Web-based Load Planning & Optimization

Getting more for
your transportation dollars
by exploiting Web-based technology

by

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Overview

The global pursuit of more responsive supply chains and lower inventories has driven a search for more effective ways to transport smaller sized shipments – while maintaining exacting standard for on-time delivery. The simple solution – ship more freight by Less-than-Truck-load (LTL) carriers – can be very expensive. To deal with these cost consequences, transportation managers have exploited a variety of techniques such as shipment consolidation and pool distribution – techniques which have been enabled by acquisition of Transportation Management Systems (TMS) that have sophisticated Shipment Consolidation Optimization and planning modules.

Unfortunately, the cost and complexity of implementing such systems internally have deterred many companies from acquiring them. They have chosen instead to allocate their scarce IT resources to supporting higher priority sales or manufacturing processes – thereby foregoing the 10% to 40% transportation cost savings potential TMS systems might bring!

New computerized logistics planning technology, delivered via the Internet, changes the equation, by dramatically reducing the demands on internal IT staff in the implementation of the TMS solution. Also, new generation of Shipment Consolidation optimizers, designed for Internet access, have greater capability to handle the enormously complex problems of grouping orders into lower cost shipments and of selecting the best transportation modes for each.

Progressive companies are already using these tools to achieve significant reductions in their transportation costs. The experience of these pioneers demonstrates that even more savings than originally expected are possible – from implementation of new collaborative and cooperative ventures between units of the same company and even between otherwise unrelated shippers – enabled by the ubiquitous access to the Internet.

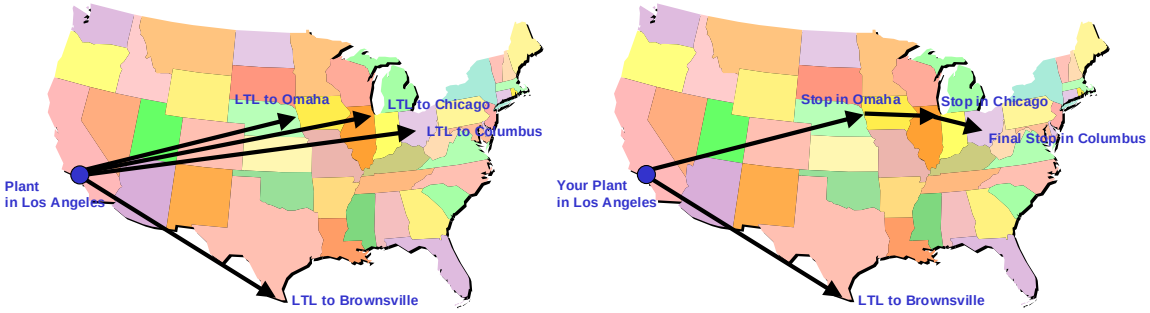
The purpose of this paper is to examine in more detail what advantages the Internet has brought to traditional load optimization and its delivery via TMS software. We will start with an examination of Shipment Consolidation optimization issues and how recent innovations in Web-based load optimization make results more useful and realistic. Next we examine how to gain maximal value from such solutions by accessing them from the new generation of Web-based TMS tools. Finally we will briefly explore some of the new business opportunities that this technology may allow your company to exploit.

Shipment Consolidation: a Deceptively Simple Concept

The large differences between LTL rates and full truckload rates have long enticed shippers to look for ways to replace higher cost LTL carriers with truckload carriers who will charge a single line-haul rate to a final destination plus a modest fee for dropping shipments along the way. In concept, this is quite simple, but as we will see, the problem of finding a feasible combination of LTL shipments for truckload delivery can become extremely complex very quickly.

In the simplest case, a single plant ships to multiple points around the country via LTL. In the illustration in Figure 1 on the next page, shipments from the plant in Los Angeles can be combined into one Truck Load shipment, with one shipment to Brownsville, TX, that is still most economically sent via LTL.

