

Argosy Mobile

Dynamic Route Planning White Paper

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RAF
TECHNOLOGY

In this paper we consider the advantages of pre-sorting Ad-hoc parcels (capture and validation of delivery addresses) using advanced mobile data extraction and verification automation at the point of package induction to reduce sortation and transportation costs.

Hub and Spoke Network

Courier, Express and Parcel (CEP) companies transport millions of packages every day, and have to contend with many challenges such as ongoing cost management and meeting aggressive delivery schedules which can be as little as 24 hours. In addition, optimizing a carrier's logistics operation in order to manage their high volume of parcels inducted daily is neither easy nor cheap. For example, delivering packages to a large number of possible origination destination pairs just within the United States is close to two billion pair combinations, (assuming 5 digit zip codes as the level of granularity) and creates a tremendous challenge for logistics planners. The marketplace also continues to be very competitive so CEP companies must continue to seek out new opportunities to improve their customer's level of service.

To overcome these challenges, CEP companies have historically routed and sorted packages through a hub and spoke network where shipments are typically routed through several hubs. In the case where the origination and destination terminals are assigned to the same hub, shipments are routed only through a regional hub.

The advantage of the hub and spoke is to consolidate freight and increase shipment concentrations to realize economies of scales; but the tradeoff for this consolidation at

the hubs can negatively impact customer service levels. Therefore consolidation does provide cost efficiencies, but can increase processing time by transporting parcels at greater distances and also requires additional sortation and handling of those packages which includes the time spent waiting for arrivals of other packages to consolidate a load. Based on our analysis, parcels being processed in one hub generally add about one day for shipments.

Transportation planning is developed ahead of time using historical data where load planners make centralized decision to prevent local perspective conflicts with network decisions. These decisions made by local load planners may have a cascading effect on load building throughout the network which can inadvertently add additional cost for CEP companies. Load planners face daily complex decisions such as freight paths; manage load/empties trailers, and drivers stopping at intermediate points. These decisions are also typically made within a time constraint with up to 20 percent of Ad-hoc packages missing critical destination address information which is not visible to them due to limited full load visibility for each courier's vehicle in route. Given these constraints, load planners must wait until packages arrive at the first hub in order to have 100 percent visibility.

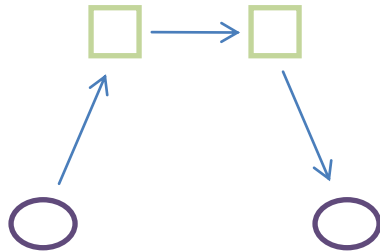
There are opportunities to reduce transportation and sortation costs by having more direct travel which can bypass one or more hubs. But those financial benefits can only be recognized when load planners make centralized decisions knowing where all packages are going in real-time.

Business case

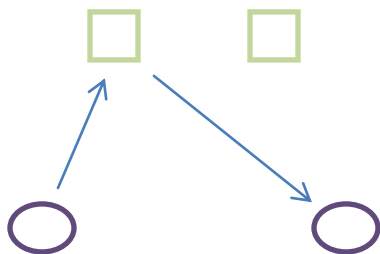
Consider terminals are pre-assigned to a parent hub. A shipment from the origination terminal to destination terminal can be routed in at least one of the following seven ways:



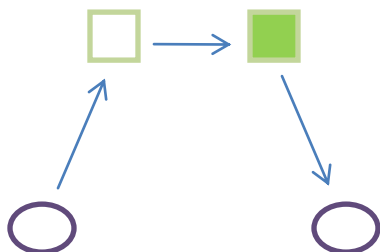
1. **Directly from terminal to terminal**, with no sorting cost



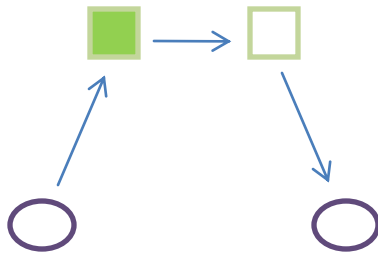
2. **Through both hubs**. Sortation does not occur at either hub. Packages travel from terminals in the same trailer which are coupled with other trailers bound to the same destination.



