kind of Utility programs come with the product? Address-file batching? Monitoring and performance diagnostics? Error log file analysis? What utilities, if any, are available to validate databases?
6. What security provisions (administration, access, recovery, etc.) does your software/solution offer? If it does not offer any, how does it interface with the host and system environment for those functions?

7. How are your documentation and support services organized this way? Are your licenses organized this way?
8. Is there a recommended restart frequency, such as a daily restart, weekly restart, or monthly restart? If so, what is the recommended frequency?

Industry Knowledge:

1. Does your company actively participate in any mailing industry trade association, if so, please identify.
2. Does your company actively participate on any USPS committees? If so, please identify which ones and your company involvement on these committees.
3. Who is your expert on USPS requirements for your company?
4. How are changing USPS requirements shared with your application teams who build your software solutions? How long does it take for these requirements to become coded and generally available to your customers?

Fulfillment:

1. How many releases do you build and distribute in an average year? How often are software updates typically issued?

2. Is maintenance of the software (software updates) separate from maintenance of the underlying data, or are the software and data updates accomplished in a packaged “all-inclusive install”? If the software and data updates are packaged together, can they be separated?

3. How easy is it to have more than one version on a single machine? Testing before commitment to production is critical, with the ability to roll back if needed. Do you currently have other clients who use this setup?

4. About how long does it take to update the product with a new database?

5. Do you package a utility test-suite for us to confirm that an installation works as intended?

6. What, if any, are the local indexes customers must create and maintain?

7. Do you issue software patches to solve your customer support problems, or do you simply fold them into complete releases?

8. If you patch, about how many patches do you issue in a year? What is the range of the time that a problem is reported and a patch is issued?

9. Are your releases distributed with change-logs and "What's new" documentation appendices?

10. If you support your products on multiple platforms:
    a. Are your products released for all platforms at the same time?
    b. Are they simultaneously usable in a heterogeneous environment (different platforms working in concert)?
    c. Do customers get software for all available platforms with releases, at no additional cost?

Testing and Implementation:

1. What languages do you support?

2. What is the developer documentation like? (Manuals, javadoc, PDF, etc.). Are there usage examples and sample programs?

3. Does your firm offer training, or is this product self-evident enough that training isn't warranted? If training is required, how much is included with the initial software purchase at no additional cost? What is the cost for additional training?

4. Is there a basic test file supplied with the software that customers can augment with addresses that are of interest to customer applications? Regression testing (test that can or will be compared to previous or future results of the same or different products) with each product update and each month when the new product database is installed is critical. Test data should represent addresses from every state and certain specific address types:

    - Grid style addresses common in Utah and Wisconsin.
    - Fractional and alpha extensions of the house numbers
    - Pre-direction and post-direction addresses

- Puerto Rican addresses that require urbanity
- High-rise style addresses
- Alpha house numbers
- Single alpha street names (A ST, M AVE, and N BLVD)

Performance:

1. If Client/Server, how many concurrent connections does the server support?

2. At what rate can address validations be serviced over any given single connection or embedded instance?

3. How is the product typically scaled for load? Can the product be throttled by control parameters and then allowed to consume more or less resources by changing them? Or do you recommend adding more instances? Or more licenses? Or more processors? Or more machines?

4. If parametric, can the configuration and scale of the product be adjusted "on-the-fly" or is it necessary to Shutdown and Restart?

Price:

1. What are the standard list price and your proposed pricing for my company? Please include a detailed price list with a total.
2. What is the cost of your on-going maintenance?
3. What is the cost of training?
4. What is your warranty policy? Include a description of how it applies relative to the fixed and non-fixed (i.e., customization) parts of your quote.
5. What allowances have you made in your price quote for customization of the base software for integration into our companies existing infrastructure?
6. How is your software licensed?
7. Do you provide an Enterprise licensing option?

Other Company Information:

1. Is your company publically held? If so, how is the company identified by Dunn and Bradstreet? If you are privately held, please include the 2 most current years' balance sheets and income statements.
2. Attach a copy of your Certificate of Insurance.
3. What is your company's commitment to ISO 9000?
4. Is your company SAS-70 Compliant?
5. Is your company a Minoritity/Women/Disabled Veterans Business enterprise?

Appendix B: Best Practices in Software Testing

What is 'Software Testing'?

