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Reduce Shipping Costs  
at the Source

Using the Freight\$ave<sup>TM</sup> Calculator

A CPU<sup>2</sup> White Paper



## **RELOCATE FULFILLMENT OPERATIONS TO REDUCE SHIPPING COSTS?**

If you market products on a national scale, you've undoubtedly grappled with the challenge of spiraling shipping costs. For many marketers, these delivery costs can amount to a significant portion of the total purchase price of your products, giving your customers pause and presenting a serious obstacle to the success of your marketing program.

If you have a choice among several different cities for your distribution facility -- either within your own company or when selecting an outsourced fulfillment provider -- you have an opportunity to optimize your fulfillment shipping program for the future, and potentially to reduce delivery costs dramatically going forward.

But your nagging question may be: Where is that ideal distribution center location, both for reduced shipping costs and for improved speed of delivery? (Speed of delivery generally correlates to ship-to delivery zone for ground delivery services, with lower zone numbers commonly equaling speedier delivery times.)

How can you realistically compare the advantage of shipping from a location in St. Louis to that of fulfilling product orders from Philadelphia or Denver, New York or Chicago? Or is there a better location than all of these that you might have overlooked?

You can have someone on your staff sit down and calculate the cost to send one of your typical packages to every state in the country, and then divide the total by 50. This will give you an "average cost" for shipping your particular products around the country. But will that calculation mirror your *real-world* shipping costs? Unless you plan to send packages to cattle in Wyoming and corn fields in Iowa, probably not.

The problem with this approach is that your *shipments* won't be equally distributed among all the states, since the *population* is not distributed that way. So one tool in your analytical toolkit should be a population matrix.



STATE	Population %
MA	2.11%
RI	0.35%
NH	0.43%
ME	0.43%
VT	0.20%
CT	1.15%
NJ	2.84%
<b>NY</b>	<b>6.31%</b>
<b>PA</b>	<b>4.06%</b>
DE	0.28%
DC	0.19%
MD	1.84%
VA	2.52%
WV	0.59%
NC	2.96%
SC	1.44%
GA	3.12%
<b>FL</b>	<b>5.97%</b>
AL	1.51%
TN	2.01%
MS	0.95%
KY	1.39%
<b>OH</b>	<b>3.75%</b>
IN	2.07%
MI	3.29%
IA	0.98%

STATE	Population %
WI	1.83%
MN	1.70%
SD	0.26%
ND	0.21%
MT	0.31%
<b>IL</b>	<b>4.20%</b>
MO	1.92%
KS	0.91%
NE	0.58%
LA	1.40%
AR	0.93%
OK	1.18%
<b>TX</b>	<b>7.81%</b>
CO	1.59%
WY	0.17%
ID	0.49%
UT	0.87%
AZ	2.07%
NM	0.64%
NV	0.84%
<b>CA</b>	<b>11.95%</b>
HI	0.42%
OR	1.23%
WA	2.11%
AK	0.22%
PR	1.29%

A U.S. population matrix in its simplest form lists all of the states along with the relative population residing in each state. Here is an example, based on U.S. Census estimates from July 2007<sup>1</sup>.

As you can see from this listing, a few states jump out as having a large portion of the total population. The top seven states -- CA, TX, NY, FL, IL, PA and OH --are home to nearly half of the entire US populace. The rest of the population is somewhat concentrated among the eastern seaboard and southern states, with the lowest populations in the northern Great Plains states and Alaska.

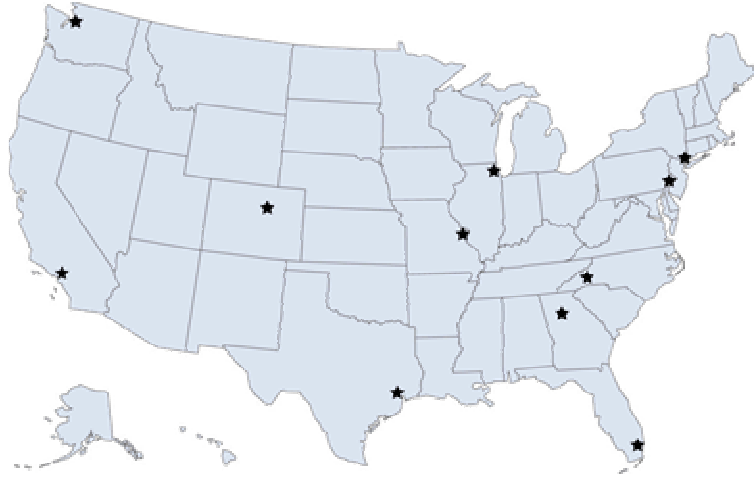
When calculating your expected shipping costs, you can't afford to ignore this basic demographic fact, so we've created a handy way for you to make use of it.