Figure 1 – One Origin, Many Destinations



The High Cost way The Optimized way

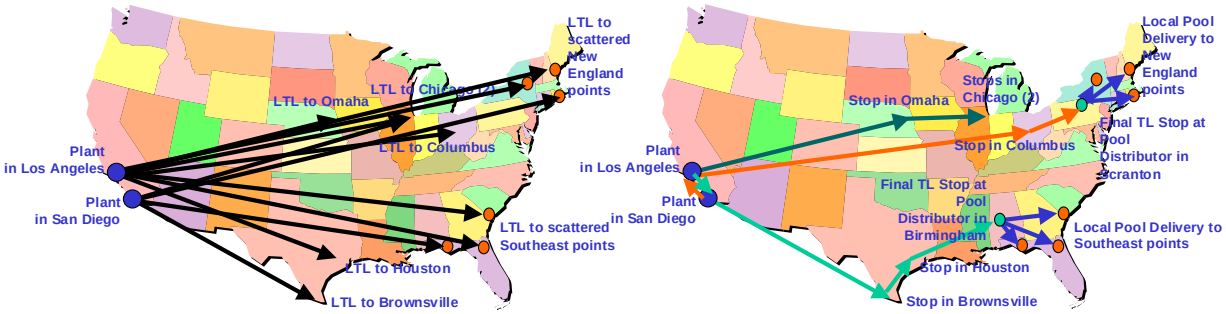
When a second West Coast plant is added, the problem becomes more complex. Should shipments be combined across the plants? What is the cost of the extra stop to pick up product at the second plant? Still, there is the potential for further economies of scale:

Figure 2 – Multiple Origins, Many Destinations

The High Cost way The Optimized way

In situations where you have multiple small shipments into one concentrated area, it may be more economical to drop a group of such shipments at a local pool distribution company, which will provide local delivery using its smaller, more cost-effective delivery trucks. In this case, there are still more options for reducing cost, but the problem expands dramatically in complexity as illustrated in Figure 3 below.

Figure 3 – Multiple Origins, Many Destinations, Pool Distribution Potential



The High Cost way The Optimized way

Real-World Challenges

Many traffic managers attempt to achieve the savings described above. Their planners spread paper copies of their current shipments on a table, and group together those having the same or similar origins and destinations. However, even when there are relatively few shipments to be handled, human planners rarely can find a "best" solution to the grouping problem. And as the number of shipments increases into the hundreds, the number of possible combinations soars into the billions, leaving the planner to use "rules of thumb" to achieve their cost reductions, and typically missing thousands of dollars in savings opportunities.

At first glance, the problem is seen as one dimensional: just put the right shipments together to make good truckloads with efficient routes to the destination. Result, save thousands of dollars. In actual practice, a solution must be found across several critical dimensions:

- Required delivery dates and times
- Feasible shipment dates and times
- Shipping dock hours and loading/unloading times
- Freight rates by mode and lane
- Carrier service areas and times
- Shipment characteristics vs. trailer type and size

The mass of information required to consider each of these factors in arriving at a lowest cost solution to the consolidation problem effectively dictates a computer-assisted solution. Since each of these areas adds a lot of complexity to finding the best shipment plan, we discuss each of them below in more detail.

Required Delivery Dates and Times

On-time delivery has become a mantra among logistics professionals. But what happens when delivery dates requested on purchase orders or sales orders are in conflict with real-world transit times?. LTL freight is quite reliable, but often requires a longer transit time than direct TL freight. However, in building multi-stop loads, the delays resulting from enroute stops must be recognized in determining whether final deliveries will meet delivery requirements, and may extend delivery times beyond expected LTL transit times.

When planning shipments, customer service reps prioritize shipments based on both the urgency of the delivery dates and the importance of the customers. Some customers can tolerate more "lateness" or "earliness" than others. Experienced transportation planners come to understand where these differences can be exploited to make workable shipping plans which keep customers "reasonably" happy, when "on paper" they fail to satisfy delivery requirements.

Automated transportation optimization tools must have this kind of sophistication as well if they are to produce results which do not have to be endlessly "tweaked" by human planners. Older optimizers tended to reject shipment sets that had too many required due-date conflicts… or simply to suggest that all shipments be sent via LTL. Instead, newer technology optimizers implement "fuzzy logic", a recent development in the Artificial Intelligence arena, which allows customer tolerance for lateness and earliness to be specified across different classes of customers in terms that humans can understand.

