



## Data Driven Mail Production: A Primer

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Data Driven Mail Production (DDMP), the mailing industry's implementation of Computer Integrated Manufacturing (CIM), is providing benefits at major mailers around the world. DDMP augments the on-the-page document coding with an electronic data stream that adds new capabilities to an inserting system as well as improving productivity and quality of the operation. DDMP's benefits go beyond just controlling the inserter: it can manage work flows, baseline quality audits, and facilitate enterprise integration. The vendor specific terminology and marketing hype surrounding the DDMP can make it difficult to evaluate alternative solutions and make the most effective use of the technology. This paper lays the ground work for a successful DDMP deployment by providing an overview of its underlying fundamentals.

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## Introduction

Data Driven Mail Production (DDMP) is a mail manufacturing technology based on controlling the mail finishing system with a data stream that accompanies the printed documents rather than with data printed exclusively on the documents. The data stream and the documents are linked by an identifier printed on each document in machine readable form such as: a barcode, OCR string or 2-D code.

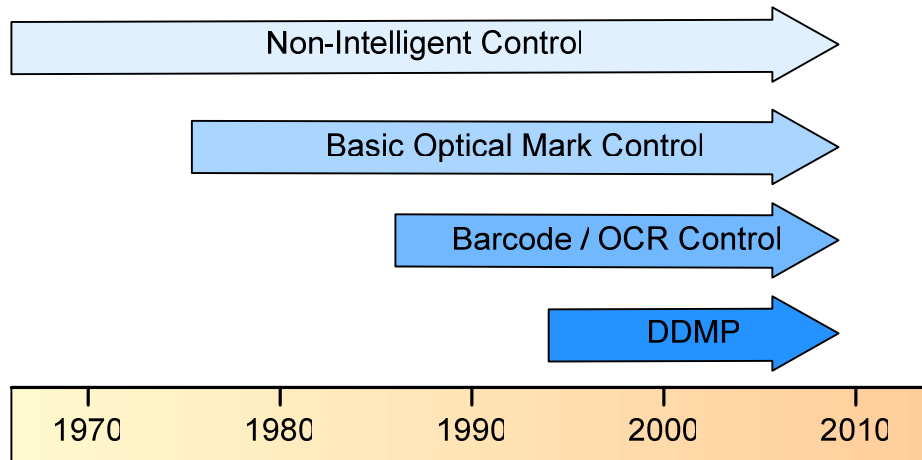
DDMP provides significant improvements in the productivity, capability and quality of a mail production operation. Benefits can include improvements in:

- **Data Rich Features** – Enables previously unavailable features such as in-line addressing
- **Productivity** – Improves productivity of the mail finishing equipment and operators
- **Document Scan Code** – Increases flexibility of on-the-page code selection and placement
- **Integrity** – Improves auditing and integrity capability
- **Just-in-Time Control** – Allows inserting instructions to be changed after the material is printed (late diverts, piggy-back marketing, insert correction.)
- **Work Flow Management** – Provides data for work flow management

The inserter manufacturers have each created somewhat different implementations of DDMP and used their own unique terminology to describe the technology. The manufacturers have also created a variety of product names that lump together a variety of other functions such as production reporting. This mix of terminology and product names can be confusing. A careful analysis of the fundamentals is the best starting point to understanding the actual capabilities and strengths of the various implementations, and provides a basis for a more effective deployment.

## A Brief History of Intelligent Inserting

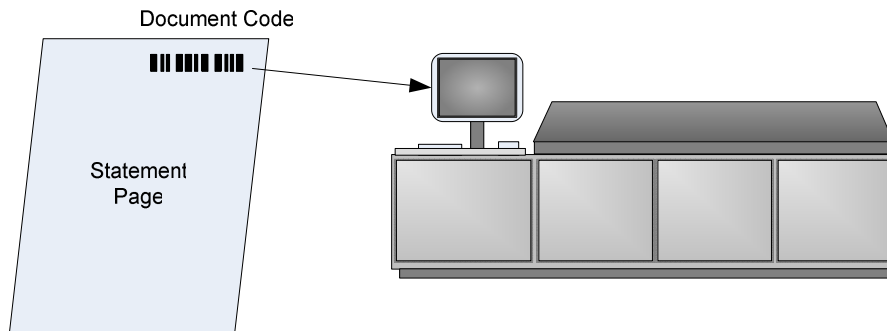
At one time statement mail processing was much simpler than it is today: a single statement page was folded, a return envelope and an insert or two were added, and all the pieces were inserted into an envelope. Every statement got the same number of pages and the same inserts.



