OFFICE OF INSPECTOR GENERAL
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A Strategy for a Future Mail Processing & Transportation Network

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Executive Summary

For more than 230 years, the Postal Service evolved with the needs of a growing country. A vast and complex network of processing facilities and transportation links was created to meet its universal service obligation. While the Postal Service lists over 500 mail processing facilities, the backbone of the current network consists of 260 major Processing and Distribution Centers (P&DCs). This legacy network was built for a different time and different level of processing capabilities, mail mix, and volume growth. Today, the Postal Service has highly automated processing technology and provides incentives for its customers to presort the mail and drop ship it deeper into the network. Against this backdrop of increasing processing capacity is a likely future of stagnant or decreasing mail volumes. For at least the last decade, there has been a mismatch between the existing powerful network capacity and decreasing user needs. Without a strategic transformation, by 2020, the network capacity will greatly exceed demand.

There is a mismatch between the existing network capacity and user needs.

In this paper, the U.S. Postal Service Office of Inspector General (OIG) Risk Analysis Research Center (RARC) presents a high-level approach to design a future mail processing and transportation network based on modeling techniques and stakeholders' input. This approach can be used by postal management and policymakers in understanding the systematic changes required to modernize the network and the cost of delaying those changes. We worked with modeling and network design experts to develop a simulation model of a mail processing and transportation network. Simulation models are a proven, accepted technique used within numerous industries to guide business strategy, implementation, and outreach efforts. We used this technique to reproduce how mail is processed and transported and then assessed how changes to the network impact cost and service. Specifically, we increased and decreased the number of major plants by changing the size of the service area and varied how mail was routed between those plants. Using this process helped identify an optimal network configuration.

A strategic plan is needed to create a network that meets future needs.

In creating the model, we began with a blank slate and created a hypothetical network of major plants. These plants were comparable to P&DCs, not other mail processing facilities such as annexes or customer service facilities that represent almost half of the total number of mail processing facilities but have a smaller role in actual mail processing operations. Some of the major plants in the hypothetical network also operated as consolidation hubs. In addition to processing mail, consolidation hubs combined and routed mail between other major plants. Next, we simulated a number of

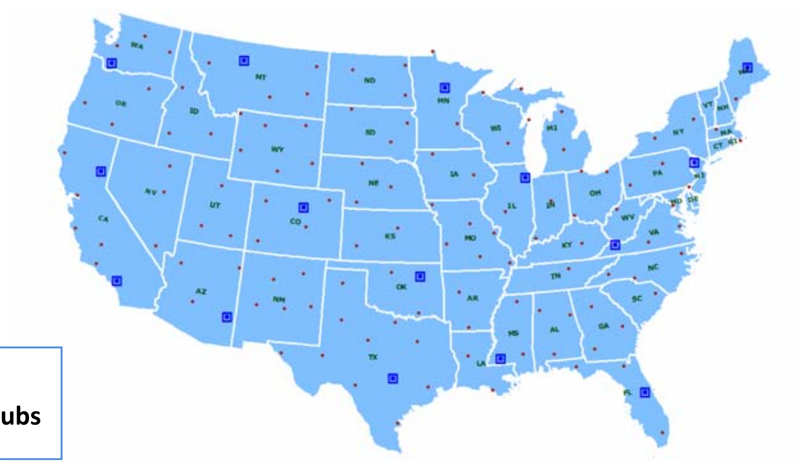
alternative networks using estimated future 2020 mail volumes. Finally, based on simulation results, we selected the network that best minimized cost and preserved service.

This high-level approach is a critical component of a strategy for a future mail processing and transportation network. It can guide strategic decision making, complement ongoing local and regional optimization efforts, and facilitate necessary discussions with stakeholders. By design, the theoretical model is not an operational blueprint detailing which specific plants would be shut down, where new ones should be built, or how big the plants should be. Instead, the model provides an outline of a modernized network with an optimal number of plants that minimize cost while preserving service. Because the Postal Service is not beginning with a blank slate but an established, legacy network, we expect that the actual number of major plants needed for future mail volumes may be different than our model results. Regardless, the model provides a useful end target in mind and supports strategic transformation efforts.

Our research and analysis showed the following results.

1. A network of 135 P&DCs, of which 15 also operate as consolidation hubs, would lower net processing and transportation costs. It would meet or exceed existing service performance for all mail, except for eight percent of non-presorted Priority Mail (less than a few hours delay on average). The impact on service for non-presorted Priority Mail is arguably marginal and, if not mitigated by operational improvements, may be an acceptable tradeoff for significant cost reductions. Ignoring transition costs, the new 135-plant network would cost the Postal Service around $2 billion less per year to operate than the existing network.

2020 Mail Volume and Workload Demand Requires a Total of 135 P&DCs, of which 15 also Operate as Consolidation Hubs



- • 120 P&DCs
- ■ 15 P&DCs/Consolidation Hubs

2. The Postal Service continues to make gradual progress in rightsizing the network. Since fiscal year 2006, it has closed 145 mail processing facilities including nine major processing plants. However, to ensure the best results, a

comprehensive, long-term strategy can inform and guide local and regional changes.

3. Facility consolidations will affect employees. However, in the next 10 years, over half of the Postal Service work force will be eligible to retire and, if implemented thoughtfully, substantive restructuring with significant savings can occur with minimal relocations and layoffs.

4. Service standards are an important element in network rightsizing. However, a very large proportion of customers are open to relaxing the existing service standards in exchange for achieving substantial economies.

5. Many potential partners, including employees, customers, and Congress, are willing and able to help the Postal Service. Despite the Postal Service's stated concerns about stakeholder opposition, working with potential partners in planning and deliberation can increase the likelihood of successful implementation.

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A Strategic Vision for a Future Mail Processing & Transportation Network

Introduction

Historically, the mission of the Postal Service's processing network has been to keep up with growing volume and geographic expansion; but times have changed, resulting in a new world. While mail processing and transportation networks have remained relatively unchanged, the new world consists of an established worksharing environment where mailers do more of the work, a mature and high level of automated processing technology, and changes in mail mix, volume, and customer expectations. The defining characteristic of this new world is that the gap between operational capacity and network demand continues to grow.

The way the Postal Service touches the mail today is different than it was 30 years ago and the flow of mail from origin to destination has changed. There is an emerging consensus for the need to rightsize the Postal Service's mail processing and transportation network. For several years, the Postal Service has examined plans to consolidate its mail processing plants and reconfigure its transportation network. The fundamental question still remains: what should the mail processing and transportation network look like to meet future demand? And how many plants will be needed? A former deputy postmaster general suggested that in order for the Postal Service to be fully efficient, its footprint must be much smaller, possibly comprising 150 plants and 400,000 employees. Another stakeholder said the current network is twice the size it should be. Are these reasonable assessments?

The U.S. Postal Service Office of Inspector General (OIG) Risk Analysis Research Center (RARC) considered these questions and worked with modeling experts to develop a simulation model that can be used by Postal Service management, stakeholders, and oversight groups to identify what is needed to strategically rightsize the network. The approach is not an operational blueprint detailing which specific plants to shut down or where to build new plants. Instead, it provides an analysis of the total number of plants required to meet future fiscal year (FY) 2020 demand in a network that best minimizes cost and preserves service. We discuss how mail currently flows through the network and the various factors that affect mail processing and transportation. We also discuss network rationalization initiatives the Postal Service has embarked on over the last ten years. In support of this effort, we conducted interviews to gain insights from the Postal Service, the mailing industry, congressional stakeholders, and union officials.

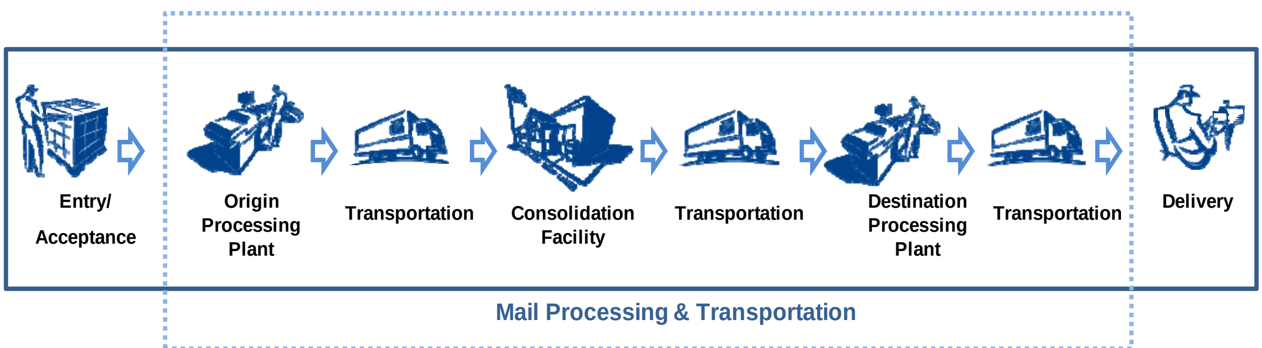
Current Postal Service Network

The current Postal Service network developed over many decades and is a coordinated interaction among processing facilities, transportation links, and delivery carriers. The network comprises over 500 facilities of varying roles and sizes that process everything from individually stamped letters originating at local Post Offices to many-thousand-piece bulk mailings entered at destination facilities. This section describes the current mail processing and transportation network and the many factors that have shaped its development.

How Mail Flows Through the Network

Collection, mail processing, transportation, and delivery are the major functions within the Postal Service. Several modes of transportation are used to move the mail between facilities, as determined by the quantity to be moved and the transit time allowable under the service standards. Figure 1 is a simplified diagram of how mail flows through the postal system. Appendix A presents a more detailed mail flow diagram.

Figure 1: Simplified Mail Flow Diagram



Source: OIG Based on Postal Service Information

Mail enters the postal network via collection boxes, retail windows, detached mail units at mailer facilities, or business mail entry units at postal facilities.[1] Facilities, such as Post Offices™, stations, branches, and contract postal units, collect outgoing mail from customers. At the same time, mail arriving at these facilities is taken out for delivery. After the outgoing mail is collected, it is handed off to the origin processing facility. Mail proceeds through origin processing facilities, consolidation facilities, and destination processing facilities.[2] At origin processing facilities, mail is separated and sorted into common destinations and from there transported to the final destination facilities for

[1] Business Mail Entry Units (BMEU) and Detached Mail Units (DMU) typically accept commercial mailings from business customers and their mail service providers. Commercial mail can also bypass originating processing facilities and transportation and be taken directly to the destination plant or Post Office.
[2] Consolidation facilities include Network Distribution Centers, Surface Transfer Centers (STC), and Logistic Distribution Centers (LDCs). STCs are consolidation points for First-Class Mail and Priority Mail. LDCs are consolidation points for Priority Mail. These consolidation facilities serve to achieve transportation efficiencies by consolidating mail destined for the same location.

delivery to homes and offices. Some mail, like drop shipped commercial mail, can bypass certain processing facilities and transportation. Most processing facilities simultaneously handle incoming and outgoing mail.

The Mail Processing Network

The current mail processing network represents an incredibly broad array of facilities that handled over 170 billion pieces of mail in FY 2010 (565 million pieces a day). Table 1 shows the Postal Service had 528 processing facilities in FY 2010; however, these facilities perform different roles and functions in the network and are very different in size and scope. Appendix B has additional information on mail processing facilities.

Table 1: Number of Processing Facilities FY 2010

Processing Facilities	Number of Facilities
Process and Distribution Centers	260
Customer Service Facilities	164
Network Distribution Centers (formerly BMCs)	21
Logistics and Distribution Centers	13
Annexes	51
Surface Transfer Centers	11
Air Mail Centers	1
Remote Encoding Centers	2
International Service Centers	5
Total Processing Facilities	**528**

Source: Postal Service FY 2010 Annual Report

The backbone of the network are the 260 Processing and Distribution Centers (P&DCs) and 21 Network Distribution Centers (NDCs). P&DCs prepare and distribute outgoing mail to the network and distribute incoming mail to local post offices for delivery. Generally speaking, the larger the facility, the more types of mail processing equipment are present. In some instances, a facility may only process certain mail products and shapes. As a rule, the number and locations of processing facilities are driven by the overnight commitment standard for First-Class Mail, i.e., mail that must be collected, cancelled, and returned to Post Offices for delivery the next day. As a result, plants were thickly populated across the country to primarily deliver single-piece First-Class Mail in 1 to 3 days.

NDC facilities are strategically located near major metropolitan areas and transportation centers and are characterized by their resemblance to a truck terminal. NDCs serve as centralized processing and transfer points for designated geographic areas. They are the gateways to the surface and air transportation networks. The NDC network serves to fill containers and trucks early in the network and dispatch them as deep into the network as possible.

The Transportation Network

Postal Service transportation networks exist to support mail processing and delivery activities. Transportation is the link connecting the outgoing and incoming distribution elements that create the network. From the highway contractors to the wide-body cargo planes operated by FedEx and United Parcel Service (UPS), purchased transportation represents the second-largest share of postal costs after labor. The transportation network is principally composed of contracted highway and air transportation. Surface transportation is primarily used to transport Standard Mail®, Periodicals, and Package Services. Surface transportation is also used to transport First-Class Mail® usually within a 500-mile destination radius.[3] Generally, transportation of mail by air is more expensive than surface transportation and is reserved for longer trips and mail classes with tighter service standards, such as First-Class Mail, Priority Mail, and Express Mail. Table 2 shows the Postal Service spent $5.9 billion on purchased transportation in FY 2010. Transportation network expenses are impacted by many factors including miles traveled, weight, cubic feet, vehicle utilization, and fuel cost.