For example, you might have the delivery service standards for two customers specified by the following table:

Table 1 – On-Time Delivery Standards by Customer

On-Time Delivery Std	Days Early					Days Late				
	5	4	3	2	1	1	2	3	4	5
Customer "A"	Never	Rarely	Some-times	Some-times	OK	Some-times	Rarely	Very Rarely	Never	Never
Customer "B"	Rarely	OK	OK	OK	OK	Never	Never	Never	Never	Never

Feasible Shipment Dates and Times

As a general rule, the greater the number of shipments to be optimized at one time, the greater the cost savings: more shipments mean a greater likelihood that suitable load mates will be found. This is an incentive to shippers to look into the future to build loads based on production or sales order schedules. But such future scheduling can present significant challenges, which differ depending on whether the company has a make-to-order or ship-from-stock business model.

Shipping schedules of the make-to-order company are driven by product availability: either actual or scheduled. Companies with high manufacturing reliability can pre-plan shipment consolidation by loading production schedules into the optimizer. In an ideal world, the optimizer will determine the best shipping day of the week for each load to maximize customer service and minimize carrier delays, enabling final product finishing schedules to be set based on detailed shipping schedule requirements. In effect, the shipment optimizer in such cases becomes both a planning tool and an execution tool.

In ship-from-stock companies, an optimizer which determines the best date and time for each consolidated load provides a powerful planning tool for picking and packing schedule requirements. For example, if the optimizer is run on Monday of "this week" for orders due to arrive "next week", the picking and shipping plan from Thursday of this week through the end of next week might be provided for. Orders which drop into the schedule at the last minute can be added to the set of shipments not already dispatched, and the optimization re-run to find the new best shipment consolidations.

Freight Rates by Mode and Lane

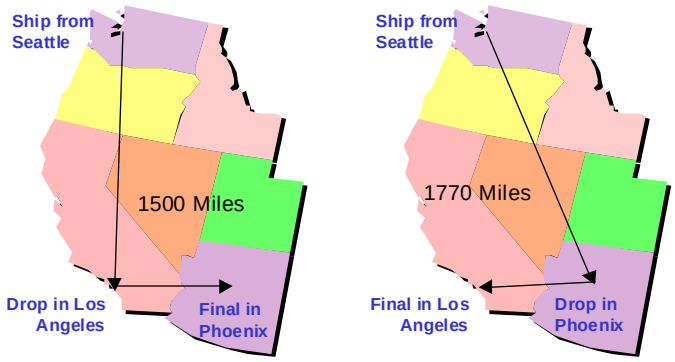
For most effective optimization, LTL rates for every shipment and TL rates to every possible destination are required. Also, if a shipment might possibly be sent through a pool distribution carrier, the pool rates need to be provided.

Some optimizers are also equipped for stand-alone operations, in which they have their own rating engine, which can determine approximate LTL rates and look up Truck Load rates from locally stored freight rate tables at a state-to-state level. Similarly, optimizers which can handle pool distribution options may have their own pool distribution rate engines to calculate pool costs as needed.

Why is this important? The latest optimizers don't simply determine the shortest distance for each Truck Load. Instead, they determine the lowest cost for each Truck Load. Since it is usually the final stop on a Truck Load delivery that determines the freight rate to be applied, both the composition of each load and the sequence of deliveries is important in determining the lowest cost.

Take for example a load originating in Seattle with shipments bound for Los Angeles, CA, and Phoenix, AZ. A distance-based optimizer would route this shipment from Seattle to Los Angeles and a final delivery in Phoenix. On the other hand, a rate-based optimizer will route this load to Phoenix, with a final delivery in Los Angeles, since the Seattle to Los Angeles truckload rate per mile ($1.10) is significantly lower than the rate from Seattle to Phoenix ($1.45), and the rate differential more than makes up the cost of 270 extra miles incurred by looping back to Los Angeles.

Figure 4 – Farther can be Cheaper when Rates are Considered



1500 miles X $1.45 = $2175

1770 miles X $1.10 = $1771

Longer route is cheaper!

Few human planners can possibly keep track of all the possible freight rates as they attempt to build a lowest cost load plan. This is yet another reason why a computer solution is virtually mandatory, and why, as we will soon see, a TMS is required to get the maximum value from a Shipment Consolidation optimizer.