## THE FREIGHT\$AVE™ CALCULATOR

This simple-to-use spreadsheet application is available free from CPU2. Using this population-weighted shipping calculator, you can quickly compare appropriately proportioned shipping rates from a number of different cities throughout the continental U.S. and use this data to make an informed decision as to where your best economies will accrue.

The Freight\$ave™ Calculator allows you to plug in your package weight, from 1 to 50 lbs.; your city of origin (from a provided list of eleven different U.S. cities); and a shipping method (currently UPS Ground, UPS 2<sup>nd</sup> Day Air, and UPS Next Day Air are supported). The calculated shipping charge is instantly displayed for shipping to the entire country from your selected city using the selected service.



### WHIZ THROUGH WHAT-IFS

To better understand this straightforward tool, let's walk through a simple example "what-if" scenario.

1. Select Package Weight (lbs):	2. Select Origin Warehouse Location:	3. Select Service:
1	Philadelphia	UPS Ground
<b>From Philadelphia</b>		
Average shipment cost <sup>1</sup> :	\$7.33	
Weighted for Population <sup>2</sup> :	<b>\$6.82</b>	

If your plan is to ship a 1-lb. package from a fulfillment center in Philadelphia to residential customers around the country, simply follow the instructions in the Calculator: 1) select the package weight, 2) select the location for your distribution center, and 3) select your preferred delivery service.

The Calculator instantly tells you that your *average* shipping cost to each state (that is, the average cost to send 52 packages -- one to each state plus the District of Columbia and Puerto Rico) via ground delivery will be \$7.33 per package.



The Freight\$ave™ Calculator further tells you that weighting the same calculation for the *distribution of population* reveals that your *actual* shipping costs will be slightly lower than that – just \$6.82 per package – since Philadelphia is located relatively near to the heavily populated U.S. Northeast. (The population weighting multiplier is akin to averaging the cost of sending one package to every person in the country.) That’s because you probably won’t be shipping as many packages to the more distant but less populous western and northern Great Plains states as to the nearby heavily populated ones.

An additional feature then tallies the destination zones from each origination city and displays a population Zone “profile” for that origination city, like this:

Destination Zone	Distribution:
<b>From Philadelphia</b>	
<b>Zone 2: 15.5%</b>	
<b>Zone 3: 6.6%</b>	
<b>Zone 4: 16.1%</b>	
<b>Zone 5: 25.1%</b>	
<b>Zone 6: 12.4%</b>	
<b>Zone 7: 2.4%</b>	
<b>Zone 8: 19.9%</b>	

UPS zones are calculated from each originating location by using the company’s proprietary zone charts, available on their website. As a very rough guide, delivery points less than 200 miles from the origin are designated as Zone 2; those up to approximately 400 miles away as Zone 3; up to approximately 600 miles as Zone 4, and with varying ranges this continues up to Zone 8 (over 2,000 miles). Hawaii, Alaska and Puerto Rico fall into Zones 44 and above.  
 A package shipped to a higher / more distant zone will cost more and take longer to deliver via standard ground service than one shipped to a lower / closer zone.

The Zone Profile from Philadelphia shows that 15.5% of the US population is in delivery zone 2 when shipping a package from Philly; 6.6% is in delivery zone 3, etc.

The Destination Zone Distribution chart gives you a rough snapshot of how centrally located the city is in relation to the overall population of the country, so that you can compare the “centrally located” claims of various originating cities.