Table 2: FY 2010 Purchased Transportation Expenses (In Millions)

Mode of Transportation	FY 2010 Expense
Highway	$3,205
Air	2,425
Other	248
Total Transportation Expenses	**$5,878**

Source: Postal Service FY 2010 Annual Report

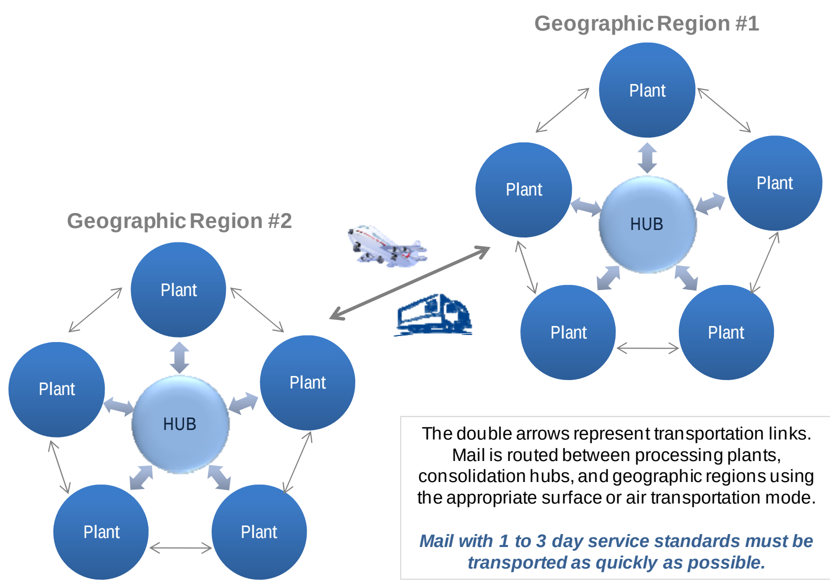
For air transportation, FedEx is the primary carrier and has two networks: a night operation with 147 air stops to transport Express Mail and a day operation with 76 air stops to transport Registered Mail, Priority Mail, and First-Class Mail. UPS also supports Postal Service air transportation by transporting First-Class Mail and Priority Mail. Commercial airlines also transport some First-Class Mail, Express Mail, and Priority Mail. The surface transportation network is mostly comprised of over 17,000 commercial contract highway carriers. There are three types of highway transportation contracts: regular, temporary, and emergency. Regular transportation contracts are competitively awarded for 4 years and are renewable by mutual agreement. Temporary highway transportation contracts cannot exceed 2 years and emergency highway transportation contracts are entered into to meet unusual needs such as when an emergency occurs.

[3] The Postal Service has suggested that surface transportation might also be used to transport mail distances as long as 1,300 miles in particular, advantageous situations.

The Transportation Distribution Strategy

The objective of mail distribution is to collect, transport, and deliver mail expeditiously within specified service standards for each class of mail. The current Postal Service transportation distribution strategy is a hybrid of hub-and-spoke and direct plant-to-plant connections. The hub-and-spoke portion of the strategy routes mail from a facility to a consolidation point such as an NDC and then distributes the mail to smaller facilities in a given geographic area. The direct plant-to-plant connections are usually regional and allow mail to be routed directly from one plant to another without going through a consolidation point. Figure 2 provides a simplified example of a hybrid transportation distribution strategy.

Figure 2: Simplified Example of a Hybrid Transportation Distribution Strategy



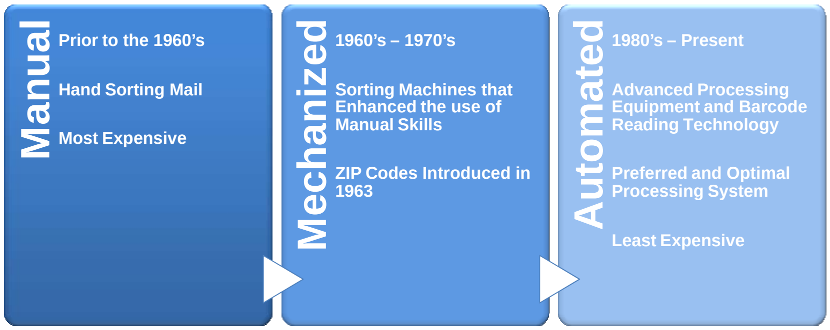
Source: OIG Analysis

Factors Affecting Mail Processing and Transportation

In addition to the Universal Service Obligation, the evolution of mail processing technology, work content and mail mix, service standards, and volumes are factors that have shaped Postal Service's mail processing and transportation network.

- Processing Technology: The Postal Service has made dramatic strides from manual handling to mechanized sorting to the automated processing equipment that sorts letters at extraordinary speeds. The introduction of ZIP Codes™ in 1963 further simplified mail distribution by creating the ability to efficiently sort mail to common destinations. Figure 3 highlights how the methods used to sort mail to its final destination have evolved over the last 50 years. Highly automated processing capabilities also lead to greater efficiency and lower mail handling cost. While automated processing equipment does sometimes require a great deal of space, the level of processing technology that now exists suggests the need for a profoundly different mail processing network than the one born of manually sorting letters.

Figure 3: Evolution of Mail Processing Capabilities

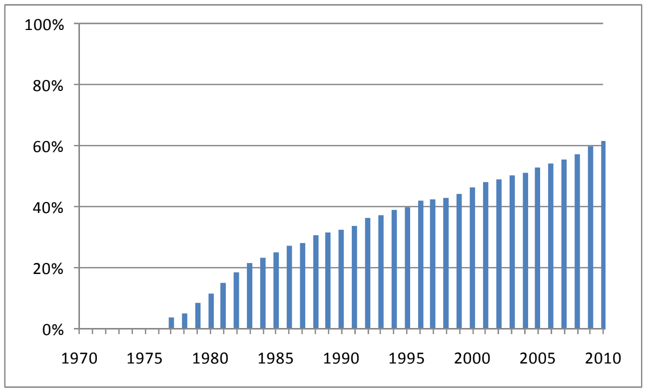


Source: OIG Analysis

- Work Content and Mail Mix: Work content (e.g., extent of destination entry, automation, and presort) and mail mix such as shape (e.g., letter, flat, and parcel) affect the demand for mail processing and transportation capacity. Historically, the Postal Service built its network to match the requirements of single-piece First-Class Mail letters and flats. But now, the increase in workshared mail has decreased the demand for processing and transportation capacity. The two major forms of worksharing, presorting and drop shipping, both bypass postal operations — drop shipping especially so, because it avoids origin operations altogether. Presorted mail requires less processing and by drop shipping, the mailer transports the mail directly to the destination postal facility. As highlighted in Figure 4, the percent of First-Class Mail workshared letters has increased to more than 60 percent. Also, Figure 5 depicts that drop shipped Standard Mail has increased to over 80 percent.[4]

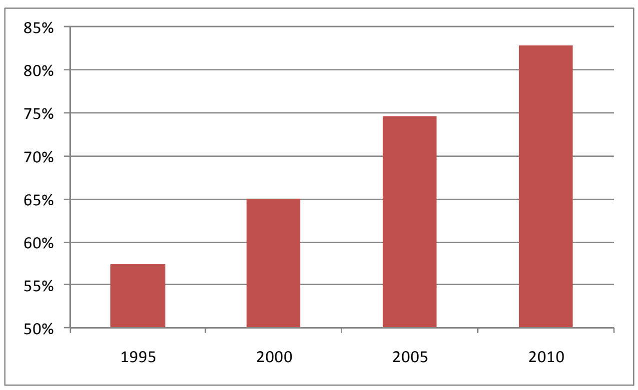
[4] The Postal Service does not offer workshare discounts for drop shipping First-Class Mail.

Figure 4: Percent of First-Class Mail Workshared Letters 1970 through 2010



Source: PRC Domestic Mail Volume History and Postal Service Revenue, Pieces, and Weights

Figure 5: Percent of Drop Shipped Standard Mail 1995 through 2010

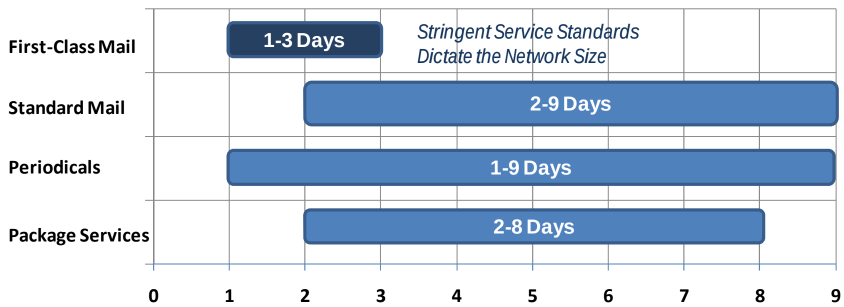


Source: Postal Service Billing Determinants

- Service Standards:[5] Service standards are probably the most critical determinant of the number, size, and location of Postal Service processing facilities. Service standards also impact the type and frequency of the transportation links between those facilities. The network evolved to ensure that mail reached its final destination within a designated timeframe. Figure 6 outlines service standards in the 48 contiguous states for major mail classes. It is important to note that the national 1-to-3 day standard for First-Class Mail is a primary factor that drives the number of facilities needed in the network as well as determining if the mail travels by highway or air.

[5] Service standards are stated goals for service achievement for each mail class. The standards incorporate the days-to-deliver for each 3-digit ZIP Code origin-destination pair within the Postal Service network. The standards also serve as the benchmark for measuring service performance. There are over 852,000 origin-destination 3-digit ZIP Code pair combinations in the postal network for each market dominant mail class.

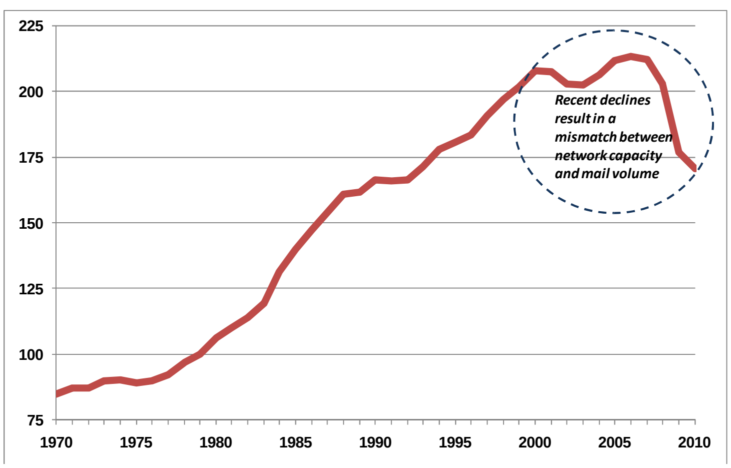
Figure 6: Service Standards by Major Mail Class



Source: 2010 Comprehensive Statement on Postal Operations

- Mail Volumes: Mail volumes are also a determinant of the need for processing and transportation capacity. Figure 7 provides historical mail volumes from 1970 to 2010. The Postal Service designed the current processing and transportation network to meet the historical growth in mail volumes. Since 1970, mail volumes have steadily grown reaching a peak of 213 billion pieces in 2006. Recent declines have contributed to the mismatch between network capacity and demand. Future mail volumes are an important factor in determining the size and extent of the future mail processing and transportation network. In simple terms, the existing network was built and staffed for historically high mail volumes.

Figure 7: Historical Mail Volumes 1970 through 2010 (Billions)

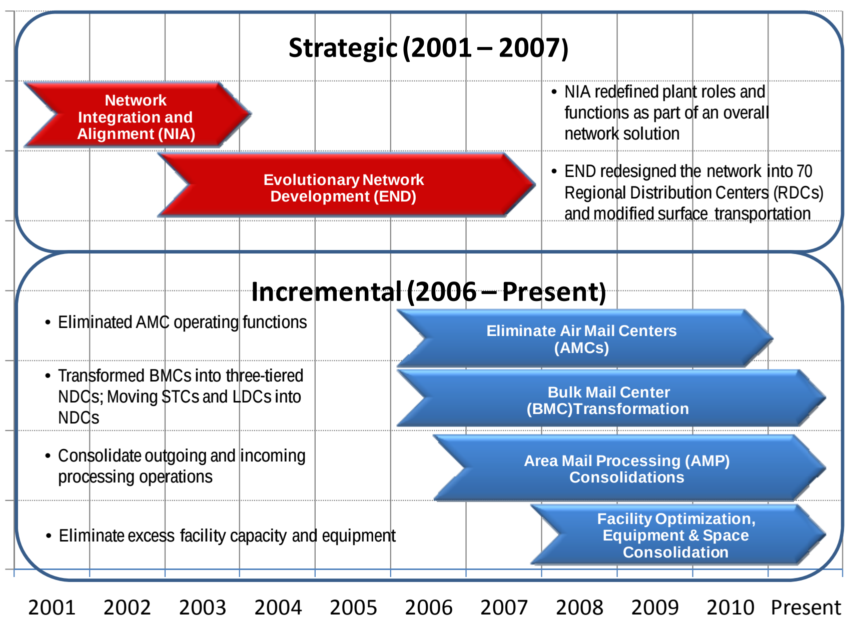


Source: Postal Service: Pieces of Mail 1970 to 2010

Current Postal Service Network Rationalization Efforts

Since 2001, the Postal Service has initiated several major efforts to realign its mail processing and transportation networks. Each initiative has addressed the issues differently, but they all have potential merit. Figure 8 highlights the major phases of the Postal Service's rationalization efforts. There are some overlapping initiatives. For example, the Evolution Network Development (END) included Area Mail Processing (AMP) consolidation and discussed transforming the Bulk Mail Center (BMC) network.[6] This paper categorized the efforts as strategic or incremental based on their breadth and scope.