**Figure 1 - Technology Timeline**

Then mailing applications started to get complicated. Customer's wanted detailed-billing creating variable page statements. Marketers wanted to send advertisements selectively: targeting likely prospects while saving the postage and printing costs needed to mail them to everyone. The postal service made an offer mailers couldn't refuse by giving discounts for presorting the mail. All of these changes required that statements be processed uniquely each with its own combination of pages, inserts, and sort break marks.

Simple optical mark coding was introduced to give each statement the personality needed so that the inserting equipment would know how to perform the unique processing. At first this coding was very simple, often implemented with the underscore or dash character printed by the line printers common at the time. The presence or absence of a mark in this "dash code" would indicate the first or last page of the statement, or the command to include or exclude an insert, to apply a sort break mark to the outside of the envelope, or perform some other function. "Intelligent" mailing had been born.



**Figure 2 - Intelligent Inserter Control**

But optical mark coding soon proved to be of only limited intelligence. It was error prone and unlike modern day barcodes there was no built-in error detection or correction capability. Because there were no industry standards, the codes for one brand of inserter would not work on another brand. The coding was often tightly bound to the physical handling of the paper on the machine so that codes became highly brand specific and sometimes would not even work on a different machine model produced by the same vendor. Changing the coding to meet new business needs was difficult as inserters were often literally hard wired for a specific code.

The emergence of affordable laser printers for the statements along with microprocessors to control the inserters, led to a big improvement: the use of barcodes to personalize each statement. Barcodes, such as *Code 39* or *Interleaved 2 of 5*, which had been developed and standardized by the material handling industries, had built-in error detection and correction capability making them much less prone to error. These types of codes started to appear on mailing applications and intelligent mailing had gained a few more IQ points.

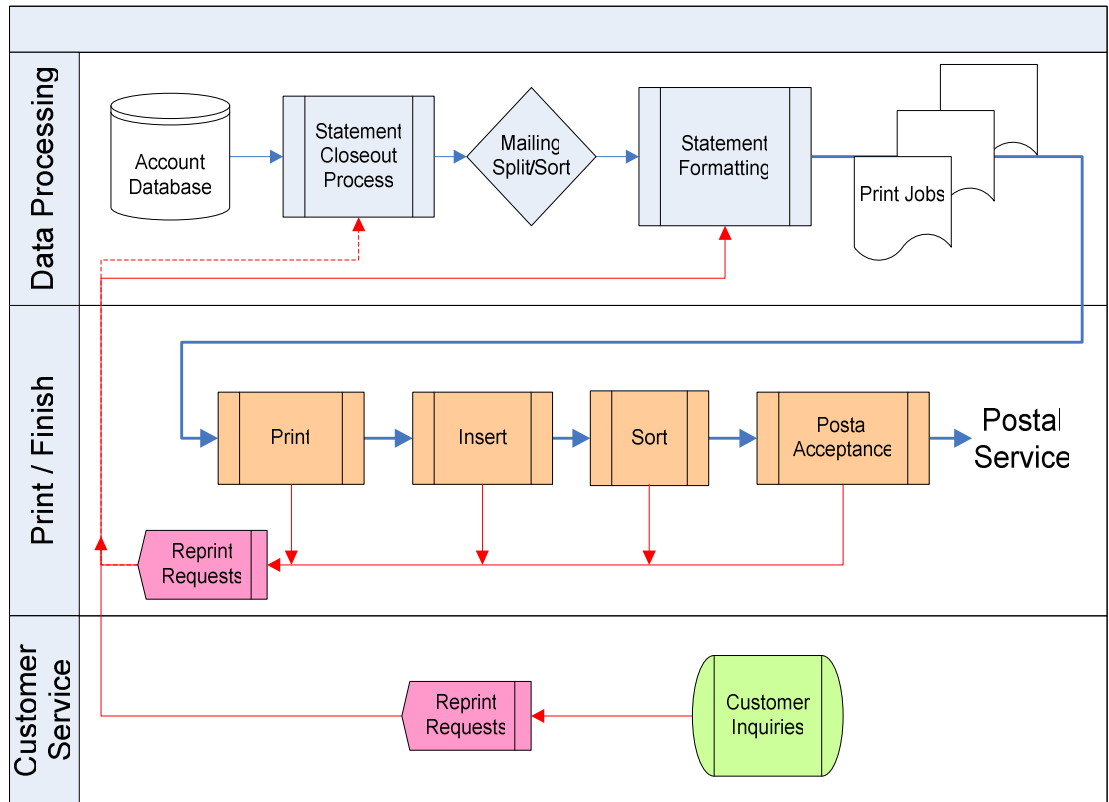
Business requirements didn't stand still either. Demands for more sophisticated processing continued to emerge: the matching of secondary personalized documents such as checks to the main statement, assembling statements from pages printed on different base stocks, and increased emphasis on the integrity and quality of the mail. But each of these capabilities added to the demand for data resulting in sequence numbers, match codes, and account numbers being added to the barcodes increasing their size and footprint on the document. The codes became harder to read and more esthetically objectionable. Valuable statement real estate was being consumed by bigger and bigger bar codes. Intelligent inserting needed to go to college.