Testing involves operation of a system or application under controlled conditions and evaluating the results (e.g., 'if the user is in interface A of the application while using hardware B, and does C, then D should happen'). The controlled conditions should include both normal and abnormal conditions. Testing should intentionally attempt to make things go wrong to determine if things happen when they shouldn't or things don't happen when they should.

Why is it important to test Address Software Products?

This document provides testing criteria and processes to be considered when testing software specific to Addressing products. Software quality is critical to ensure software products do not incorrectly update or change customer address information. Adequately testing software quality includes detailed analysis and diagnosis of the original customer address data to the new update. Address Software Products should be fully evaluated each time a new database or software product is deployed. These changes include monthly or quarterly database updates, patches/fixes provided by the vendor, and the annual USPS Certification changes which require new software to be deployed.

Companies and organization vary in how they assign responsibility for software testing. The risk to the business from the software process should be considered when evaluating how robust the testing conditions should be and who to involve in reviewing the results. It has been said before that as long as the software doesn’t abend – it works. This is not true! Companies could have a catastrophic problem if address software is not adequately tested prior to deployment. Even when software vendors

indicate a software update as customer transparent – robust testing is still required!

Testing Conditions/Criteria to consider:

The following is important to consider whether you are managing an address software product database update, fix/software patch, or new software version.

The overall process of testing should include – but is not an exhaustive list to consider:

- Stay knowledgeable regarding the product expectations and changes the USPS is making or considering for future releases.

- Ensure receipt of the software or database update is within the specified timeframe required for USPS compliance.

- Define what was changed to the software or database provided.
    - Evaluate what changes the USPS may have required of the software vendor to make.
    - Evaluate what changes the software vendor has identified they are making that fall outside of the USPS required changes. These may include fixes and enhancements.

- Document the list of all changes and define test cases and expected results for all expected changes. Develop this in a checklist to ensure all components are tracked. Highlight on the checklist any specific changes that must be monitored more carefully.

- Ensure a robust test database is available for testing that has multiple example of various address complexities (this list is not inclusive of all variations to consider):
- Grid style addresses common in Utah and Wisconsin.
- Fractional and alpha extensions of the house numbers
- Pre-direction and post-direction addresses
- Puerto Rican addresses that require urbanity
- High-rise style addresses
- Alpha house numbers
- Single Alpha Street names (A ST, M AVE, and N BLVD)
- Add test data to cover the changes to the software and exercise any parameter changes that affect your company's use of the product.
- Add the list of additional test cases identified from the changing requirements to the master address database/test file for the overall

quality evaluation. Continue to add to the test database based on any live/production experience.

- Include in your test addresses items you would not expect to be changed – so you can ensure the product didn't do something unexpected.

- Have others within your team review your test cases and expected results – with the proposed changes by the vendor – to ensure all test cases are adequately covered.

- Ensure not only individual components are tested, but that integration testing with other functions are included to ensure no other applications are impacted as a result of the update/change.

- Evaluate the need for stress/volume testing to ensure all aspects of the software performance and expected results are managed.

- Ensure the test environment that is developed mimics the production environment in which the software will run – to ensure performance of the software once implemented is as expected.

- Evaluate the base (original output) to the test (new output) from the original and changed software.
    - Review all statistical data and information provided from software reports
    - Compare the base and test results to ensure all changes are as expected
    - Determine specific test cases that are uniquely validated for all components to ensure the software update performs as expected.

- Ensure all parameters of how to utilize the software are implemented correctly. Running address software products in non-compliant parameters could make a product void from USPS compliance.
    - Check changes to parameter settings/definitions whether USPS regulatory or the vendor's enhancements.
    - Check parameter changes against any special work-arounds or routines that may have been done to adapt the software to your environment.

- Ensure if your company uses the same product in multiple platforms – that all platforms are adequately tested. Don't assume since it is

tested in one environment that it will function and operate the same in another environment or platform.

- Document the results from the testing and maintain these results for future evaluation of production issues should they arise.

- Evaluate the quality of the software provided by the vendor and keep track of the number of fixes/patches or software updates a vendor provides within a year. Ensure you keep track of when these updates were implemented into your production environment – so in case issues arise in the future you can quickly isolate any potential cause from a software update.