Let's then assume that you have a choice to distribute your products from a different facility -- in Chicago -- but you're not certain whether shipping costs will be higher or lower from there. Change the origin city in #2 to Chicago and read:

1. Select Package Weight (lbs):	2. Select Origin Warehouse Location:	3. Select Service:
1	Chicago	UPS Ground
<b>From Chicago</b>		
Average shipment cost <sup>1</sup> :	\$7.29	
Weighted for Population <sup>2</sup> :	\$6.77	

The difference is marginal, but the weighted rate is lower by five cents per shipment. The reason can be seen in the zone distribution profile, where a higher percent of the total U.S. population falls in the nearby delivery zones than is true when shipping from Philadelphia:

Destination Zone	Distribution:
<b>From Chicago</b>	
Zone 2:	11.4%
Zone 3:	8%
Zone 4:	14.8%
Zone 5:	43.2%
Zone 6:	1.8%
Zone 7:	18.7%
Zone 8:	0%

To “drill down” to the state-level detail and check individual state delivery zones, another feature of the Calculator lines up the ship-to state, the standard carrier rate for delivery to that state, the percentage of U.S. population contained in the state, and the shipping zone from the chosen origination point.



Here's an example screen shot of that feature showing the result for nine states:

State	Delivery charge from: <b>Philadelphia</b> to:	State's % of U.S. Population	Destination Zone From <b>Philadelphia</b>
MA	\$6.27	2.11%	3
RI	\$6.27	0.35%	3
NH	\$6.27	0.43%	3
ME	\$6.41	0.43%	4
VT	\$6.41	0.20%	4
CT	\$6.27	1.15%	3
NJ	\$6.15	2.84%	2
NY	\$6.15	6.31%	2
PA	\$6.15	4.06%	2

Someone told you that St. Louis is the “magic city” for fulfillment operations because it’s centrally located? Here’s what the Calculator says:

1. Select Package Weight (lbs):	2. Select Origin Warehouse Location:	3. Select Service:
1	St. Louis	UPS Ground
	<b>From St. Louis</b>	
Average shipment cost <sup>1</sup> :	\$7.29	
Weighted for Population <sup>2</sup> :	<b>\$6.78</b>	

There’s only a \$.04 advantage over the Philadelphia rates for this particular package and service, since St. Louis is nearer to your west coast customers than Philadelphia, but further from the heavily populated northeast.

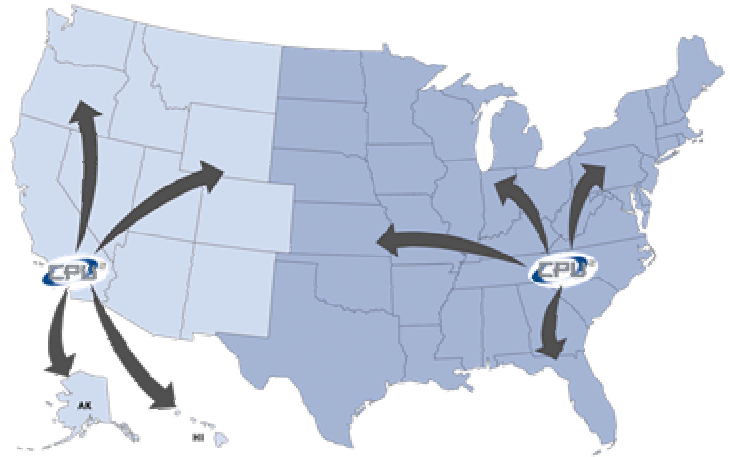
The Freight\$ave™ Calculator is a quick and simple way to gauge the effect of population distribution and shipping facility location on your expected shipping costs while comparing apples to apples throughout the process. With the Calculator you can quickly compare 33 different options and get an idea how much of a variance there is in small parcel shipping charges among 11 different origination points.

As fuel and shipping costs continue to mount, finding the best distribution location for your fulfillment program can be a powerful weapon in your total cost-cutting arsenal. The Freight\$ave™ Calculator can help you quickly consider a range of options.



**LET FREIGHT\$AVE™ SAVE YOU EVEN MORE**

At the same time the Calculator lets you quickly compare shipping costs from different origination points, it will also show you, side by side, what the same package and service profile would cost if fulfilled using CPU2's Freight\$ave™ program. With our fulfillment centers in North Carolina and California, we can get your products delivered faster and more cost-effectively to a nationwide customer base than you'll get shipping from any single-point distribution center location.