The straw that finally broke the camel's back was the requirement to print the statement's delivery address on the outside of a closed-face envelope. Encoding an address in Code 39 resulted in a graphic that was approximately 14 inches long; too long to fit on most pages and so long that

it was effectively unscannable even if it could be printed. The data to control the mail processing had to be moved off the paper. Data Driven Mail Production had been born.

## Statement Mail Production Workflow

Before diving into the details of how Data Driven Mail Production works, it is helpful to take a look at the overall workflow of a statement mailing application. Figure 3 shows a simplified generic outgoing workflow; actual systems may add some steps or delete others.



**Figure 3 - Outgoing Statement Mailing Workflow**

Generally three different functions participate in the workflow: Data Processing, Print / Finish, and Customer service. The normal path is shown by the blue lines:

- **Statement Closeout Process** - The flow starts with the business’s Statement Closeout Process that generates the raw statement data. On a periodic basis (generally monthly), the cutoff date is applied to each account and the final accounting is completed. Cutoffs are normally distributed throughout the month in a series of mailing “cycles”.
- **Mailing Split/Sort** - A number of factors impact what statements can be printed and inserted together, including base form stock requirements, attachment documents (inserts) to be included, and postal submission rules. The Mailing Split/Sort process groups

together statements based on these factors. The jobs created by this step generally become the workflow tracking units for the rest of the production flow.

- **Statement Formatting** - Print jobs (or print files) are created by the statement formatting process for each group of statements created by the Mailing Split/Sort process. This print file is in a language such as AFP or PDF that can be consumed by the printers.
- **Print** - The print jobs are transmitted to the printers and printed.
- **Insert** - The printed output is then moved to the inserting area and inserted.
- **Sort** - In some shops, multiple jobs are merged together on a mail sorter before postal submission.
- **Postal Acceptance** - Mailings are then sent to the postal service, through an acceptance process. Depending on the size of the mailing operation and their agreement with the local postal service, this acceptance may happen at the production facility or at a postal facility.

In a perfect world, every statement would be printed perfectly, inserted without damage, and passed through the postal system to the recipient unhindered. In our world, every mail production operation requires a mechanism to handle recreation of lost or damaged mail, as shown by the red lines on the diagram. Regeneration requests can originate at any point during their physical handling, as the result of rejected or returned mail, or from inquiries received by customer service. Implementation of the regeneration mechanism varies between operations, some are able to access the original print file and just reprint a portion of it. Others must actually regenerate the statement and create a new print file

The significant factor affecting the design of a DDMP operation is the breakdown of a mailing application into a number of separate print/insert jobs in the Mailing Split/Sort step. These jobs normally become the primary work unit for the operation. They are usually each printed, transported, inserted as a batch. They are often the most convenient module for work tracking and quality management.

## Mail Manufacturing is Truly Unique

The production of high volumes of statement mail is truly manufacturing. The management of work flows, materials and human resources is no different than any high volume manufacturing operation. There is however, one very key difference: each mail piece truly is unique.