Figure 8: Postal Service Rationalization Efforts



Source: OIG Analysis

Strategic Initiatives (2001-2007)

From 2001 through 2007, the Postal Service explored strategic rationalization efforts at a time when volumes were still growing and its financial health was good. The Postal Service presumed it had the capital to build new facilities and close old ones. Network Integration and Alignment (NIA) and END were strategic "big bang" proposals designed to reduce total system costs and improve efficiency. NIA proposed to reconsider the role and functions of existing postal plants, present reductions in transportation cost, and explore new worksharing opportunities. END introduced a complete network redesign that included creating 70 Regional Distribution Centers, modifying the surface transportation network to reduce overall cost, and reducing redundant transportation networks for different mail classes. In the end, the Postal Service perceived radical

[6] Although there were several proposals to streamline the BMC network between FYs 2005 and 2008, it was not until May of 2009 that the Postal Service began the transition of the BMC network into NDCs.

redesign proposals such as NIA and END[7] to be impractical and instead began to pursue incremental initiatives.

Incremental Initiatives (2006-Present)

Since 2006, the Postal Service scaled back the strategic plans of NIA and END and modeled mail processing and transportation operations. The goal was to identify where the network did not function efficiently and where there were opportunities to reduce workhours and transportation costs, while not adversely impacting service. This incremental approach included the elimination of Air Mail Centers (AMCs), the transformation of BMCs into NDCs,[8] Area Mail Processing (AMP) consolidations, and elimination of excess facility space and equipment.[9]

Some of the Postal Service initiatives were a result of changing mailer behavior, i.e., increased workshared mail and decline in single-piece First-Class Mail. For example, BMC network operations were no longer needed because the introduction of mail preparation and transportation workshare discounts encouraged mailers to bypass BMC origination operations and enter mail at destination postal facilities.

Results of Network Rationalization Initiatives

The Postal Service has made progress in streamlining the mail processing and transportation network. Since FY 2005,[10] the Postal Service closed several AMCs and approved or proposed 29 AMP[11] consolidations. In March 2010, the Postal Service completed reorganizing the functions of the 21 BMCs into NDCs and as of October 2010 realized $111 million of projected annual savings.[12] Between 2004 and 2006, the Postal Service closed a net of two facilities; however, between 2006 and 2010, a net of 145 facilities of varying size and function were closed. Notably, rationalization efforts closed nine P&DCs (major plants), the backbone of the mail processing network. In addition, AMCs were no longer needed because of contracts with FedEx and UPS to transport mail by air. Table 3 presents the net change in mail processing facilities since 2004.

[7] Because END initiatives would potentially result in nationwide changes to service standards, it was presented before the Postal Regulatory Commission. See Docket No. N2006-1.
[8] Appendix B provides additional details on the history of the BMC network.
[9] For example, in cases where there is excess capacity and floor space in plants, facilities such as annexes are consolidated because they are no longer needed. Equipment may be repurposed or eliminated to create additional space.
[10] GAO audit report, *Mail Processing Network Initiatives Progressing, and Guidance for Consolidating Area Mail Processing Operations Being Followed*, (GAO-10-731), June 2010
[11] The Postal Service has initiated a number of AMP studies. Updated AMP studies are available on the Postal Service website: http://www.Postal Service.com/all/amp.htm
[12] OIG audit report, *Network Distribution Center Activation Impacts* (EN-AR-11-002), March 2011. The NDC implementation resulted in transportation savings of more than $77 million as of October 2010 and a portion of the savings was from mail that formerly traveled on airline carriers that is now transported via surface transportation. Actual workhour savings were $33.9 million.

Table 3: Net Change in Mail Processing Facilities

Processing Facilities	Net Change 2004-2006	Net Change 2006-2010
Process and Distribution Centers	0	(9)
Customer Service Facilities	0	(31)
Network Distribution Centers (formerly BMCs)	0	0
Logistics and Distribution Centers	0	2
Annexes	0	(15)
Surface Transfer Centers	3	(6)
Air Mail Centers	(2)	(76)
Remote Encoding Centers	(3)	(10)
International Service Centers	0	0
Total Processing Facilities	**(2)**	**(145)**

Source: OIG Analysis

Table 4 presents the net change in transportation expenses since 2004. As mentioned earlier, transportation expenses are impacted by many factors, such as fuel costs and mail weight, which may be unrelated to rationalization efforts. Nonetheless, transportation expenses increased by $1.1 billion between FY 2004 to FY 2006 and decreased by $200 million between FY 2006 and FY 2010.

Table 4: Net Change in Purchased Transportation Expenses (In Millions)

Mode of Transportation	Net Change 2004-2006	Net Change 2006-2010
Highway	$ 554	$ 228
Air	$ 586	$ (346)
Other	$ (64)	$ (49)
Total Transportation Expenses	**$ 1,076**	**$ (167)**

Source: OIG Analysis

With the enactment of the Postal Accountability and Enhancement Act of 2006 (Postal Act of 2006), the Postal Service is required to annually report its network rationalization efforts to Congress.[13] The plans outlined the three core network rationalization efforts to include closure of AMCs, AMP consolidations of outgoing and/or incoming mail processing operations, and transformation of the BMC network. The OIG and the Government Accountability Office (GAO) conducted audits assessing the Postal Service's network rationalization initiatives.[14] One OIG report highlighted that, although the Postal Service has made progress in its effort to streamline its mail processing and transportation infrastructure, management has been unable to fully adjust resources to offset mail volume declines. The OIG also issued a series of facility optimization reports that identified opportunities to optimize existing real estate.[15] Excess space existed in a

[13] The Postal Service submitted its first-ever annual network plan to Congress in June 2008. It is required to annually submit a summary report to Congress 90 days after the end of each fiscal year. The summary report must discuss how postal decisions have impacted or will impact rationalization plans.

[14] OIG audit report *Status Report on the Postal Service's Network Rationalization Initiatives*, (EN-AR-10-001), January 2010; GAO audit report *U.S. Postal Service Mail Processing Network Initiatives Progressing, and Guidance for Consolidating Area Mail Processing Operations Being Followed*, (GAO-10-731), June 2010. At the request of members of Congress, the OIG has also audited specific AMP consolidation proposals.

[15] The OIG issued the following facility optimization audit reports during FY 2011: DA-AR-11-001, DA-AR-11-002, DA-AR-11-003, DA-AR-11-004, DA-AR-11-005, DA-AR-006, and DA-AR-11-007. The OIG also issued *Excess Space in Mail Processing Facilities in the Suncoast District,* (EN-AR-11-001), November 2010.

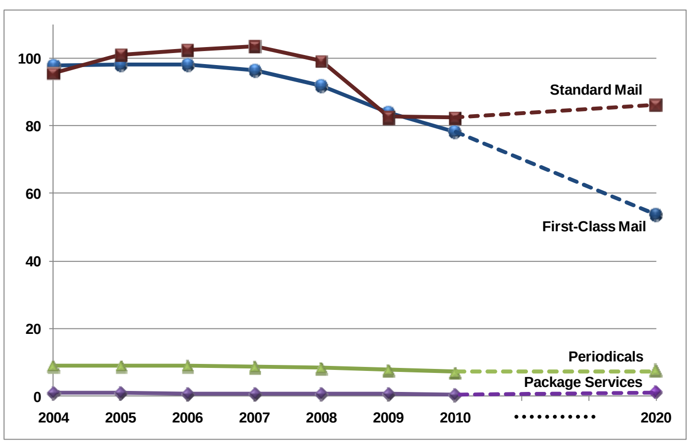
number facilities located in several districts. The OIG recommended that the Postal Service clarify excess space reporting procedures and pursue opportunities with other federal agencies as an option to optimize excess property.

An Incremental Approach May Not Be Enough[16]

The gap between mail processing and transportation capacity and demand is growing and many stakeholders want to know more about the Postal Service's long-term strategies. As discussed previously, the same factors that created the existing mail processing and transportation network can be considered in a future network design. Those factors include the evolution of more efficient processing technology, different work content and mail mix, meeting service standards, and significant declines in mail volumes. Processing technology is continuing to improve resulting in higher machine throughputs and new processing capabilities (e.g., flats sequencing). Major business customers are presenting mail that is presorted more finely and drop shipped more deeply into the Postal Service network. With more work being done by its customers, there is less work for the Postal Service.

Declines in mail volume further create an opportunity to rightsize the mail processing and transportation network. Overall total mail volume peaked in FY 2006 and significantly declined in FY 2010. Figure 9 presents current and future[17] mail volumes by mail class. Although Standard Mail and Package Services volumes are projected to slightly increase, First-Class Mail projected volumes decrease significantly.

Figure 9: Mail Volume by Class for FY 2004 – FY 2010 and FY 2020
(In Billions)



Source: Postal Service Annual Reports and BCG 2020 Mail Volume Projections

[16] A former Postal Service Vice President of Strategic Planning discussed lessons learned from an earlier transformation effort and offered insights to how organizations can keep a turnaround from faltering. One insight cautioned organizations not to mistake incremental improvements for strategic transformation and noted that operational successes can blind you to the need to re-invent the business strategically. See, generally, "When a Turnaround Stalls," *Harvard Business Review*, February 2002.
[17] Future mail volumes are the Boston Consulting Group mail volume forecasts for FY 2020.

Model Framework and Results

This section describes the framework used to simulate a future Postal Service mail processing and transportation network.[18] The modeling goal was to develop a high-level objective and transparent simulation of mail processing and transportation network processes to determine the performance of hypothetical network designs using projected FY 2020 mail volumes. The model also evaluated the impact of various transportation network distribution strategies on cost and service. The objective was not intended to precisely replicate the real-world postal network, but rather, to provide a framework for testing the performance of hypothetical network designs and thereby inform the debate over possible future changes to the mail processing and transportation network.

Model Framework: What We Did

The model began with a blank slate, or green field, approach for determining the appropriate number of processing plants and extent of transportation. The model simulated domestic mail volume flows for 13 major mail products, which were defined based on mail class, shape (e.g., flats and letters), and presort level.[19] Although the model does not identify specific facility locations or transportation routes, it does address key characteristics of a future rightsized network such as the number of plants and the service radius covered by each plant. Figure 10 presents the three critical steps of the model framework: number of facilities, transportation distribution strategy, and impact on cost and service. Following is a brief discussion of each stage. The mail types modeled and a more detailed discussion of the model framework can be found in Appendix C.

Figure 10: Three Critical Steps of the Model Framework

Source: OIG Model Analysis

[18] Modeling and simulation is a discipline used for developing a level of understanding of the interaction of the parts of a system, and of the system as a whole. A model is a simplified representation of the actual system intended to promote understanding. A simulation generally refers to a computerized version of the model which is run over time to study implications of the defined interactions.

[19] The study analyzed the network for letters and flats, which comprise over 97 percent of mail volume. Although there may be some overlapping, the Postal Service's current processing and transportation network for letters and flats is somewhat distinct from the processing and transportation network for parcels. Our research of foreign posts further suggests that a best practice is to establish and manage a separate network for parcels. A similar, follow-on study could analyze a separate network for parcels.

First Step: Number of Facilities

The modeling's first critical step is the number and general placement of processing facilities, establishing a network footprint. Regardless of the current location of processing plants, a geometric facility placement approach was used that assumed each processing facility could service all of the 3-digit ZIP Codes within a specified service radius. This service radius variable was used to indirectly alter the number of facilities in the network, i.e., a larger service radius produced a network with fewer facilities, and vice versa. The approach determined the number of plants based on a maximum service radius and specific placement rules.[20] At first, the methodology established a baseline of processing facilities that approximated the current number of plants based on a 70-mile maximum service radius. This resulted in a baseline processing network of 319 facilities that serve every 3-digit ZIP Code.[21] Although the 319-facility baseline network is not identical to the current Postal Service network, it loosely represents the backbone of the network, which comprise 260 plants and 21 NDCs, or 281 facilities.

The baseline provides an apples-to-apples starting point to compare alternative networks. Defining a baseline network also provided a common reference point for interpreting the relative performance of all other alternative network scenarios that were tested. The model evaluated four alternative networks in addition to the baseline network. The alternative networks were based on a maximum service radius ranging from 55 to 150 miles. Table 5 presents the baseline along with the four additional scenarios, which resulted in a facility count ranging from 96 to 404 processing plants. A map depicting the modeled baseline network and the four alternative networks can be found in Appendix C.

Table 5: Facility Placement Scenarios

Scenario	Maximum Service Radius	Facility Count
Baseline	***70 miles***	***319***
One	55 miles	404
Two	90 miles	214
Three	120 miles	135
Four	150 miles	96

Source: OIG Model Analysis

Second Step: Transportation Distribution Strategy

Having established a baseline, the model's second critical step is selecting the transportation distribution strategy, or the rules used to dictate how mail is routed between each processing plant from origin to destination. Figure 11 describes the three

[20] The facility placement algorithm used a maximum service radius per plant in selecting the geographic point serving the greatest number of 3-digit ZIP Codes. The algorithm placed a facility at that chosen point and removed those 3-digit ZIP Codes from further consideration. The algorithm repeated this process until a facility covered every 3-digit ZIP Code.
[21] We modeled the continental United States and did not include Alaska, Hawaii, and Puerto Rico.

distribution strategies included in the analysis. The baseline network used a pure consolidation (hub-and-spoke) distribution strategy, which routes mail through consolidation hubs. In addition to the baseline hub-and-spoke distribution strategy, the model also evaluated two alternative strategies — shortest path, in which mail is sent using the shortest distance surface route between facilities, and hybrid consolidation, which is similar to the Postal Service's current strategy and is a combination of shortest path and hub-and-spoke, which allows mail to bypass hubs and exchange directly with processing facilities. Plants are connected to one another regionally when there is sufficient mail volume between them to create their own transport links, and each plant is connected to one or more consolidation centers. Additional information about the distribution strategies can also be found in Appendix C.