- Ensure all documented test cases and expected results are obtained. If testing anomalies are discovered – ensure this information is presented to the vendor immediately for investigation of the results to determine if the integrity or quality of the software update is at risk.

- Do not deploy software that jeopardizes address quality due to database or software bugs. Escalate any found issues with the appropriate vendor or USPS management for resolution, when needed.

Appendix C: Best Practices for Managing Un-assignable Addresses

Mailers:

- ③ Send all addresses through a CASS certified software with DPV (Delivery Point Validation) integrated while at address initiation.
- ③ Review detailed reporting to determine root cause on UAA from the CASS results.
- ③ Have vendor come in to do an audit of the process and how it is architectured/ integrated in the system and look for ways to take advantage of the software.
- ③ Use of multiple CASS tools to ensure assignable addresses. Ideal situation is to hold vendors accountable to provide quality products that wouldn't require multiple uses of CASS tools.
- ③ Review parameters of how software is set-up to get maximum benefit of software applications
- ③ Provide their technical teams more training on how to use the CASS software process
- ③ Look at the context of how the address was presented to the CASS certified product
- ③ Un-assignable addresses should be further interrogated to evaluate the reason or cause for un-assignable addresses.
- ③ Invoke Early Warning System (EWS) to determine if any potential addresses may be on a future database release.
- ③ Utilize automated methods/channels to resolve the question and initiate customer contact as a last resort.

USPS:

- ③ Update source data to ensure that un-assignable addresses are not caused by delays in getting address data posted into the USPS address database.
- ③ Non-codeable addresses should be further interrogated to evaluate the reason or cause for non-codeable addresses.
- ③ Define/ Establish a process that enables an address to be DPV (Delivery Point Validation) prior to mail delivery being initiated by the carrier.
    - "Y" is the valid code.
    - "N" is not confirmed by DPV, no such primary address number on that street, street doesn't exit, non-existent delivery point.

- "S" and "D" codes are incomplete/ inaccurate addresses. Valid primary number, secondary number inaccurate or incomplete, delivery point not identified yet.
- For these responses, additional interrogation of the address is needed by the mailer and possibly USPS.

③ Continue to prove the value of Address Element Correction (AEC) with Industry Mailer's assistance. This means that the address management technology must be able to flag an address as being in process for AEC I and II processing as this can take up to 90 days for resolution. Once proven by mailers:
- Utilize AEC software, where legally applicable for all non-DPV/non-codeable addresses, prior to mailing.
- Utilize AEC II to further evaluate delivery ability to the mailing address. **Vendors:**

③ Provide quality CASS certified products that don't require the use of multiple software applications to give us assignable addresses.

③ Offer solutions in transactional based scenarios versus batch formats only.

CASS certified software and other related tools provide return codes (error codes) that can provide important clues as to the next best action for correcting an un-assignable address. The following chart is an example of this approach.

Error	Description	Action
E101	Last line is bad or missing	3
E212	No city and bad ZIP	2
E213	Bad city and no ZIP	2
E214	Bad city and bad ZIP	2
E216	Bad ZIP, can't determine which city match to select	2
E302	No primary address line parsed	1
E412	Street name not found in directory	1
E413	Possible street name matches too close to choose	1
E420	Primary range is missing	1
E421	Primary range is invalid for street/route/building	1
E422	Predirectional needed, input is wrong or missing	1
E423	Suffix needed, input is wrong or missing	1
E425	Suffix & directional needed, input wrong or missing	1
E427	Postdirectional needed, input is wrong or missing	1

E428	Bad ZIP, can't select an address match	2
E429	Bad city, can't select an address match	2
E430	Possible addr. line matches too close to choose one	1
E431	Urbanization needed, input is wrong or missing	2
E439	Exact match in EWS directory	1
E500	Other Error	4
E501	Foreign	4
E502	Input record entirely blank	4
E503	ZIP not in area covered by partial ZIP + 4 Directory	4
E504	Overlapping ranges in ZIP + 4 directory	4
E600	Marked by USPS as unsuitable for delivery of mail	4

Action Codes:

1 – Should be reviewed by user for minor adjustments to yield an assignment
2 – Candidate for external service bureau processing
3 – Candidate for AEC[2] processing by the USPS
4 – Should be removed from the domestic mailing list