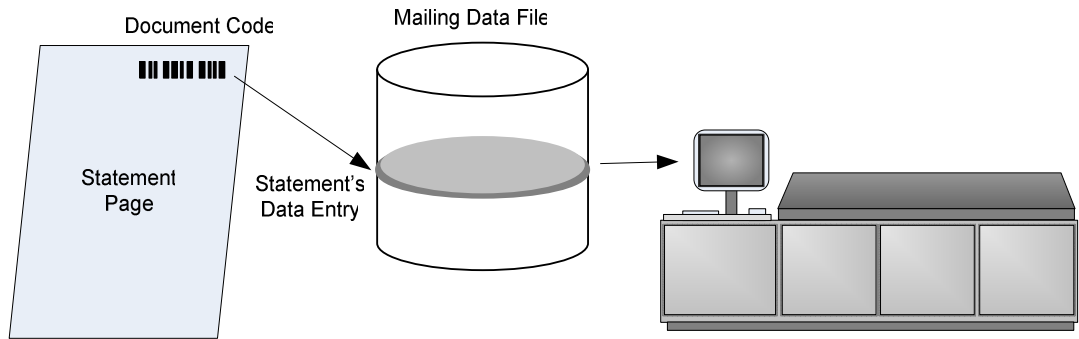
Whereas a conventional high volume manufacturing operation will produce millions of *identical* widgets, a statement mail production shop must produce millions of *different* widgets. Each statement has a unique identity and each must be correctly produced. In conventional manufacturing environments defective products can be caught by a quality inspection resulting in at worst a productivity cost. In a statement mailing operations every incorrectly assembled or unsent statement is an unsatisfactory customer interaction. This fact puts tremendous quality requirements on all statement mailing operations. Even 1 or 2 parts per million quality levels are not nearly good enough. For many shops that error rate would translate into several unhappy customers every day (and Murphy's Law guarantees that at least one of bad statements will go to your company's CEO).

The unique nature of each mail piece forces statement mail production operations to adopt a strict quality assurance regimen. Data Driven Mail Production can be a critical part of such a program.

## How DDMP Works

### Essential Elements of DDMP

In a conventional “intelligent” statement processing system, a code printed on the document directly provides the data used by the inserter to control the assembly of the document (Figure 2). In DDMP, the code on the document points to an entry in an electronic data table which contains the information needed by the inserter to produce the mail piece (Figure 4).



**Figure 4 - Statement to MDF Linkage**

There are two essential components to the system:

#### Document Code

The document code is printed on every statement page, and can be any machine readable symbology such as a barcode, OCR code string or a 2-D code. The Document Code uniquely identifies each statement page in the mailing job.

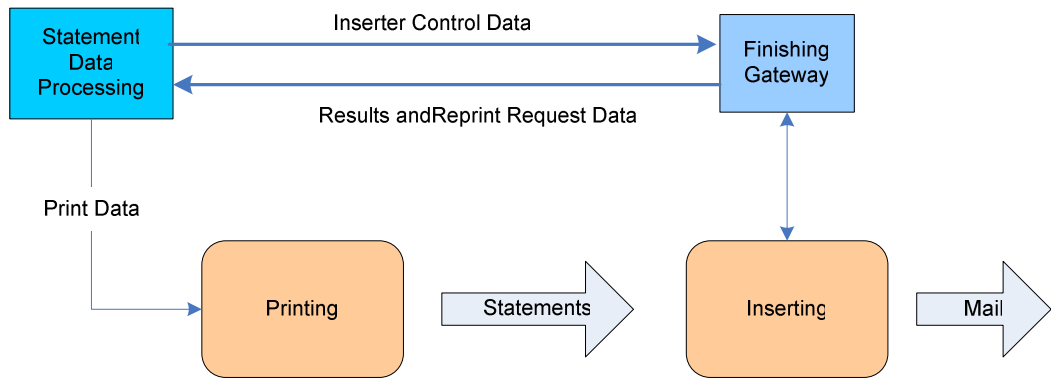
#### Mailing Data File

The Mailing Data File is an electronic listing of the pieces in a mailing job. It could be implemented in any fashion that will hold sufficient data and be understood by the equipment, such as a simple flat file, an XML document, or a database table. The key attribute of the file is that it holds information on both the entire job, every piece in the job, and the order that the pieces occur in the print stream.