Figure 11: Alternative Distribution Strategies Analyzed

Shortest Path

Mail is sent by the shortest surface route with no leg exceeding 500 miles. Air transport is used only if the surface route will not meet the service standard.

Pure Consolidation (Hub-And-Spoke)

Facilities are classified as consolidators (hubs). All mail is routed through consolidation hubs (maximum of 2) from origin to destination. No mail is exchanged directly between processing facilities.

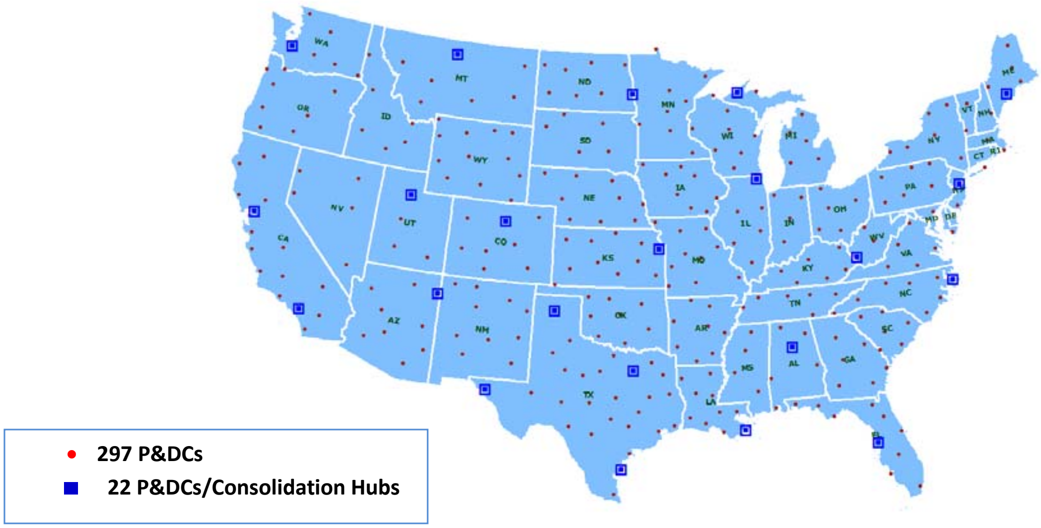
Hybrid Consolidation

Incorporates elements of pure consolidation and shortest path. Some mail is directed to hubs, but nearby processing facilities (less than 500 miles) would also exchange mail directly, thereby bypassing hubs.

Source: OIG Model Analysis

To determine which facilities would act as consolidation hubs in the baseline model, a similar radius-based approach was used to select a subset of the facilities for promotion to hubs. For a chosen consolidation radius the same type of process was used to select particular plants for promotion based on the number of 3-digit ZIP Codes covered within the consolidation radius ranging from 400 to 800 miles. This promotion process proceeded until every ZIP Code was covered by at least one hub. In addition to consolidation activities, these hubs also perform the same mail processing activities as non-hub plants. The baseline network promoted plants to hubs using a 400-mile service radius. Using the hub-and-spoke transportation distribution strategy, Figure 12 presents the baseline network with a total of 319 facilities of which 22 facilities function as consolidation hubs.[22]

Figure 12: Baseline Network with a total of 319 Facilities (70-Mile Service Radius), of which 22 are Consolidation Hubs (400-Mile Service Radius)



Source: OIG Model Analysis

Third Step: Impact on Cost and Service

The model calculated estimated mail processing and transportation cost[23] and service performance for combinations of facility placement and transportation distribution strategy. Hence, the model's third critical step was applying projected mail volumes, mail processing and transportation costs, and incorporating the service standards. The framework used FY 2020 mail volume forecasts of 145 billion pieces, which represents almost 97 percent of projected mail volume.[24]

The total estimated network cost was computed as an aggregate of both transportation and mail processing costs for each network configuration. It is important to note that we did not attempt to capture all costs within the model. The purpose of estimating network costs was to allow for relative, not absolute, apple-to-apple comparisons between various alternative network configurations within the context of the modeling. Service performance was defined as the percentage of mail that met its current ZIP Code-to-ZIP

[22] The consolidation hub selection process used a maximum consolidation service radius in selecting the existing facility serving the greatest number of 3-digit ZIP Codes. The process "promoted" a facility to a hub and removed those 3-digit ZIP Codes from further consideration. The process was repeated until a hub covered every 3-digit ZIP Code. The remaining non-consolidation facilities were then assigned to their nearest hub to form a classical hub-and-spoke network.
[23] Mail processing cost estimates are based on workload, incoming, outgoing, and support workhours, and postal labor rates. Transportation cost estimates are based on workload, surface costs, and air costs. Modeled cost estimates will naturally differ from total postal accrued costs; however, modeled cost estimates allow for relative "apple-to-apple" comparisons between alternative network configurations included in the analysis.
[24] The analysis excluded certain mail products, including parcels, so the framework evaluated a subset of the total volume forecast of 150 billion pieces for FY 2020.

Code service standard. The analysis computed the performance of alternative scenarios on cost and service compared to the modeled baseline of 319 facilities of which 22 are consolidation hubs, and a hub-and-spoke transportation distribution strategy. Appendix C presents a more detailed discussion of the data and service standards.

Model Results: Significantly Fewer Facilities Needed

Based on the model analysis and balancing cost differences with service impacts, we selected a preferred network with a total of 135 mail processing facilities, of which 15 are consolidation hubs, employing a hybrid transportation distribution strategy. This would match future volume workload and reduce net processing and transportation costs. It would also meet or exceed existing service performance for all mail, except for eight percent of non-presorted Priority Mail (less than a few hours delay on average). The impact on service for non-presorted Priority Mail is arguably marginal and, if not mitigated by operational improvements, may be an acceptable tradeoff for significant cost reductions. Table 6 presents a summary of model results and detailed results can be found in Appendix D.

Table 6: Summary of Model Results

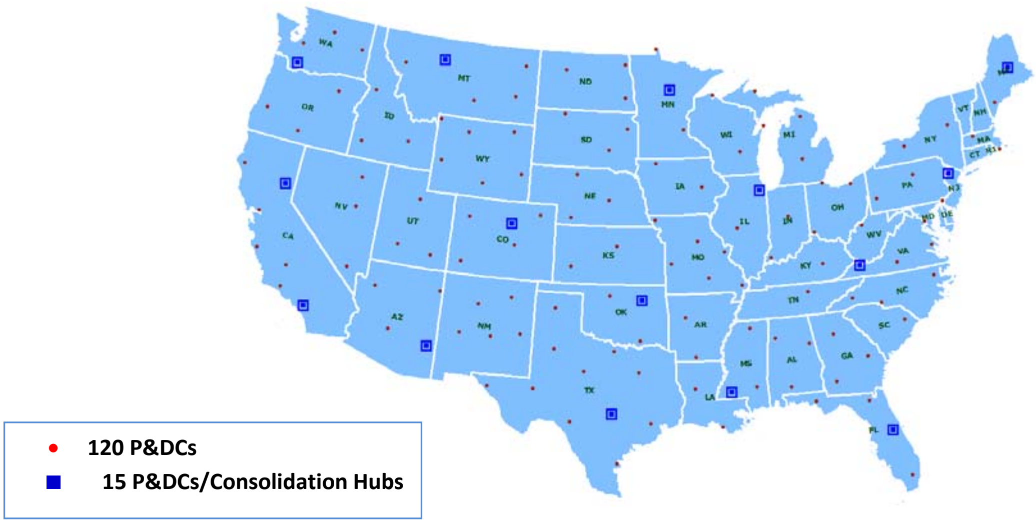
Scenario	Number of Facilities	Number of Hubs	Distribution Strategy	Net Cost Difference	Service Impacted
Baseline	***319***	***22***	***Hub & Spoke***	**-**	**-**
Preferred	135	15	Hybrid Consolidation	-9%	Priority Mail
No Service Impact	214	17	Hybrid Consolidation	-7%	None
Lowest Cost	96	11	Hybrid Consolidation	-11%	Several

Source: OIG Model Results

Ignoring implementation costs, the net mail processing and transportation costs for the selected preferred network would be $2 billion[25] less per year than the baseline. Figure 13 presents a map of the facility and consolidation hub placement. Again, the map represents hypothetical facility locations. Detailed cost calculations can be found in Appendix D.

[25] The $2-billion cost difference would vary based on the net impact of assumptions, such as the efficiency of the baseline network.

Figure 13: Preferred Network – 135 Facilities (120-Mile Service Radius) of which, 15 are Consolidation Hubs (500-Mile Service Radius)



Source: OIG Model Results

Key Model Observations

The results illustrate the clear tradeoff between network size, cost, and service performance. The selection of a target network size therefore depends on the desired level of cost reduction and tolerance for service degradation. Model results reflect the decline in net processing costs and transportation costs as the service area expands. The model confirms that the Postal Service should pursue its current hybrid consolidation transportation distribution strategy, which combines a hub-and-spoke distribution strategy with the shortest path. The Postal Service can lower net costs by consolidating mail processing at central hubs to achieve economies of scale. The model does not identify specific plant location or size. It assumes the Postal Service has the flexibility to vary the size of the plants to accommodate local capacity.

- Impact on Mail Processing & Transportation Cost
  - There is a direct, significant relationship between mail processing costs and number of facilities. Processing costs decline substantially due to the economies of scale associated with having fewer facilities. Transportation costs are not significantly affected.
  - Changes in mail processing and transportation costs are not equivalent. In other words, when consolidating an oversized network, decreases in mail processing costs can be greater than increases in transportation costs.
  - This changing relationship between processing and transportation costs presents a strategic opportunity for the Postal Service to manage its cost structure. Processing costs are driven by labor costs that are traditionally

structural in nature and less responsive to local management initiatives. Transportation costs are driven by procurement contracts that should provide management more flexibility to control long-term costs.

- Impact on Service Performance

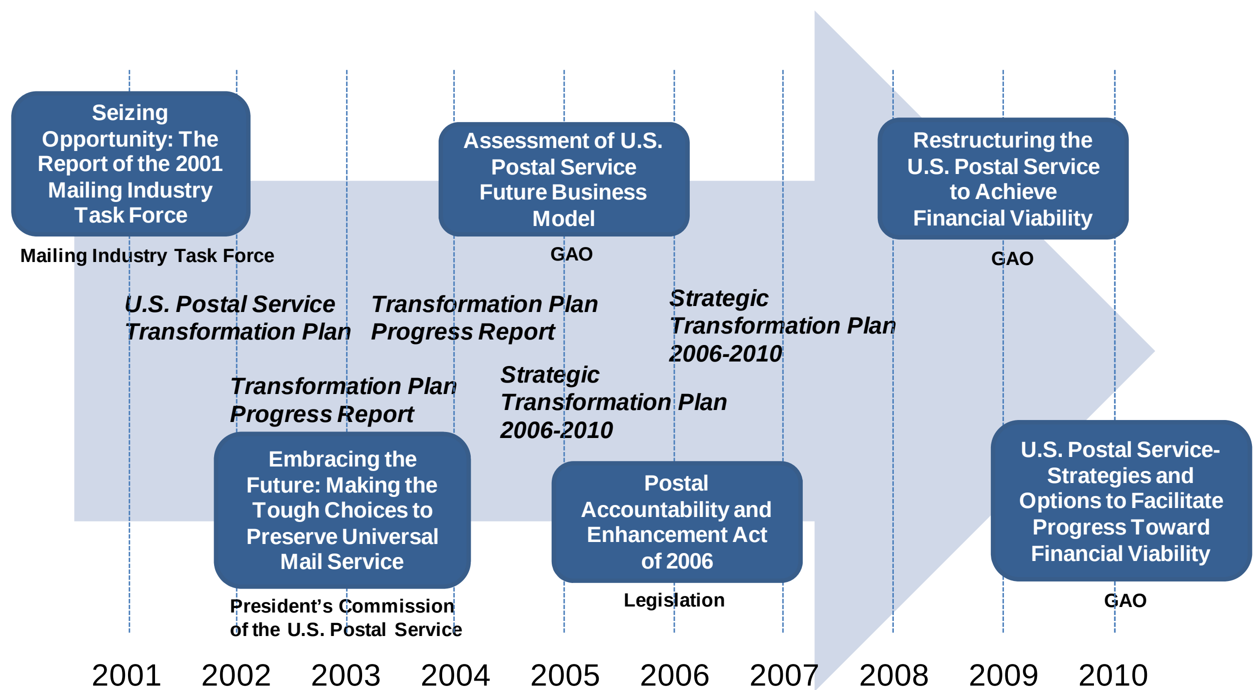
    - There is a direct, significant relationship between network size and service performance. As the network approaches one huge, centrally located plant, service performance would degrade significantly and would impact mail products with tighter service standards first.

    - Network consolidation does not impact performance as seriously for products with looser service standards. Appropriate network sizing, transportation, and intelligent processing could mitigate impacts to service.