Carrier Transit Times and Service Areas

LTL carriers, TL carriers and pool distribution services each have characteristics which must be recognized if the consolidation plan is to meet the requirements of customers:

LTL Carriers

The expected transit time of the LTL carrier must be considered for every shipment in the solution set. Transit time standards are published by most LTL carriers, and there are services which compile this information. LTL transit times are not easily estimated simply by distance, since the number of terminals encountered en-route is a major determinant of transit time. If reliable transit time information is not available in your own computer systems or your TMS, the optimizer will need to have a way to estimate transit times, either using a generic estimation tool or by accessing one of the services.

TL Carriers

Truckload transit times are both a matter of distance and the Federal hours of service regulations, which have recently changed. In addition, transit times will be affected by product load and unload times. In determining the optimum consolidations, either the human planner or the computer optimizer will have to make transit time estimates for each proposed load. This requires information on mileage, dock hours of service, loading and unloading times per unit. The computational requirements of this are substantial, and too time consuming for most human planners. Sources of this information must be provided to the computer solver, which must have a means to handle it. Modern computer optimizers have these capabilities with details down to the individual customer dock level.

Pool Distributors

Load consolidation plans can include either freight consolidation services, which pick up many small LTL shipments from a region or pool distribution services, which take deliveries of multiple small LTL shipments from a line-haul Truck Load carrier and redistribute them to their individual consignees. We refer to these in this article as "Pool Distributors", but include both concepts in the term. The possibility of using these services adds considerably to the information requirements of the planning process.

In many instances, more than one pool distribution service may be applicable to a given shipment. For example, a shipment to Columbus, OH, might routed through either a distributor in Indianapolis or Cincinnati. In such cases, the optimization process must have access to all possible pool locations, their rates, and the days of the week they offer delivery to determine the best routing. The number of possible solutions escalates rapidly with an increase in the number of pool distribution points, dictating computer assisted optimization for achieving a plan that is both economical and practical. Further, a TMS is extremely valuable to feed the rate and service information to the optimizer.

Shipping Dock Hours of Service

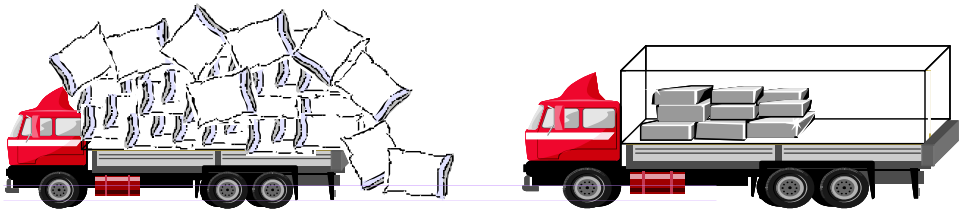
One of the critical factors in scheduling multi-stop loads is the dock hours of each facility visited. Computerized optimizers have long had the capability of taking dock hours as input for each shipment. The challenge is storing and maintaining this information about each customer or vendor. The modern TMS provides the database tools for this – a capability generally lacking in even the most modern sales order entry or purchase ordering systems.

A related problem is knowing how long a stop en-route will take. Historic information on average load or unload times for the product being handled is generally the basis for load/unload times in some convenient metric like "minutes per 1000 pounds". Typically, modern computer-based optimizers provide a number of input parameters which allow the calculation of stop times as part of the determination of whether a potential load configuration can meet customer delivery time expectations.

Shipment Characteristics vs. Trailer Type and Size

What are the trailer weight and cube limits? Trucks have finite limits on the weight they can carry and the cubic space they have to fill. For example, an order of lightweight goods, like pillows, won't exceed the weight limit, but could very easily exceed the trailer's volume capacity if cubic dimensions are not considered. Conversely, an order of

very heavy materials, such as lead ingots, could quickly exceed a truck's weight maximum before the trailer's space is filled.



It is vital, therefore, that weight and volume be calculated and included in the optimization criteria, to ensure that the trailer is optimally utilized. A further complication is that many producers ship a mix of products which both do and do not require temperature protective services. Often, it will be economical and practical to load "dry" freight with "reefer" freight when by so doing a trailer is fully utilized. In such cases the optimization must have access to the reefer rates as well.