There is a one-to-one mapping between Mailing Data Files and print jobs, so that the flow of the files mirrors the work flow in the mail production shop.

### Flow of Mailing Data to Production

The data flow for the Mailing Data File is shown in Figure 5. In this diagram, Statement Data Processing is normally part of the enterprise's IT system. The Mailing Data Files are normally created there as part of the Statement Formatting step and transferred electronically to the mail finishing operation.



**Figure 5 - Mailing Data Flow**

The Finishing Gateway is a generic term for the computer system installed in the mail finishing operation to act as an interface to the inserting systems. Known by a variety of vender specific names, the Finishing Gateway can be implemented as a file server, a database server, a workstation or some combination there of. It is responsible for performing any preprocessing required by the inserting equipment, such as format conversions, translations, compilations, or database importing, and for storing the Mailing Data Files until needed by the inserting equipment. Depending on its specific design, it may also provide additional functions such as work flow management or productivity reporting.

### Flow of Data Back to the Enterprise

To complete the process, there is normally a reverse flow of information, from mail production to the enterprise's data processing. Reprint requests can be sent from mail production to the statement generation system. Mailing status information can also be forwarded, possibly to a customer service system, to provide details on when each statement was mailed. Production statistics, captured by the inserting systems, can be sent to management data systems.

## Benefits of DDMP

Data Driven Mail Production can both improve the reliability and performances of conventional mail finishing functions and add a variety of expanded capabilities. These benefits stem from some essential characteristics of the technology: reliable data transmission, increased data volume, virtualized document data, unique piece identification, job aggregate data, and enterprise integration.

### Reliable Data Transmission

Older technology optical mark based systems, and even new barcode based systems suffer from scanning problems, especially as the amount of data in the code is increased. These problems contribute to errors and gaps in the finishing data stream and lead to incorrectly assembled mail pieces and excessive machine stoppages.

Since machines can read electronic data much more reliably than printed data DDMP moves the finishing instructions electronically. Although DDMP does not eliminate scanning all together, when properly implemented it can reduce scanning related errors. This error reduction comes about both as a result of a reduced code size and the ability of the inserting system to use the contextual information inherent in the Mailing Data File to perform scanning error correction.

This improved data transmission reliability improves the operation and productivity of the conventional mail finishing functions, such as:

- Controlling the number of statement pages.
- Selecting inserts
- Providing codes for document matching
- Marking or diverting mail pieces
- Selecting a postage meter

### Increased Data Volume

When the entire document finishing instructions had to be printed on the page the quantity of data that could be printed was severely restricted by the technology and footprint of the document code. With DDMP large quantities of data are easily transmitted supporting rich finishing operations and providing data to downstream operations. Capabilities include:

- Printing outgoing addresses on the envelope.
- Printing a recipient specific return address, such as to indicate a customer's local office.

- Printing customized graphics on the envelope.
- Providing account information (account number, address, etc) to downstream operations, such as CRM.

### Virtualized Document Data

When the finishing instructions are on the document, they cannot be changed after printing. With DDMP the instructions are electronic, so they can be changed at any time, helping to decouple mail finishing from statement programming and making it easier for the mail production operation to respond to last minute business requests.

- **Late Diverts** – Last minute requests to hold a specific statement can be implemented electronically, rather than requiring someone to go thru a mailing by hand.
- **Targeted marketing insert selection** – Many enterprises would like to do targeted marketing by sending selected inserts to specific customers, however to do so would require the on-going commitment of scarce statement application programming resources to implement and maintain the marketing selection. With DDMP the selection can be done after the Mailing Data Files are generated by a system downstream from statement formatting.
- **Weight and postage computations** – Often, the statement application programmers are called upon to update the postage computations caused by changes to insert or paper weights. Moving meter and insert selection downstream from data processing to the mail production operation can eliminate this burden on the statement programmers.

The virtualized nature of the DDMP document data allows these capabilities to be performed outside of the statement formatting application program. Their implementation can be generic rather than being designed for a specific mailing application. Standardized, 3<sup>rd</sup> party supported solutions can be employed, running on workstations in the mail production operation.