Conclusion

Due to its unique role and national presence, Postal Service consolidation efforts attract significant attention. Over the last ten years, many outside parties have suggested the Postal Service should rationalize its processing network. In response, the Postal Service has published numerous plans outlining its approach to network rationalization. Transformation Plans, Transformation Strategic Plans, and Annual Comprehensive Statements highlight the need to transform the network and, in some instances, provide progress on planned efforts made to achieve stated goals. Figure 14 presents a timeline for selected network rationalization publications and Postal Service plans.

Figure 14: Timeline of Network Rationalization Publications & Plans



Source: OIG Analysis

In spite of recommendations, progress, and outreach efforts, the Postal Service faces challenges and obstacles in rationalizing its mail processing and transportation networks. In 2003, the President's Commission noted that it will take the flexibility of all who have an interest in the Postal Service's success — employees, mailers, consumers, partners, and politicians – to allow it to take full advantage of efficiency opportunities. While the Postal Service perceives some stakeholders to be impediments in its ability to rationalize the network, the experience of foreign posts and the private sector as well as the statements of the stakeholders themselves suggest the Postal Service can best succeed by actively engaging stakeholders in the planning phase – before any individual facility is identified for closure. A first step is to present a comprehensive plan that is based on an objective and transparent approach similar to one presented in this paper. The public policy prescription can consider the following items:

- Present a comprehensive plan that provides the target number of plants, transportation distribution strategy, and net operational cost differences.
- Align the workforce to the future network through attrition. While facility consolidations will affect the labor force, such changes can be made without significantly impacting jobs. Over the next ten years, the Postal Service anticipates that 300,000 employees, or over half of its current workforce, will be eligible to retire. If accomplished at a sensible pace, restructuring with significant savings can occur without layoffs.
- Increase the focus on transportation and transform to a world-class logistics network. The Postal Service has the flexibility to manage contract transportation costs more easily than mail processing labor costs.
- Focus on service consistency versus speed. Most mailers are more interested in knowing when the mail will be delivered, not how quickly it will be delivered.[26]
- Reach out to stakeholders, including unions, mailers, and public policy leaders, in network consolidation planning and implementation efforts. Appendix E provides a summary of our interviews with mailing industry stakeholders.

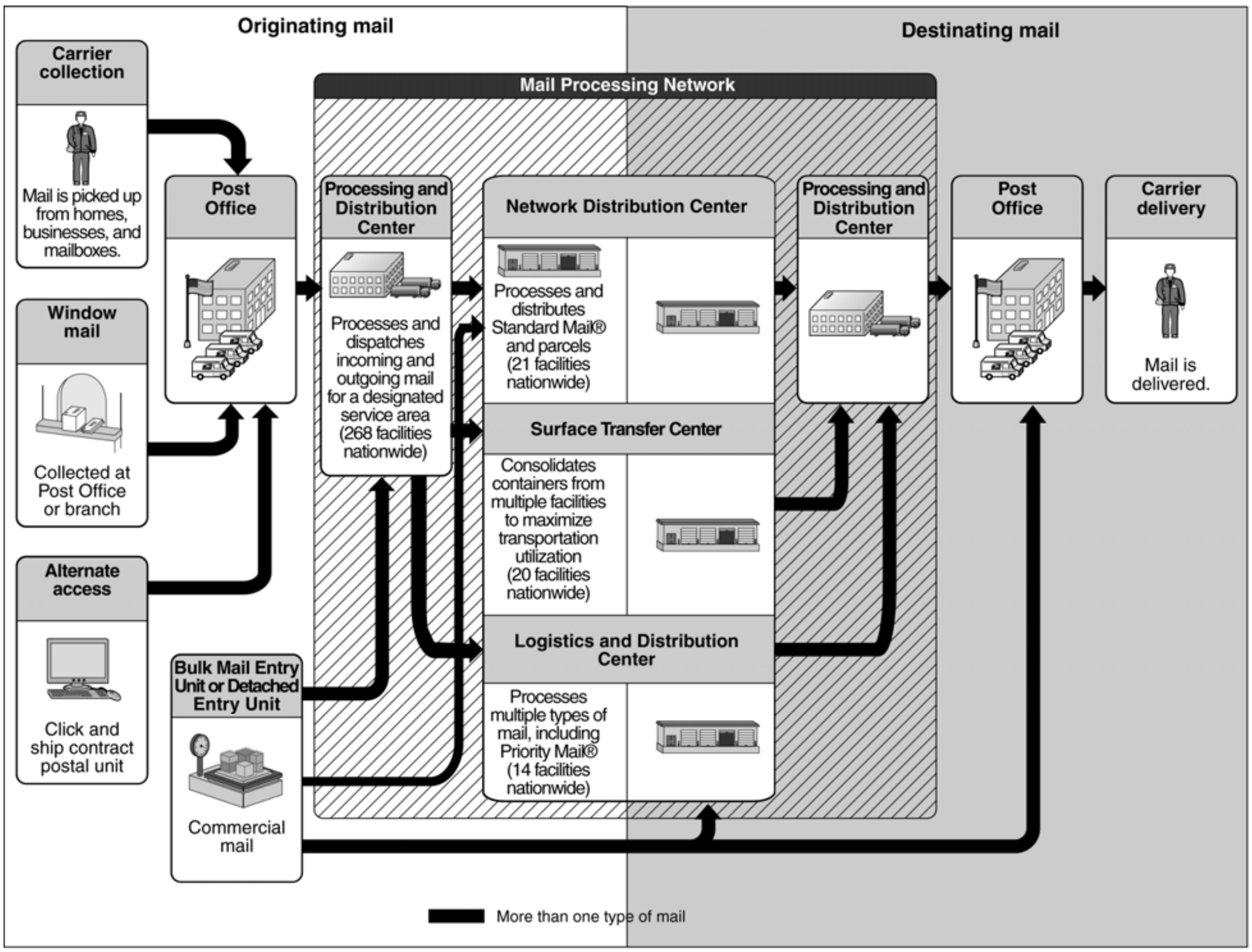
[26] Most customers we interviewed preferred consistency over speed. See Appendix E for details.

Appendices

Appendix A Mail Flow Diagram

The Postal Service mail processing function is very complex and no two plants operate exactly the same. Figure 15 highlights the flow of mail through the mail processing and transportation network.

Figure 15: Mail Flow Diagram



Source: GAO and Postal Service

Appendix B Mail Processing Facilities

The mail processing network processed 565 million pieces of mail a day in FY 2010 and is currently comprised of 260 P&DCs, 21 NDCs, and 247 other processing facilities that include customer service facilities, annexes, and LDCs. Table 7 provides the type and number of mail processing facilities from FY 2004 through FY 2010.

Table 7: Postal Mail Processing Facilities FY 2004 through FY 2010

Processing Facilities	2004	2005	2006	2007	2008	2009	2010
Process and Distribution Centers	269	269	269	269	269	268	260
Customer Service Facilities	195	195	195	195	195	195	164
Network Distribution Centers (formerly BMCs)	21	21	21	21	21	21	21
Logistics and Distribution Centers	11	11	11	14	14	14	13
Annexes	66	66	66	66	64	61	51
Surface Transfer Centers	14	14	17	14	20	20	11
Air Mail Centers	79	79	77	29	20	12	1
Remote Encoding Centers	15	15	12	10	6	3	2
International Service Centers	5	5	5	5	5	5	5
Total Processing Facilities	**675**	**675**	**673**	**623**	**614**	**599**	**528**

Source: Postal Service Annual Reports

NDCs were formerly BMCs. The BMC network was implemented in the 1970s to process Parcel Post, Bound Printed Matter, Media Mail, Standard Mail (catalogs, parcels, and bulk mail), and Periodicals. Originally, nearly all customer mail volume was entered at origin locations, which made BMC facility and transportation utilization efficient. The introduction of mail preparation and transportation workshare discounts allowed mailers to bypass BMC originating operations and enter mail at destination postal facilities. In 2007, the Postal Service proposed outsourcing the BMC network. Management issued a draft request for proposal in July 2008; however, because of the large drop in BMC network product volume, the Postal Service could not project volumes for the statement of work. Thus, in February 2009, management decided to terminate this initiative and re-engineer product flows through the BMC network by re-engineering them into the NDC network.

Appendix C Model Framework

This appendix contains a more detailed description of the mail processing and transportation simulation model. The modeling goal was to develop an objective and transparent simulation of mail processing and transportation network processes to determine the performance of hypothetical network designs using projected FY 2020 mail volumes. The model also evaluated the impact of various network distribution strategies on cost and service. The objective was not to precisely replicate the real-world postal network, but rather, to provide a framework for testing the performance of hypothetical network designs and thereby informing the debate over possible future changes to the mail processing and transportation network. To manage the complexity of the simulation, the following describes the modeling scope.

- The model simulated projected 2020 domestic mail volumes for First-Class Mail and Standard Mail letters and flats. Simulated mail flows originated and destinated within the continental United States. Origin-destination mail volumes were aggregated at the 3-Digit ZIP Code level for 13 distinct mail categories differentiated by shape, class of service, and presort level. Mail volumes were assumed to be constant each day.

- For modeling efficiency, the various pre-sorting, barcoding, and bundling operations that might be performed by mailers and consolidators were combined into a single, binary, “presorted” attribute. The processing costs for all mail designated as presorted were discounted relative to their single-piece equivalents, but the specific details of the presort operation were not modeled.

- The model abstracted the internal details of mail processing plant operations such as numbers of machines, operator shift schedules, etc. These internal details were distilled down to workhour regression equations that were used to estimate processing costs for various operations based on mail volumes.

- Surface transportation costs were assumed to be dependent only on the physical mail size, travel distance, and a cost per cubic-foot-mile factor. Air transportation costs were dependent on mail weight, class, travel distance, and a cost-per-pound-mile factor. A higher cost-per-pound-mile rate was used for Priority Mail and Express Mail air. The model did not take into account the number of physical trucks or planes that might be required to carry out the transportation operations. Transportation capacity was assumed to be unconstrained and available on-demand.

- Mail processing and transportation operations were not modeled for the Destination Delivery Unit (DDU)-level and below.

The following sections describe the model in more detail.

Estimating 2020 ZIP-to-ZIP Volumes

As no comprehensive source of 3-digit ZIP-to-ZIP volume data could be obtained,[27] a population-based method was used to obtain ZIP-to-ZIP volume estimates, with adjustments made to account for drop shipping. Actual FY 2009 national volumes were used as the starting point. These volumes were then projected forward using the estimated Compound Annual Growth Rates in Table 8 to obtain volume estimates for year 2020.

Table 8: Estimated 2020 Mail Growth Rates[28]

Class of Mail	Compound Annual Growth Rate	Source
First Class Mail	-4.0%	BCG Study
Standard Mail	0.4%	BCG Study
Periodicals	0.0%	Estimated
Package Services	5.0%	Estimated
Express Mail	5.0%	Estimated
Priority Mail	5.0%	Estimated

Source: OIG Analysis of BCG Study Mail Volume Estimates

The estimated 2020 volumes were then divided into drop shipped and non-drop shipped portions for the applicable mail types. All mail drop shipped to the DDU level was removed from consideration entirely as DDU-level operations were not modeled. Mail drop shipped to the Destination NDC/DSCF level was modeled as entering the network at the destination facility, and non-drop shipped mail was modeled as entering the network at its origin ZIP Code. Apart from the drop ship percentages listed below, 28 percent of First-Class Mail[29] was assumed to be "turnaround" mail, i.e., mail destinating in the same ZIP Code from which it originated. Table 9 below outlines the drop ship percentages.

Table 9: FY 2009 Drop Ship Percentages

Class of Mail	Shape	Presort	Total Drop Ship Percentage	DNDC/DSCF Level	DDU Level
Standard Mail	Letters	Yes	95%	95%	NA
Standard Mail	Flats	Yes	98%	38%	60%
Periodicals	Flats	Yes	71%	70%	1%
Package Services	Flats	Yes	79%	78%	1%

Source: Postal Service Billing Determinants used in the FY 2009 Annual Compliance Report

[27] The Postal Service indicated that they could not provide the OIG with origin/destination volume data because the data they had were old, inaccurate, and unusable.
[28] Boston Consulting Group study, *Envisioning America's Future Postal Service*. Selected Slides: http://www.PostalService.com/strategicplanning/_pdf/BCG_Selected_Slides.pdf
[29] An average of 28 percent is plausible because postal data indicate about 40 percent of single-piece First-Class Mail and about 15 percent of presorted First-Class Mail originates and destinates at the same SCF.