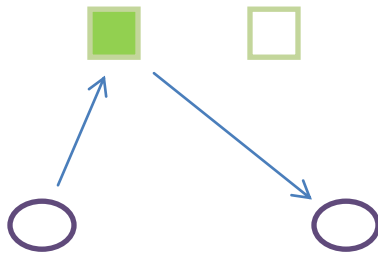
3. **Via a single hub**. Packages are not sorted at the 1st hub. It travels in a trailer from terminal to terminal and this trailer is coupled with another trailer from the 1st hub to the destination terminal



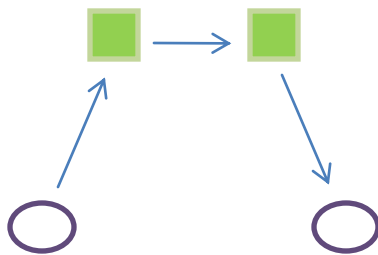
4. **Through both hubs**. Packages are sorted at the 2nd hub but not at the 1st hub. The package travels in a single trailer from the 1st terminal to the 2nd hub (via the 1st hub) and possibly in a different trailer from the 2nd hub to the destination terminal



5. Through both hubs. Packages are sorted at the 1st hub but not at the 2nd hub. The package travels in a single trailer from the 1st hub to a destination terminal (via the 2nd hub) possibly in a different trailer from the origin terminal to the 1st hub.



6. Via a single hub. Packages are sorted at the 1st hub



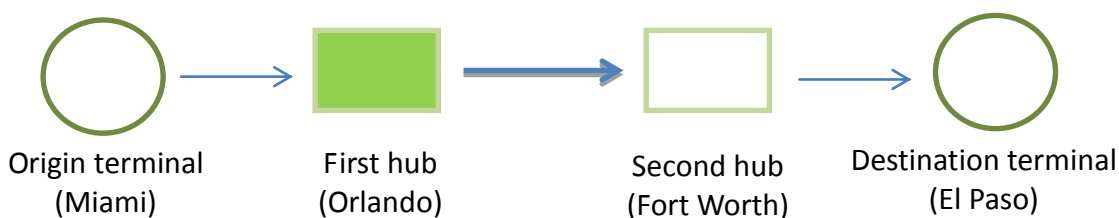
7. Through both hubs. Packages are sorted at both hubs.



The majority of packages are routed and sorted through two hubs which is the most expensive, but the simplest logistics planning path (please see path number 7). Besides not having sufficient freight to justify direct runs, two other constraints play a major role in this expensive routed decision. The first one is a narrow delivery timeline/window. The second constraint is not having 100 percent visibility of the packages in real-time. These two constraints limit opportunities for load planners to take advantage of certain freight patterns that can reduce sortation and/or transportation cost.

In order for CEP companies to exploit these savings, delivery addresses must be validated at the point of collection and information will need to be transmitted in real-time to load planners. Having accurate data sooner will permit load planners to take advantage of freight patterns; and they will no longer have to deal with the constraint of waiting until all packages arrive at the first hub to complete their shipping routes.

To illustrate our savings potential, let's reference an example where a shipment is routed through two hubs, but sorted only at the first hub.



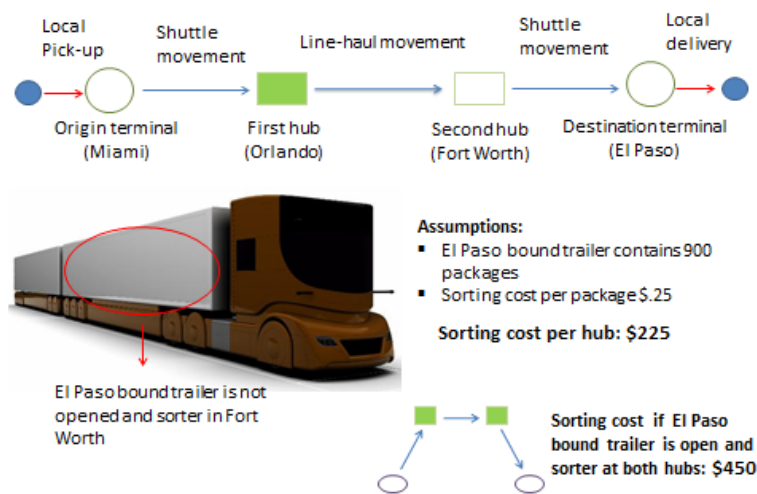
In a typical hub and spoke network, packages transported from Miami, FL to El Paso, TX, would be grouped with other packages originated from the South Florida area. These grouped packages would then be loaded on a trailer destined to a hub in Orlando, FL. Once they arrive in Orlando, the truck would be unloaded and those packages would be sorted and grouped with packages traveling to Texas. At the Fort Worth hub, packages again are unloaded, sorted, and a grouped with packages going to El Paso and surrounding towns.