### Pieces are Uniquely Identified

DDMP is particularly well suited to dealing with the quality challenge of statement mailing. The first step in building a system that can correctly produce each mail piece is to be able to uniquely identify each one. DDMP inherently requires that each statement page be uniquely identified. The document real estate used for the document code is invested in the best way possible; as the unique identifier.

This piece level identifier, when combined with the data in the Mailing Data File can be used to implement several key functions:

- **Integrity Checking** – The MDF becomes a master checklist for the mailing. The production equipment can “check off” each mail piece as it is produced.
- **Piece Level QC Inspections** – A sampling based audit system can be an important part of a quality control regimen. The identifier on the mail piece links it to the MDF entry, providing the mail piece makeup standard that an inspector needs to validate the sampled piece.

### Aggregate Job Data

In a conventional mailing application, where the control data is exclusively printed on the document, there is no standardized place to find information about the entire job. Such information, if it exists, must be programmed specifically by data processing as part of the print job creation process. The Mailing Data File provides a compact and quite complete source of data about the entire job which can support a variety of shop management functions and help reduce the maintenance requests going to data processing.

- **Materials Management** – The material requirements for a job can be determine by summing all of the data in the MDF. This information can be use to dispatch materials to the machines in advance of the job, as part of a material usage reconciliation system, or for client billing.
- **Job Tracking** – The MDF identifies the job and clearly indicates its size. Because the files are created at the same time as the print file they are available before the mail is printed, providing a readily automated “to-do list” for the production shop that can be invaluable for daily planning and work tracking. This list of jobs can also be used to track jobs in the shop and ensure that none get overlooked.

### Integrates with the Enterprise

Data can flow back from the mail production operation into the enterprise’s data infrastructure. The MDF can easily carry information about each mail piece, such as the account number or recipient’s address; information that is useful beyond mail production. This information, when coupled with the mail production results data can produce new synergies:

- **Automated Reprints** – Lists of destroyed mail pieces can be generated by the production equipment and sent back to data processing to automate the reprint process.
- **Customer Relationship Management (CRM)** – The mailing status for each statement can be an important addition to a CRM database.

- **Work Flow Management** – The job status information, which can be helpful in managing the mailing production operation, can also be sent to a larger enterprise wide work flow management system.

## Implementing DDMP

Data Driven Mail Production gains much of its advantage by better integrating mail production with the rest of the enterprise. Getting the most from DDMP, as with any enterprise integration project, requires careful planning and management of the implementation. Below is an introduction to the factors that are often critical to a successful installation:

### Understanding the System

A variety of different DDMP implementations have been created by the production mail industry and not all operate the same way. The functionality and robustness of the implementations vary widely. Understanding how a proposed system will operate and how it will handle errors is critical.

Factors to consider include:

- **Insertion Control** – Some systems use the MDF data to completely control the inserter, and can take advantage of data to compensate for scanning errors and to improve collation building performance. Other systems bring the MDF along as an auxiliary data source and are still dependent on printed data for producing the mail making them more sensitive to scan errors.
- **Piece Level Integrity** – A DDMP system can be an important element in implementing a high integrity mail production operation. However it doesn't automatically create integrity. The machinery, shop floor processes, and operator actions are also critical factors.
- **Complex Code Alternative** – Some proposed solutions are really not DDMP systems. These systems use a high density document code, such as a 2-D barcode, in lieu of the data file. Although these do provide increased data volume, they provide almost none of the other benefits of a DDMP system.

### Managing the Installation

As with any sophisticated manufacturing operation, there are three critical components to any DDMP implementation:

- Facilities (hardware and software)
- Processes
- People

Frequently, planning focuses on just the first factor, the hardware and software, because it is usually the object of a complex purchase transaction. A successful implementation must balance all three of the factors.

Procedures need to be designed to cover the range of routine activities and exceptions that will occur. Personnel must be trained and managed to implement them correctly.

The planning activity should develop procedures and training plans for the range of routine activities that will occur in the operation, such as loading and closing out jobs on the inserters. Plans should also be created and tested for key exceptions (fault conditions). For example, what to do if the printed material for a job is damaged and has to be reprinted: how the reprint is initiated, how the damaged material is destroyed to prevent duplicate mailing, how it is logged.