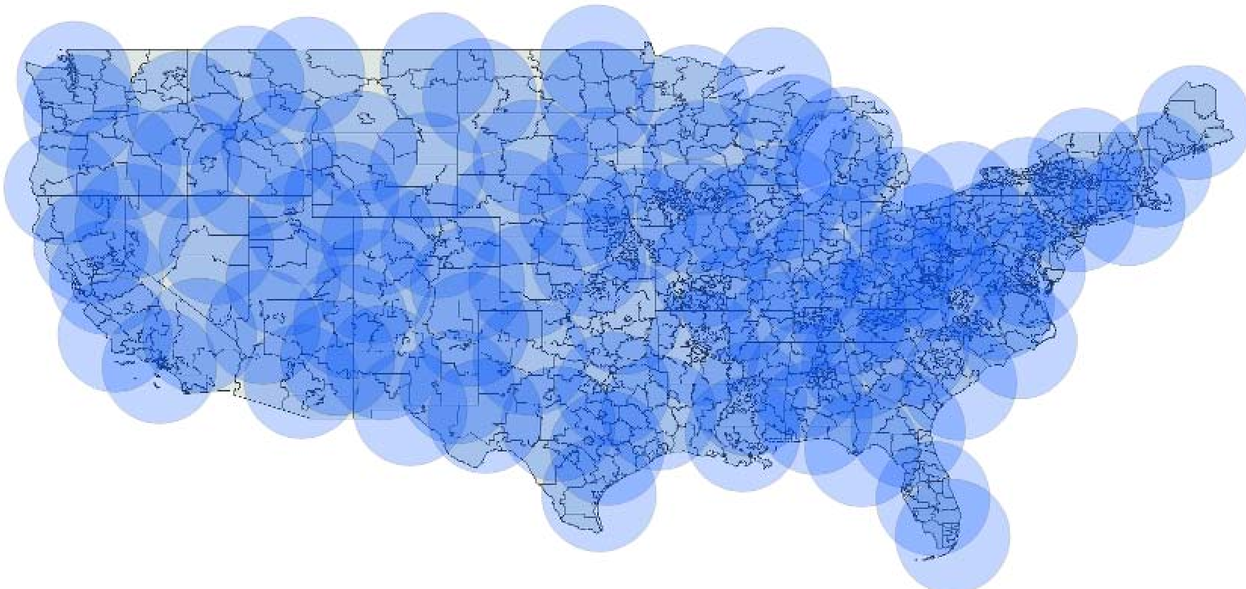
The ZIP-to-ZIP volumes were computed by first apportioning the non-drop shipped and non-turnaround volumes among each origin-destination ZIP-to-ZIP pair in proportion to the product of the origin-destination populations. The drop shipped and turnaround portions were then added to each ZIP Code's estimated turnaround mail volume, i.e., mail originating and destinating in the same ZIP Code, in proportion to that ZIP Code's population. Lastly, these estimated yearly ZIP-to-ZIP volumes were converted to daily equivalents for use in the model. This volume estimation approach provided a necessary approximation given the scarcity of available data.

Establishing the Baseline and Alternate Scenarios

A green field approach was used for locating the facilities in the hypothetical networks that were tested. A geometric facility placement approach was used that assumed each processing facility could service all of the ZIP Codes within a specified radius. This service radius variable was used to indirectly alter the number of facilities in the network, i.e., a larger service radius produced a network with fewer facilities and vice versa. For all purposes, a ZIP Code was assumed to be located at its geographic centroid. Thus, if a ZIP Code centroid was within a facility's service radius then the entire ZIP Code was considered to be covered by that facility.

For a specified service radius, the facility placement algorithm worked as follows: first, a ZIP Code centroid was chosen such that the greatest number of ZIP Codes fell within the specified service radius of the chosen point. Ties were broken using the distance-weighted populations of the covered ZIP Codes. In other words, if multiple candidate locations covered the same number of ZIP Codes, the algorithm favored the point closest to high-population areas. A facility was placed at the chosen point, and its covered ZIP Codes were removed from further consideration. This process was repeated until every ZIP Code was served by a facility. Figure 16 shows an example of a network topology generated using this approach and a 150-mile maximum service radius resulting in 96 facilities.

Figure 16: Example Network Topology of 96 Facilities (150-Mile Service Radius)

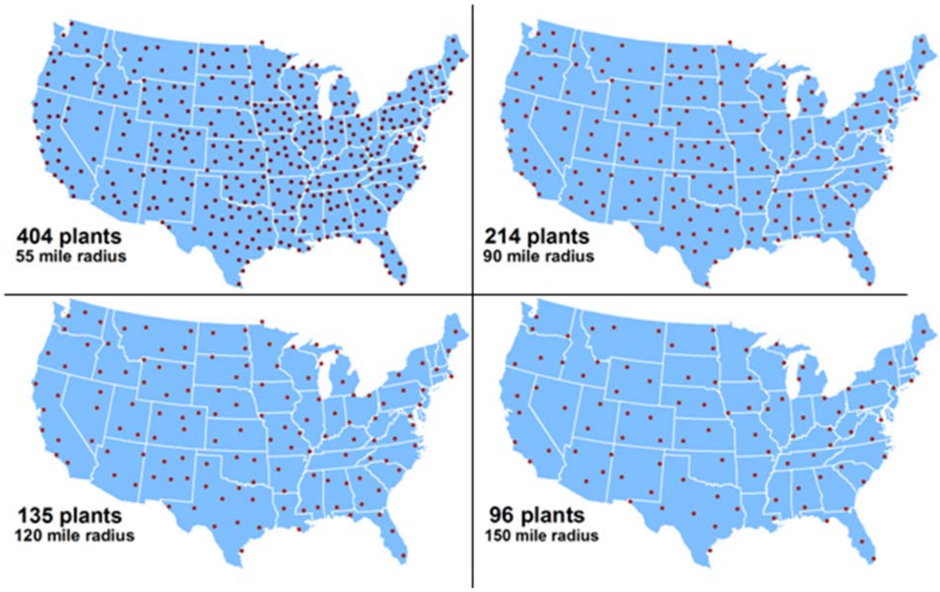


Source: OIG Model Analysis

We created a baseline of processing centers located on the map throughout the continental United States, regardless of the current location of processing plants. Defining a baseline network provided a common reference point for interpreting the relative performance of all other network alternatives tested. We attempted to define the baseline network in a way that loosely approximated the real-world network in terms of size, but in most other respects there are differences. The baseline network was generated using a maximum facility service radius of 70 miles, which resulted in a network of 319 facilities. A pure consolidation (hub-and-spoke) distribution strategy was used to control mail routing.

Having established a baseline we then explored the range of network sizes to determine its effect on network performance with a goal of selecting an optimal number of facilities. To do so, we generated several alternative network sizes based on different maximum service radii ranging from 55 miles to 150 miles. All results were compared against those of the baseline network size of 319 facilities. The alternative network scenarios tested are shown in Figure 17.

Figure 17: Alternative Network Scenarios



Source: OIG Model Results

To determine which facilities would act as consolidation hubs, a similar radius-based approach was used to select a subset of the facilities for promotion to hubs. For a chosen consolidation radius the same type of process was used to select particular plants for promotion based on the number of ZIP Codes covered within the consolidation radius ranging from 400 to 800 miles. This promotion process proceeded until every ZIP Code was covered by at least one hub. Each of the remaining non-consolidation facilities (spokes) was then assigned to its nearest hub to form a classical pure consolidation (hub-and-spoke) network distribution.

Selecting a Distribution Strategy

Our study explored alternative network designs and distribution strategies in order to provide guidance for future processing and transportation network changes. For example, we explored the effectiveness of pure consolidation (hub-and-spoke) style distribution versus the shortest path distribution. To evaluate alternative designs, we defined three distribution strategies that dictated the rules for how mail volumes were routed through the network from origin to destination. The three distribution strategies tested were shortest path, pure consolidation (hub-and-spoke), and hybrid consolidation. Each strategy is described below.

1. **Shortest Path:** Mail was sent via the shortest-distance surface route, with a constraint that no single surface leg could exceed 500 miles. The shortest paths were computed using the standard Dijkstra algorithm.[30] Direct air transport was

[30] The Dijkstra algorithm is often used in routing. For a given source vertex (node) in a graph, the algorithm finds the path with the lowest cost (i.e., shortest path) between that node and every other node. It can also be used for finding

used only for non-standard class mail if the shortest surface route would not meet the ZIP-to-ZIP service standard. Thus, in this strategy, service standard attainment was essentially enforced for non-standard class mail.

2. **Pure Consolidation** (Hub-and-Spoke): The facilities in the network were classified as either consolidators (hubs) or non-consolidators (spokes). Each spoke was assigned to its nearest hub, and all mail transported to and from the spoke occurred through its assigned hub, i.e., no direct spoke-to-spoke transport was possible. Mail that originated and destinated at the same facility was simply handled locally by that facility and not sent to a hub. Mail with a different origin and destination was first sent by surface transport from the originating facility to the hub (unless the origin was itself a hub). Once at a hub, if the mail's destination facility was a spoke served by the hub, the mail was sent down to it. Otherwise, the mail was sent directly to the hub that served the destination facility using air transport if the mail was non-standard class and the hub was greater than 500 miles away, or otherwise using surface transport. It was implicit in this strategy that mail could travel through a minimum of one facility, or up to a maximum of four (an origin spoke, origin hub, destination hub, and destination spoke).

3. **Hybrid Consolidation:** This strategy combines the pure consolidation strategy in which long-haul mail (greater than 500 miles) was routed through central consolidation hubs with the shortest path strategy that allows shorter distance mail to be transported directly between the origin and destination facilities, bypassing the hubs.

Mail Types and Attributes

To efficiently represent mail volume flows, 13 distinct mail types were defined based on mail class/product, shape, and presort level. Other associated attributes included pounds-per-piece and cubic-foot-per-piece. Table 10 shows the mail class and the associated attributes. In some cases, multiple products were combined into a single mail class.

costs of shortest path from a single node to a single destination node by stopping the algorithm once the shortest path to the destination node has been determined.

Table 10: Mail Types Modeled

Mail Class & Mail Products	Shape	Presort Level	FY 2009 Volume	FY 2020 Volume	Pounds Per Piece	Cubic Foot Per Piece
First Class Mail	Letters	No	31,633,220,000	20,189,565,156	0.02845	0.00176
1C Single Piece Letters/Postcards						
First Class Mail	Letters	Yes	47,933,717,000	30,593,183,449	0.03965	0.00224
1C Non-automation Presorted Letters						
1C Auto - Non-carrier Route Letters						
1C Non-automation Presorted Cards						
1C Auto Cards - Non-carrier Route Cards						
Standard Mail	Letters	Yes	50,218,327,800	52,472,660,924	0.05388	0.00256
Standard Automation Letters						
Standard Non-automation Letters						
Standard ECR Basic Letters						
Standard ECR High Density Letters						
Standard ECR Saturation Letters						
Standard Mail	Letters	No	9,311,881,600	9,729,897,971	0.05467	0.00259
Standard Automation Letters						
Standard Non-automation Letters						
First Class Mail	Flats	No	1,718,697,600	1,096,940,406	0.2254	0.00999
1C Single Piece Flats						
First Class Mail	Flats	Yes	1,145,798,400	731,293,604	0.16071	0.0068
1C Non-automation Presorted Flats						
1C Auto - Non-carrier Route Flats						
Standard Mail	Flats	Yes	18,054,882,150	18,865,377,454	0.21801	0.00781
Standard Automation Flats						
Standard Non-automation Flats						
Standard ECR High Density Flats						
Standard ECR Saturation Flats						
Standard ECR Basic Flats						
Standard Mail	Flats	No	2,337,952,500	2,442,904,696	0.26531	0.0095
Standard Automation Flats						
Standard Non-automation Flats						
Periodicals	Flats	Yes	7,953,715,000	7,953,715,000	0.38462	0.01385
Within County Periodicals						
Outside County Periodicals						
Package Services	Flats	Yes	191,039,200	326,741,863	1.39174	0.05813
Package Services Bound Printed Matter Flats						
Package Services	Flats	No	47,759,800	81,685,466	1.39174	0.05813
Package Services Bound Printed Matter Flats						
Express Mail	Flats	No	47,015,000	80,411,605	0.82203	0.02965
Priority Mail	Flats	No	395,035,000	675,643,908	0.82203	0.02965

Source: Postal Service FY 2009 Revenue, Pieces & Weight Reports and OIG Model Analysis

As depicted in Table 10 above, FY 2009 mail volumes for each mail class modeled were taken to be the sum of the volumes of its constituent mail product. To obtain a single pounds per piece and cubic-foot-per-piece value for each mail class, a volume-weighted average of the pounds per piece and cubic-foot-per-piece values for its constituent mail products was used.

Cost Modeling

As stated, the total estimated network cost associated with a particular network configuration was computed as an aggregate of both transportation and mail processing costs. It is important to note that we did not attempt to capture all costs within the model. The purpose in estimating network costs was to allow for relative apple-to-apple comparisons between various alternative network configurations within the context of the modeling. The performance of alternative network configurations was measured in total network cost and service performance. The total network cost included costs associated with transportation and mail processing operations. The model uses the total pieces handled (TPH) productivity to evaluate the processing and transportation cost of each network alternative. The mail volumes were assumed to be constant from day-to-day, which allowed the network volumes flowing through the network to reach a steady, constant state by the end of a two-week period. To take advantage of this, daily performance metrics were collected based on the last day of the simulation.

Transportation Costs

Transportation costs were accrued for all movement of mail from one processing facility to another and between processing facilities and origin-destination ZIP Codes. The estimation of transportation costs was dependent on the mode of transportation. Surface transportation costs were assessed based on standard rates per cubic-foot-mile (CFM) for inter-facility and intra-facility-area transport, while air transportation costs were computed based on weight, distance, and class of service. One air transportation rate was applied to Express Mail and Priority Mail and a lower air rate was applied for all other classes of mail. The assumed rates for surface and air transportation are provided in Table 11.

Table 11: FY 2009 Transportation Cost Factors[31]

Transportation Mode	Rate	Units
Surface (Intra-Facility Area)	$0.54490	$ per cubic-foot-leg (CFL)
Surface (Inter-Facility)	$0.00179	$ per cubic-foot-mile (CFM)
Air (Priority Mail and Express Mail)	$0.00080	$ per pound-mile
Air (All Other)	$0.00060	$ per pound-mile

Source: OIG Model Analysis of Postal Service Data

For each transportation segment, the total weight or cubic volume of the shipment was computed using per-piece weight and volume factors derived from the Fiscal Year 2009 Revenue, Pieces, and Weight (RPW) report. These factors were multiplied by the number of items of each mail type included in the shipment, summed to determine the total weight or volume, and then multiplied by the appropriate cost factor above to obtain a cost. For surface transportation, separate cost factors were used depending on whether the transport was “Intra-Facility Area” (i.e., from a ZIP Code to a facility or vice versa, considered one leg), or “Inter-Facility” – (i.e., long-haul transport from one processing facility to another). Surface mileage was estimated as the great-circle distance between the origin and destination multiplied by a constant factor of 1.22 to adjust for road network circuity. Past transportation research has found circuity factors of 1.20 to 1.23 to be appropriate.[32]

[31] Surface rate based on FY 2009 total transportation costs for letters and flats divided by total letters and flats capacity. Air rates are rough estimates developed through internal cost analysis by the OIG.
[32] G. Newell, *Traffic Flow on Transportation Networks.* (Cambridge, Mass.: MIT Press, 1980).