In order to further optimize your logistics planning decisions from this example, we are proposing that your planners will require 100 percent real-time visibility. This can be accomplished by further automating transaction processing and data capture at the point of package induction into your network by using ruggedized mobile computers with

address data extraction and verification software. Once the Ad-hoc package has been introduced into track & trace and the destination address delivery point automatically verified in real-time, load planners will know in advance exactly how many packages are destined to El Paso originating from Florida. With 100% real-time visibility, load planners can group all the packages going to El Paso at the Orlando hub and maximize the assigned capacity in their trailers thus bypassing the Fort Worth hub.

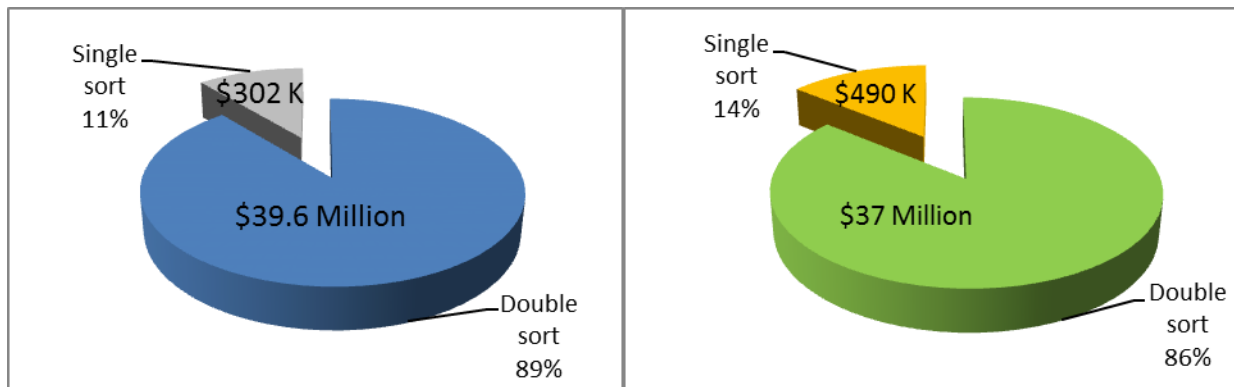
In this example, the El Paso bound trailer is closed and locked in Orlando. When this trailer reaches Fort Worth, it will not need to be opened and therefore will not need to be unloaded and sorted. This automated transactional benefit will reduce sortation costs and the associated time necessary for processing.

ROI Benefit: Let's assume that it takes about 1 minute to unload and then reload a package onto a trailer. Based on a \$15 hourly wage for a package handler, we can estimate handling charges to be about \$0.25 per package. With these assumptions, we can conclude having the ability to bypass one hub can dramatically reduce your network costs (please see example).



Network savings: Now let's assume that about 89% of the packages are routed and sorted through two hubs and cost \$0.50 whereas 11% of the packages are routed through two hubs, but sorted only at one hub and cost \$0.25 to sort. The aggregate sorting cost for a package passing through this type of path is \$0.4725 (= $0.89 \times 0.5 + 0.11 \times .25$).

Given a network of volume of 100 million packages per year and the opportunity to reduce the total number of packages requiring double sortation from 89% to 86% or 3%, would provide a net savings sortation cost benefit of \$2,437,500 per year



Sorted	Pct	Volume	Cost per pkg	Cost
Double sort	89%	89,000,000	0.4450	39,605,000
Single sort	11%	11,000,000	0.0275	302,500
Total		100,000,000	0.4725	39,907,500

Sorted	Pct	Volume	Cost per pkg	Cost
Double sort	86%	86,000,000	0.4300	36,980,000
Single sort	14%	14,000,000	0.0350	490,000
Total		100,000,000	0.4650	37,470,000

Conclusion

Logistic optimization presents the biggest opportunity for most companies to significantly reduce their cost and improve their level of customer service. For most logistics operations, there is an opportunity to reduce cost by 10% to 40% by making better decisions with real-time accurate data. Companies can minimize transportation and sortation costs using Argosy Mobile which is a revolutionary new RAF Technology product which provides advanced data extraction and verification for mobile workers in courier, express, and parcel (CEP) organizations. Argosy Mobile helps improve your data accuracy and can significantly reduce manual keying of addressing information. By performing this function at the point of collection and providing this real-time information to logistics planners, Argosy Mobile enables optimization of sortation, routing, and transportation. Because Argosy Mobile will verify address accuracy at the point of collection, mobile workers can detect and quickly correct any misaddressed parcels. This significantly reduces costs for processing parcels that are “Undeliverable As Addressed”.

For more information on how Argosy Mobile can improve your bottom-line, please contact RAF Technology for more product details and a demonstration.

Bibliography

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