Generally, procedures need to be developed in three general areas:

- Machine operation
- Materials management
- Data system operation

### Qualifying the System

A structured test program is also important to ensure that the system is installed and maintained correctly. A test procedure should be developed both to use for initial qualification of the system, and revalidation of the system after any major upgrades or maintenance.

A test should be comprehensive, repeatable, and provide for end-to-end verification of the system. Just randomly selecting a production job to test the system usually is not sufficient, both because it does not allow for repeatability (being able to compare results with prior test runs or tests on other machines) and it is impractical to open completed mail for auditing purposes. The test job should also be run through the print and insert processes in the same time frame as a live job, and not printed in advance and stored for an indeterminate time before inserting.

It is usually necessary to create a standardized test job that can be ordered from statement data processing whenever a test is needed. Creating a good test job requires some attention to detail; it has to be an effective test, but should not contain valid looking statements that could be accidentally mailed. A good test job should:

- Cover the range of features used by the system (i.e. statement page range, numbers of inserts selected, etc).
- Be large enough to allow a statistically valid measure of quality and performance to be made (usually 1,000 to 5,000 pieces).
- Not have idiosyncratic features that can mask a system problem (i.e. selecting the same insert for every mail piece).
- Use the same material (paper and inserts) as a live job.

A standard test job can also be quite useful to use for system debugging and operator training. It can allow for realistic system operation without committing live customer statements.

### Documenting the Installation

There can be many players in a DDMP implementation: mail production, data processing, network administration, and one or more vendors. With any project of this sort, documentation is often the critical element in ensuring everyone is in the know. Every DDMP system should have at least:

- **System Data Specification** – Detailing the contents and flow of the Mailing Data Files, the reprint or results files returned from the Finishing Gateway and the document codes.
- **Operating Procedures Plan** – A plan for detailing system and operator level procedures for both normal and fault recovery operations.
- **Qualification Test Plan** - A standardized test for validating the system once installed, and retesting after any major upgrades or maintenance

It is important to recognize that the existence of these documents alone is not a sufficient condition to ensure a successful installation. What is required is a complete plan that is understood by all the parties. The documents themselves are of little value if they are not accurate, comprehensive, stable, and understood. The process used to create, review and obtain “buy-in” from all parties is usually of far greater value than the documents themselves.

The requirement for specification stability is often overlooked when managing a project. A specification is of little value if it keeps changing. Since it represents a description of the work that is to be performed, every effort must be made to ensure that it is complete before the work is done. Moving targets just lead to errors and increased costs. Thoroughly planning the project before work begins and running an effective change review process during implementation are critical factors for success.

### Choosing a Document Code

A machine readable code must be printed on each statement page so that it can be linked to the data in the MDF. DDMP does not require that a specific type of code be printed on the document. A wide variety of code symbologies can be used for DDMP systems:

- **1 Dimensional Barcodes** - Standard linear codes such as Code 39, Interleaved 2 of 5, and Code 128.
- **OCR Text Strings** - Machine readable text, using fonts such as OCR-A, OCR-B, and other fixed pitch fonts.

- **2 Dimensional Barcodes** – Areal codes, such as DataMatrix, PDF-417, and Aztec Code.

Some factors to consider when selecting a symbology:

- **Printability** – Select a code that can be printed reliably, even when the printers are a little out of tune. Most codes require fonts or printing libraries specifically designed for a type of printer. Creating a barcode with a general purpose graphics library can lead to significant problems due to pixel quantization errors.
- **Scannability** - The inserters must be able to scan the code while running at full speed, and should be able to do so reliably even if not perfectly aligned. Paper handling considerations can place limits on the type of codes or their location on the page.
- **Document Appearance** – The selection of a document symbology can generate strong reactions from constituents, some like a high-tech look, others find any code objectionable.
- **Document Real Estate** – The code will compete with other needs for space on the statement. The space required for the code will be larger than the code graphic due to “clear zone” requirements. Codes require this blank area around the symbol to ensure reliable scanning. Clear zone size requirements often exceed conventional barcode industry specifications; the paper handling in some inserter scan stations can significantly increase clear zone requirements.
- **Cost** – The costs for scanners can vary significantly based on type of code and how the code is orientated on the document. Some code types or locations on the document may also add to the costs by requiring paper handling changes to the inserter.