Let's take that "ideal" St. Louis origination point again, and see how the Calculator compares single-point shipping with the Freight\$ave™ program:

1. Select Package Weight (lbs):	2. Select Origin Warehouse Location:	3. Select Service:		
1	St. Louis	UPS Ground		
	From St. Louis	Using CPU2 Freight\$ave		
Average shipment cost <sup>1</sup> :	\$7.08	\$7.01	<b>Freight\$ave™ Savings:</b>	
Weighted for Population <sup>2</sup> :	\$6.78	\$6.62	\$0.16	per shipment

A sixteen-cent savings or 2.36% on each shipment may or may not represent a significant cost reduction for your particular program profile. If you're shipping 50,000 units per month, that's an \$8,000 monthly reduction in shipping costs and it can add up quickly.

■ **High volume marketers can generally achieve significant cost reductions by looking at an intelligent bicoastal fulfillment program for their product lines.**



Now let's look at costs for a 5 lb. package under the same set of circumstances:

1. Select Package Weight (lbs):	2. Select Origin Warehouse Location:	3. Select Service:		
5	St. Louis	UPS Ground		
	From St. Louis	Using CPU2 Freight\$ave		
Average shipment cost <sup>1</sup> :	\$8.90	\$8.77	Freight\$ave™ Savings:	
Weighted for Population <sup>2</sup> :	\$8.18	\$7.84	\$0.34	per shipment

Compared with the St. Louis origination point cost of \$8.18 per package, you would save \$.34 apiece – now we're up to 4.15% savings -- with CPU2's Freight\$ave™ program, racking up shipping charge reductions of \$17,000 per month on 50,000 shipments. Still heavier packages yield even greater savings from Freight\$ave™. The Calculator will let you compare your specific package profile to see for yourself.

■ **The heavier the package, the larger your savings will likely be from a well-implemented bicoastal fulfillment program.**

It's easy to see why so many marketers are turning to bicoastal shipping as delivery costs continue their relentless climb. It's one of the most straightforward ways available to position your company for long-term cost reductions and remain competitive in an increasingly cost-conscious marketplace.

### THE FINE PRINT

Residential delivery surcharges have been applied to all calculated UPS rates (since those are relatively stable throughout the year), but not fuel surcharges (since those change periodically during the year). Moreover, fuel surcharges are calculated as a *percentage* of the shipping charge, which means that omitting this variable doesn't alter the basic comparative analysis provided by the Calculator.

The Calculator does *not* take into account volume discounts or other special considerations, nor does it calculate special services such as guaranteed AM and Saturday delivery, and additional insurance. It gives you the choice to compare published shipping charges for UPS Ground, UPS 2<sup>nd</sup> Day Air, and UPS Next Day Air, calculated as if shipped from eleven different U.S. cities, including the following:

- Asheville, NC
- Atlanta, GA
- Chicago, IL
- Denver, CO
- Houston, TX
- Los Angeles, CA



- Miami, FL
- New York, NY
- Philadelphia, PA
- Seattle, WA
- St. Louis, MO

Calculated rates are based on a single destination in each state – typically the largest city or state capital – for simplicity of calculation.

The more your shipping volume is concentrated among a handful of SKUs, the more significant your realized savings are likely to be. No ready-made calculator can take all the relevant factors into account, so if it appears that CPU2's Freight\$ave™ program could be a good fit for your company we will gladly walk you through the additional considerations involved in determining your potential savings.

Whether you want to compare various single-point shipping location options, or would like to see for yourself how CPU2's Freight\$ave™ program can help you position your company to reduce your fulfillment costs for the long term, you may download the Freight\$ave™ Calculator by visiting <http://www.cpu2.com> and following the Freight\$ave™ links.

If you have additional questions about whether a CPU2 Freight\$ave™ program can help reduce your fulfillment costs for the long haul, call 800.379.9664 ext.1255. or email [info@cpu2.com](mailto:info@cpu2.com) to request your free Freight\$ave™ program workup.

1. <http://www.census.gov/popest/states/NST-ann-est.html>