Processing Costs

Estimated mail processing costs were accrued for each facility based on the incoming and outgoing workloads being handled by that facility. Workload was measured in estimated workhours, which was a function of the volume and composition of the processed mail. Estimated total daily mail processing costs were calculated as follows.

- Each processing operation at a facility incurs a number of workhours depending on the volume and composition of the processed mail.
- Workhours are estimated using regression equations based on real-world data.
- Workhours are scaled by an adjustment factor to account for mailhandler support functions and all non- Management Operating Data System (MODS) office workhours.
- Estimated workhours is multiplied by a labor rate to obtain total processing cost.

Historical MODS office data was used to fit regression equations relating workhours to monthly TPH for the possible combinations of mail processing operations and mail shapes. The chosen functional form of the regression equation was:

$$\ln(WH) = a + b_1 \ln(TPH) + b_2 \ln(TPH)^2$$

Table 12 provides a list of the estimated processing cost regression and other parameters, (Abbreviation note: OP = Outgoing Primary, IP = Incoming Primary, IS = Incoming Secondary).

Table 12: Processing Cost Parameters

Operation	Auto/Manual	Volume Allocation	a	b1	b2	Ratio of TPH to Volume	Presort Discount Factor
OP Letters	Auto (LDC11)	97.70%	-13.52288	1.71195	-0.02693	1.01053	0.31734
OP Letters	Manual (LDC14)	2.30%	3.82252	-0.13325	0.02694	1.00404	
IP Letters	Auto (LDC11)	85.80%	-9.0739	1.06788	-0.00389	1.1037	0.20342
IP Letters	Manual (LDC14)	14.20%	-2.75869	0.72258	-0.00117	1.20805	
IS Letters	Auto (LDC11)	99.20%	-13.7713	1.782	-0.0294	3.41988	0.20342
IS Letters	Manual (LDC14)	0.80%	-0.50748	0.71085	-0.01413	1.50808	
OP Flats	Mech. (LDC12)	85.80%	0.71619	0.25677	0.00652	1.00456	0.58571
OP Flats	Manual (LDC14)	14.20%	8.8947	-1.31975	0.08752	1.01267	
IP Flats	Mech. (LDC12)	82.90%	4.34793	-0.61467	0.05372	1.16743	0.37546
IP Flats	Manual (LDC14)	17.10%	-13.43325	2.31107	-0.05797	1.10727	
IS Flats	Mech. (LDC12)	96.40%	-6.86599	1.10359	-0.01149	1.57962	0.37546
IS Flats	Manual (LDC14)	3.60%	-8.69727	1.78952	-0.04726	1.61587	

Source: Statistical Analysis of Postal Service MODS-Office Data

Once per simulated day, costs were accrued for the processing operations performed within each facility as follows. The appropriate volume allocation percentages shown above in Table 12 were used to split the shape-specific, daily volumes between automated and manual processing, each of which had a distinct cost profile. These daily volumes were multiplied by 30 to obtain monthly volume equivalents as required by the regression equations. Next, the automated and manual volumes were converted into TPH values using the corresponding TPH-to-Volume ratios, and these TPH values were substituted into the workhours regression equation along with the appropriate coefficients a, b_1, and b_2 from the table above to compute the estimated workhours for each operation.

If the mail type being processed was a presorted type, then the computed workhours were adjusted by multiplying by the presort discount factor in the last column of the table above. The result was multiplied with an adjustment factor of 2.7483 to account for all MODS-Office Clerk-Mail handler support functions and all non-MODS-Office processing labor. Finally, the resulting monthly workhours for each operation were aggregated, divided by 30 to obtain a daily estimate of workhours, and multiplied by the FY 2009 full processing labor and benefit rate of $40.0944/hour to obtain a total daily processing cost for the facility.

<u>Service Performance</u>

In addition to total cost, network performance was also measured in terms of expected service performance, which was defined as the percentage of mail that met the published ZIP-to-ZIP service standard for each mail class. Express Mail is not included as part of the Modern Service Standards, so its on-time service performance was not modeled. Service performance was defined by mail class as the percentage of mail which arrived “on-time” according to the published ZIP-to-ZIP service standard for that mail class.

The service performance metric was computed in the following way. All new mail began its simulated life with an assigned number of days allowed before it would be considered late. This value was the published Modern Service Standard[33] for mail of that class, origin, and destination. Shortly before new mail was generated each day, the simulation ran a maintenance routine that decremented the number of days left for every piece of mail in the system. Any pieces of mail in the system whose days left value dropped below zero before being delivered (and thus exiting the system) were flagged as late and were counted against the service performance score for mail of that class.

This construct naturally depended on the timing of mail arrival, processing, and transportation activities within the simulation. The modeling assumptions associated with the timing of these activities can be summarized as follows:

- **5 p.m.** - New mail entered the system at each origin ZIP Code and began ground

[33] Modern Service Standards: http://ribbs.Postal Service.gov/index.cfm?page=modernservice

transport to the nearest processing facility at an estimated travel speed of 30mph (to account for frequent required stops for pick-ups along the way).

- **8 p.m.** - The Critical Entry Time (CET) at each processing facility. Any mail that arrived after the CET was held over until the next day's processing.

- **Midnight**[34] – Mail processing ended and all processed mail began transport to its next destination.

- **Various Times** – Transported mail arrived at its intended destination after a travel delay based on the distance and mode of travel. Surface transport assumed a travel speed of 50 mph, and air travel assumed 500 mph.

[34] The choice of 8 p.m. and midnight as the critical entry and processing end times was based on a sampling of real-world facility operations schedules.

Appendix D Model Results and Cost Difference Calculation

The primary goal of the modeling effort was to explore alternative network design principles by evaluating the performance of hypothetical network configurations. This was done by varying the networks along two principal dimensions: size and distribution strategy. The effect of changing these variables was measured in terms of expected total network cost and impact on service performance. To make the results more interpretable, we defined and validated a baseline network configuration against which all other alternative network configurations were compared. It is apply the modeling analysis to identify the best network alternatives based on different tolerances for service degradation.

Table 13 provides the model results for the three lowest-cost network configurations based on different tolerances for service performance degradation. Service degradations are depicted in red and except for the eight percent of non-presorted Priority Mail (less than a few hours delay on average), most mail in the preferred option meets the performance standard. All cost metrics are shown as percentages relative to the baseline network costs and all on-time percent metrics are shown in their raw form. These alternatives provide network configuration options for minimizing total processing and transportation costs subject to tolerance for service degradation.

Table 13: Results of Various Model Scenarios

				Preferred	No Service Impact	Lowest Cost
INPUTS			Distribution Strategy	**Hybrid**	Hybrid	Hybrid
			Total # of Facilities	**135**	214	96
			# of Hubs	**15**	17	11
			Consol. Radius (mi)	**500**	500	600
			Service Radius (mi)	**120**	90	150
OUTPUTS	Costs	Transport	Air Cost ($)	**-3.8%**	-3.1%	-3.2%
			Intra-SCF CFM	**82.9%**	38.9%	136.4%
			Intra-SCF CFL	**0.0%**	0.0%	0.0%
			Inter-SCF CFM	**-1.5%**	-1.3%	3.0%
			Ground Cost ($)	**-0.5%**	-0.4%	1.0%
			Total Transport ($)	**-2.6%**	-2.1%	-1.7%
		Processing	Processing Cost ($)	**-12.9%**	-9.7%	-16.8%
			Total Cost ($)	**-9.2%**	-7.0%	-11.3%
	Percent On-time	Letters	1st Class Presorted	**1.19%**	2.64%	-0.04%
			1st Class Nonpresort	**1.19%**	2.63%	-0.04%
			Standard Presort	**0.00%**	0.00%	0.00%
			Standard Nonpresort	**0.00%**	0.00%	0.00%
		Flats	Priority Nonpresort	**-7.66%**	4.17%	-19.25%
			1st Class Presorted	**1.07%**	2.15%	-0.04%
			1st Class Nonpresort	**1.18%**	2.52%	-0.03%
			Standard Presort	**0.00%**	0.00%	0.00%
			Standard Nonpresort	**0.00%**	0.00%	0.00%
			Periodical Presort	**0.02%**	0.03%	-0.02%
			Package Presort	**0.00%**	0.00%	-0.02%
			Package Nonpresort	**0.00%**	0.00%	0.00%

Source: OIG Model Results

Following are some observations can be derived from Table 13 above.

- There is a direct relationship between processing costs and number of facilities. Transportation costs are not affected significantly, but processing costs decline substantially due to the economies of scale associated with having fewer facilities.

- Reductions in network size have no significant effect on service performance until below 214 facilities, at which point both First-Class Mail and Priority Mail begin to suffer service degradation. Other mail classes exhibited no significant changes in service performance. The impact is relatively modest for First-Class Mail and more substantial for Priority Mail. The results illustrate the clear tradeoff between network size, cost, and service performance. The selection of a target network size therefore depends on the desired level of cost reduction and tolerance for service degradation. A network of 214 facilities achieves modest cost differences with no effect on service performance, while a network of 135 facilities further reduces costs but with a slightly negative impact on service.

- The analysis indicated that a cost and service network of 214 facilities with 17 consolidation hubs employing a hybrid consolidation distribution strategy would also match future mail volume demand and result in lower net costs without adversely impacting service.

- After determining a target network size of 135 to 214 facilities, we explored the tradeoffs between three alternative distribution strategies, shortest path, pure consolidation (hub-and-spoke), and hybrid consolidation. Consolidation resulted in higher transportation costs because mail must be transported through sparsely scattered consolidation hubs, increasing the required travel distances, but total costs were reduced through the economies of scale achieved by consolidated processing operations.

- Of the three alternative distribution strategies tested, we found the minimum cost distribution strategy to be hybrid consolidation, in which long-haul mail (greater than 500 miles) was routed through central consolidation hubs while shorter distance mail was transported directly between the origin and destination facilities, bypassing the hubs.

- Reducing the number of consolidation hubs to 15 yielded the greatest cost differences — a nine percent reduction in total cost versus the baseline scenario.

Table 14 provides the analysis used to identify the estimated annual cost differences for the optimized network of 135 facilities of which 15 are consolidation hubs.

Table 14: Annual Cost Differences Estimate: 135 Facilities with 15 Hubs

	Description		Value	Source
1	Modeled Percentage Cost Differences			
2		Mail Processing	(12.9%)	Model results
3		Transportation	(2.6%)	Model results
4				
5	Mail Volume for Mail Types Modeled (Billions)			
6		FY 2009	170.989	FY 2009 Revenue, Pieces, and Weight (RPW) Report
7		FY 2020	145.240	Boston Consulting Group (BCG) data
8				
9	Mail Processing for Mail Types Modeled			
10		FY 2009 Mail Processing Cost (Billions)	$10.441	FY 2009 Cost Segments and Components Report
11		Volume Variability Factor	0.944	FY 2009 Cost Segments and Components Report
12		Piggyback Factor	1.689	ACR2010 Library Reference USPS-FY10-24 (FY 2010 Non-Operation Specific Piggyback Factors)
13				
14	Transportation for Mail Types Modeled			
15		FY 2009 Domestic Air Transportation Cost (Billions)	$ 1.631	FY 2009 Cost Segments and Components Report
16		Domestic Air Transportation Volume Variability Factor	0.998	FY 2009 Cost Segments and Components Report
17		FY 2009 Highway Transportation Cost (Billions)	$ 1.758	FY 2009 Cost Segments and Components Report
18		Highway Volume Variability Factor	0.784	FY 2009 Cost Segments and Components Report
19				
20	Annual Cost Differences (Billions)			
21		Mail Processing	$ (1.953)	=[2]*[10]*(1+([7]/[6]-1)*[11])*[12]
22		Transportation	$ (0.077)	=[3]*([15]*(1+([7]/[6]-1)*[16])+[17]*(1+([7]/[6]-1)*[18]))
23		**Total**	**$ (2.030)**	**=[21]+[22]**

Source: OIG Analysis

There are a number of reasons for differences in the overall cost between the model and the actual postal network. First, this modeling effort begins with a green field distribution of the processing facilities, in which facilities are spaced across the country in roughly equal intervals. Not only does this affect the distances between facilities, but it also dictates the necessary facility size to meet the associated mail volume demand. Having more, larger plants in the network may play a role in the overall efficiency of the modeled network.

An additional modeling assumption is one of an idealized network in which all of the processing and transportation occurs at the roughly 300 facilities, which is intended to be representative of the network of P&DCs and NDCs. The model does not account for the dispersed, less efficient processing and mail handling that occurs at smaller facilities and delivery units, which is difficult to quantify. Furthermore, the model does not include costs for outgoing secondary and managed mail processing.[35] For these reasons, the modeled baseline mail processing costs tend to be lower than the actual costs incurred by the Postal Service.

[35] A follow-on, more operations-detailed study could analyze a more complete network that includes these processing schemes. Including these processing schemes would increase any cost differences between the baseline and model scenarios.