### Designing the Document Code’s Contents

The document code needs to contain enough information to uniquely identify each page, within each statement, within the mail job, and amongst all the jobs that are in the shop at one time. The fields normally include are:

- **Page Number** – Used by the inserter to make sure all of the pages are included in the statement are in the correct sequence.
- **Statement ID** – A unique identifier for the statement in the job, normally a sequential number.
- **Mail Job ID** – A code which can be used to ensure that the statement belongs with the job, and that the correct data file is being used to process the statement.

Some DDMP implementations duplicate some of the MDF data in the document code to allow for processing of the mail in a fall back mode in case

the MDF is not available. Increasing the size of the code is possible, but at the risk of reducing system performance. Scanning error rates increase exponentially with an increase in the number of characters in a code (doubling the length of a code will result in a quadrupling of the scan error rate). Increasing the size of the code will also increase its impact on the document design. Adding this extra data usually prove to be counter productive; the impact it has on normal operations negatively outweighs by far any value for backup operation. While having a fallback mode of operation might have been important during the early days of DDMP, the relatively low cost of high reliability data systems makes a fallback oriented design ineffective.

### Data Communication Architecture

As shown in Figure 5 data flows between data processing and the mail production shop. Mail assembly data flows into the Finishing Gateway and production results information will flow back out. There are four basic types of electronic files that can move back and forth:

- **Mailing Data File** (sent to the Gateway) - Contains both job level and piece level data for each mailing job. The job level data is used to determine how a job is prioritized and produced. The piece level data is to control and audit mail piece assembly. The file also specifies the order of the statements in the print file.
- **Comprehensive Results File** (returned by the Gateway) - Contains a list of the mail pieces produced and their status: whether they were completed successfully, when they were produced, what materials were used, and what postage was applied. This data can also be used as part of the postal submission process.
- **Reprint File** (returned by the Gateway) – A file listing pieces that need to be reprinted.
- **Production Statistics Data** (returned by the Gateway) – Data about the production operation. Can be imported into an enterprise work flow management system, or as part of a cost accounting system.

The physical implementation of the connection between the enterprise network and the Finishing Gateway is vendor specific. Generally, a direct network connection is employed (IP over Ethernet).

A web services style interface (using SOAP over HTTP) usually provides the best protocol, allowing for rich communications while remaining loosely coupled. Alternately, a file transfer protocol such as FTP or NFS is used to move the data. In that case it is important that the transfer procedures are clearly specified (i.e. who will be responsible for cleaning up files in transfer directories, will files be “camouflaged” during transfer to prevent premature access by the receiver).

To protect the integrity of the enterprise network, and to simplify maintenance of the mail production system, it's often best to treat the mailing system as a foreign network. It should be installed as a completely isolated sub-net attached to the enterprise network through a firewall.

### MDF Generation

The Mailing Data File must be created for each mailing job instance. Because mail jobs change from month to month, a generic MDF cannot be created once and then reused. Two major options exist for generating the MDF:

- **During Statement Formatting** – The statement formatting program normally has the information necessary to generate the MDF: it knows the contents of each statement, and it knows the order in which they will appear in the mail job. The statement formatter can also insert the document code. This approach usually results in the least computing overhead and cleanest solution, at the expense of impacting the statement generation application.
- **By Post Processing the Print File** - Often the print file can be post processed to extract the required information to build the MDF, and to insert the document code. Several commercial software products are available that can perform this function. This solution avoids changes to the statement application program, but can be limited if all of the required information is not in the print stream. It can also be somewhat brittle if the statement format is changed frequently.

The choice between these two options is often more organizational than technical. Factors such as the availability of statement application programming resources and the application qualification and release process are usually the determining factors.

## Conclusion

Data Driven Mail Production (DDMP) has proven to be much more than just an alternate way to implement intelligent inserter control. It can be the foundation of an integrated mail manufacturing system; providing improved productivity, quality, and manageability. Mail manufacturing is a complex process, integrating many parts of the organization, and utilizing multiple equipment and materials vendors. A DDMP implementation heightens the need for disciplined management of the interactions of these many components.

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*Lone Oak Technologies, LLC* is a production mail focused software technology firm offering a suite of state-of-the-art products aimed at productivity management, mailing data automation, and production modeling and simulation.

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