Differences between modeled and actual transportation costs include a model assumption that mail transportation can be purchased by the cubic-foot-mile rather than by truck load. Hence, modeled routes with mail volumes that have unused truck space do not reflect the full truck load costs. Because actual truck utilization rates are low, this is likely one of the most significant sources for the transportation cost difference.

Appendix E Stakeholder Interview Summary

Interviews with key users of the Postal Service network, including major business customers and mail service providers, were conducted between September 29, 2010, and November 11, 2010. Interviews were conducted with users/providers of many key Postal Service product categories, including First-Class Mail, Periodicals, Standard Mail, Package Services, Priority Mail, Parcel Select, and Parcel Return Service. Within each product group, representatives of a variety of industry segments or their trade association were selected for interview in order to obtain a broad spectrum of input from industry stakeholders with different needs from the Postal Service network.

Table 15: Stakeholder Interviews by Mail Segment

TYPE	NUMBER OF INTERVIEWS
First-Class Mail	5
Periodicals	5
Standard Mail	4
Package Services	3
Priority Mail/Parcel Select	1
Consolidator/Logistic Providers*	5
Other (Competitors, Paper & Envelope Manufacturing, Remittance Mail, etc.)	4
TOTAL NUMBER OF INTERVIEWS	**27**

**Interviews with consolidator and logistics providers produced feedback regarding multiple mail classes.*

Source: OIG Interview Summary

Network users define an optimized network in much broader terms than the number, location, and function of postal facilities. Their successful and cost-efficient use of the postal network encompasses all aspects of network access, ease of use, and ability to achieve their desired service levels. While different industry segments expressed somewhat different needs from the postal network, mostly in the area of service, needs expressed by interviewees within the same industry segment were consistent. Table 16 summarizes stakeholder responses into four main categories, network strategy, network design, service, and current network strengths and weaknesses.

Table 16: Stakeholder Interview Summary

	Mailing Industry Segment Feedback
Network Strategy	• A long-term, overarching mail processing and transportation network strategy needs to be defined, documented, and shared with network users and other stakeholders. • Network users would like to partner with the Postal Service to develop a strategic plan and ease implementation. • Develop a long-term network strategy and stay the course.
Network Design	• Most users are unconcerned with the specific network design, but sensitive to changes that may impact access, cost, and service level. • Network users support reducing the number of processing facilities. • Locate facilities at a reasonable distance and based on volume densities coming to those facilities; plan resources to effectively manage the incoming volume. • Eliminate inefficient multistory inner-city processing facilities. • The industry wants one-stop shopping for all product types and shapes (letters, flats, and parcels), not three different facilities in one geographic area. • The desire for a flexible network to accommodate marketplace and mail volume changes.
Service	• Consistency and predictable service are more important than speed. • Some industry segments are open to relaxing service standards if consistency and predictability improves. • Consider relaxing service standards by geography. • A few industry segments focused on speed of service and the ability to obtain overnight service. • Improved service consistency can lead to product growth.
Current Network Strengths & Weaknesses	**Strengths** • Build on strengths and core competencies, such as drop ship and "last mile" delivery. **Weaknesses** • Lacks logistics and transportation expertise. • Poor communication of network changes. • Information technology support is lacking and can be costly to users.

Source: OIG Analysis of Mailing Industry Stakeholder Interviews

Network Strategy

Postal Service network users across all product groups expressed a common desire for a long-term network optimization strategy that is documented and shared with network users. Once the strategy has been determined, users also believe the Postal Service must stay the course. The Postal Service could then implement appropriate pricing structures, incentives, and changes in mailing standards to drive customer behavior in a manner that will best complement the optimized network. Sufficient advance notice is needed before making significant changes in the network strategy.

In situations where marketplace or volume changes result in optimization challenges such as excess capacity, the Postal Service can explore alternatives that might reduce significant negative impacts on its business customer and service provider partners. If the Postal Service does make significant network changes, users want sufficient lead time to make appropriate changes in their processes and operations in a cost-effective and efficient manner.

Network Design

Postal network users were asked during the interviews how they would redesign the network using a “clean slate” approach to better meet their business needs. In many cases, the specifications of the network (e.g., how many postal plants there should be, where they should be located, what their functions should be) were not a great concern as long as core needs from the network were able to be met. Not all network users interviewed had a detailed view of how the Postal Service network should be redesigned but some provided the following suggestions.

- When asked what the impact would be to their business if the Postal Service were to significantly decrease the number of processing facilities in its network, nearly all network users responded positively, equating fewer processing facilities to lower costs. Most supported continued or even accelerated plant consolidation efforts by the Postal Service, as long as they are able to meet their critical network needs (network access, ease of use, service) at a reasonable cost.

- Users suggest processing facilities be located based on volume densities and geographically located based on the origination and destination mail volume density patterns. Network users operating as logistics providers, mail consolidators, and other mail preparation service providers generally locate their facilities based on their customer volume densities as well as other business drivers related to real estate, workforce, and access to surface transportation routes.

- Business customers and their providers employing drop ship programs to bypass postal facilities and achieve more control over service universally reported that having to spread their mail volume over more processing destinations would reduce the mail volume densities necessary to make drop ship programs cost effective. Transportation and mail preparation costs would increase for their businesses due to having to separate and drop ship mail to more postal facilities with less volume per facility; however, too few postal processing facilities could hamper their ability to achieve their desired service levels. If service could be maintained with fewer facilities, however, they were very supportive of the concept.

- Design a more flexible network to accommodate volume peaks and lows in a cost-effective manner. Postal network users expressed the view that a more flexible cost-effectively network can better accommodate marketplace demands, changes in mail volume, changes in geographic mail flow patterns and customer needs. Specific suggestions to design a more flexible network included renting/leasing facilities and transportation to reduce costs and improve flexibility; exploring partnering opportunities to share network resources, particularly transportation; and employing a more flexible workforce to reduce labor costs and handle periods of peak or low mail volume.

- Include postal facilities based on the most efficient and cost-effective model for each facility type. Network users felt that for each type of postal facility a high-efficiency, low-cost model should be developed, which then should be used to design standardized facilities of each type (e.g., consolidation hub, processing plant, carrier/delivery operation). Network users largely viewed very large processing facilities as unwieldy and difficult to manage, culminating in mail flow issues which lead to service deficiencies.

- Multistory facilities and those located in inner-city areas were identified as types of facilities to be avoided. Network users view these types of facilities as confusing, inefficient, and costly, and do not rank highly their experiences in using these types of facilities for mail entry. Those with their own logistics and production operation facilities reported that their businesses have moved away from using these types of facilities for their own operations.

- Eliminate separate entry requirements based on product type. Network users largely use economies of scale in transportation of postal products. Separate postal facilities based on processing category (shape) or product type (mail class) erode economies of scale and increase network user costs.

- Simplify preparation and entry requirements. Standard operating procedures should be more consistent across product categories. Network users said that complexities of mail preparation and entry requirements are a barrier in using the Postal Service network. In addition, network users entering different product types of the same processing category (e.g., different types of parcels) said that having different preparation and entry requirements for each product type even though the pieces are processed the same way by the Postal Service is a barrier to their ability to consolidate, combine, and drop ship such mailings in a cost-effective manner.

Service

Network users signaled the importance of service in optimizing the Postal Service's network. Users desire a network design that allows them to achieve desired service levels and needs. Service needs encompass the ability to manage and control service to meet customer expectations, need for service commitments to be met consistently, and service visibility. The Postal Service can work with network users to review existing service standards by product, with an eye toward updating standards to reflect current network user needs and market realities.

Many product users were open to some modification or relaxation of service standards, which could allow the Postal Service to more optimally design its network. Among those product users needing to retain the ability to achieve overnight service (e.g., some First-Class Mail, time-sensitive Periodicals, and Competitive Services users), many were open to concepts such as new drop ship incentives or different product offerings that would allow them to better manage and control their desired service level. If there were viable options that they could use to better control service, for example, they would have less need for overnight service standards in some cases. Many product users said they would pay more for overnight service when needed, but would prefer to have a variety of options to achieve various service levels. Network users offered the following on their service needs:

- When asked what impact it would have if the Postal Service were to "relax" existing service standards by one day (e.g., a two-day standard today would become a three-day standard), but significantly improve consistency of meeting the standard, many network users said they could adjust their business models accordingly without a significant negative impact. When asked what types of changes in service standards would be tolerable for their business, relaxation of standard by one day was relatively acceptable; however relaxation of existing standards by more than one day was perceived to be negative.

- Most notably, several major First-Class Mail product users said their businesses do not need overnight service for the majority of their mail. A two-day service standard, consistently achieved, would largely meet their business needs, they reported, particularly if there were more options available to First-Class Mail users to control costs and better time delivery, such as drop ship.

- For a few industry segments, however, speed of service remains important. Mailers of some time-sensitive First-Class Mail and Periodicals products, as well as users of Parcel Select, for instance, expressed the need to retain their current ability to achieve overnight service. These stakeholders were not necessarily adverse to changes in the design of the postal network, however, as long as they had a cost-effective way to achieve overnight service.

Postal network users reported service needs that differ by the types of postal products they use. In most cases, as can be seen by the percentage of mail drop shipped within the postal network closer to its destination, network users prefer to manage the transportation and timing of their mail entry themselves, to reduce costs and better achieve their desired delivery service. Postal network users said they can perform these functions more efficiently themselves or through service providers. Mailers offer the following about network design and drop shipping.

- The network design and product offerings must provide users with the ability to attain their desired service levels. Business customers and service providers have service expectations based on the Postal Service's established service standards. In many cases, network users utilize drop ship programs to bypass as much of the Postal Service network as possible and to better control the timing of their delivery to meet customer needs.

Network Strengths

Build an optimized network design based on the Postal Service's strengths and unique competencies. Exploit existing product offerings and incorporate strategies to minimize use of the end-to-end postal network. Drop ship entry programs are a key example. They are already an integral part of the Postal Service network design and build on its last mile competencies. The cost avoidance the Postal Service achieves through drop ship incentives is well documented through decades of regulatory proceedings. Users feel the Postal Service does not appear to have sufficiently explored the impact significant changes in drop ship incentives/patterns could have on the network.

Network Access

Network users offered additional suggestions and observations about issues related to network access:

- Implement mail entry support systems to facilitate electronic management of appointments and mail entry. Those using the Postal Service Facility Access and Shipment Tracking (FAST) system often reported that appointments could be obtained by calling the postal facility even though they were not shown as available through the FAST system. Network users also reported issues, inconsistencies, and deficiencies with the FAST system.

- Offer sufficient appointment availability to meet network user needs. Many postal network users reported dissatisfaction with what they perceived as a growing trend for Postal Service facilities to limit the number and hours for mail entry appointments. Network users need to be able to achieve their service needs through availability of mail entry appointments at all postal facility types, including Destination Delivery Unit (DDU) facilities.

- Create a better process for re-directing mail around postal facility changes. Nearly all network users interviewed reported dissatisfaction with the Postal Service's policies and procedures for redirecting mail entry from one postal facility to another. Lack of advance notification tools and system consistency often leads to situations where network users bring mail to what they believe is the correct postal facility, only to have the mail refused and redirected to another destination, which could be as close as a different dock door at the same facility, or as far away as another state. Regardless of the distance, however, inconsistent redirection data and redirections made without sufficient advance notice add costs to industry and causes dissatisfaction.

Technology Improvements

Significant technology improvements are necessary to better support and manage an optimized network. Postal network users were asked what technology improvements can make the Postal Service better in supporting its existing or an optimized network. Interviewees interpreted “technology” as applying to a variety of things, including mail processing equipment technology, network management technology, transportation technology, or mail data technology.

Employ intelligent network management. Network users recommended that the Postal Service leverage data to better utilize resources (e.g., facility staffing, transportation, processing sort plans) based on advance information of incoming volumes at facilities. Data should be communicated between postal facilities in terms of mail movement, as well as data obtained from customers in advance of mailing or at the time of entry. Utilizing data in near real-time could enable dynamic mail flow/transportation management between postal facilities.

Sharing Network Resources

Optimize the network by utilizing partnering strategies to share resources such as transportation with users. Postal network users largely support outsourcing components of the network as well as more aggressively pursuing partnering opportunities to share resources such as transportation or facility space. Business customers and their providers were open to partnering concepts that involve sharing Postal Service transportation and facility space, as well as being open to concepts that involve sharing their own transportation/facility space with the Postal Service.

While issues were identified that would need to be resolved, network users largely felt that the Postal Service has an opportunity to aggressively explore options. These opportunities could help the Postal Service achieve a more cost-effective and flexible network design. Some specific examples of ideas suggested during the interviews included:

- Transportation. Redundant transportation utilization and networks can be reduced through partnering. Businesses transporting mail through drop ship entry often are running redundant or less-than-full transportation for routes similar to one another and to Postal Service transportation. Through more data sharing and intelligent network management, the Postal Service and businesses could consolidate mail transportation to optimize truck capacity and minimize transportation redundancies. Mail consolidators often know the contents of their trucks a week in advance, which could facilitate planning of shared industry transportation. It was also suggested that the Postal Service can create an electronic system to notify a group of prequalified businesses when it has space available on its transportation and receive just-in-time bids for the space. Or the Postal Service can buy space on local transportation from others, such as Wal-Mart, to move mail between facilities.

- Outsourcing. Business customers and their providers were open to the Postal Service outsourcing transportation and network components, while retaining management of its last-mile core competencies.

- Collaborative Venue. Network users report that a venue for collaborative discussions with the Postal Service on network resource sharing can be valuable.