In even more complex cases, shipments are being consolidated where each shipment may have its own allowable range of temperatures. Modern freight consolidation optimizers can accept as input those individual ranges so as to be able to determine which shipments are allowed to be loaded onto the same refrigerated trailer.

Estimating the Benefits

With all the issues of data availability and computational crunching detailed above, the question arises: "Is Shipment Consolidation optimization really worth the effort?" The answer we have found repeatedly to be "Emphatically, yes!" The table below shows the incremental benefit from implementing computerized shipment consolidation optimization under several starting conditions – based on our own experience with clients over the last several years.

Table 2 – Estimated Savings from Implementing Optimized Consolidation

Starting from...	**Typical Percent Cost Savings Range**	
All LTL shipping by LTL carriers	20%	45%
Some LTL sent via truckload based on simple, rigid rules	10%	25%
Systematic manual shipment consolidation	5%	12%

Achieving the Benefits

With these sizeable savings, why isn't everyone implementing optimized shipment consolidation? Certainly the challenges described in the sections above suggest why many Traffic Managers consider these tools a luxury… *their internal systems are simply not capable of providing this kind of sophisticated data support to make optimization*

practical. In other cases, Traffic Managers have tried older generation optimizers and discovered that the "mathematical precision" touted by their developers translated into "impractical rigidity" in the real world – all too often unrealistic solutions were proposed due to insufficient consideration of the physical constraints previously mentioned or because rigid "time windows" for delivery could not be met by real trucks driving on real schedules. The result was extensive manual revision of the "optimized" plan, with loss of much of the calculated cost savings.

Here is where new technology solutions have entered the picture, offering multiple tiers of solutions, implemented via the Internet, and providing real world answers to these hugely complex problems.

Web-Based Solution Engines

With the ubiquitous accessibility of the Internet, it is now possible for optimization vendors to put high performance optimizer engines on-line, freeing customers of the costs and implementation headaches of setting up such high-end computers in their own facilities. Software vendors now offer products that are delivered via the web and priced on an as-needed basis. Typically, these tools are built on latest generation problem solving technology such as the Genetic Algorithm or Mixed Integer mathematics. These tools can handle the complex constraints and logical interactions of Shipment Consolidation problems more effectively than older, more rigid approaches.

For example, LoadOpt™ by M-P System Services, Inc., provides its exclusive Tailored Service approach to defining on-time delivery expectations of customers. This allows the information such as found in Table 1 above to be directly input for each customer or group of customers. The problem of the optimizer simply saying "no solution within delivery time windows" is a thing of the past.

But how, exactly, can a Web-based optimizer be put to work for your company? There are two basic strategies for implementing access to these solvers.

Direct Web Access

The quickest way to get started with optimization is to access the solver directly from a PC in your office over the Internet. Products like LoadOpt™ and others allow you to navigate to a special website, upload a file of shipment information – possibly in Excel or "comma delimited" format, wait a short while for the optimizer to run, and then download a file in one of several formats that can be sent to an internal system or used to print out a shipping plan for the Shipping Department.

Under such a scenario, better solutions will result if actual truckload freight rates can be loaded into the optimizer's internal rating engine. Also, information on your current LTL class and discount agreements can be used to derive LTL costs for each shipment, if that information is not available from your systems to be sent to the solver. These data setups are largely a one-time thing, with periodic update.

But, not every Traffic Manager wants to handle this kind of a process on a daily or weekly basis. Moreover, there are opportunities for mistakes and delays when human intervention in processes like these is the routine. And… it may well be time for the entire Transportation Management process to be supported by a real computer system: a Transportation Management System or "TMS".

The Internet Enabled TMS

TMS systems have been around for a number of years, but only in the last 2 to 3 years have well-designed TMS products been available on an ASP model (Application Service Provider) delivered over the Internet. The advantage of the ASP approach, accessible by any Internet browser, is evident to any Transportation Manager who has had to fight for IS Department priority against Sales, Accounting or Manufacturing requirements.

Capturing Maximum Optimization Benefits with the TMS

The implementation of a web-based TMS can substantially enhance the effectiveness of Shipment Consolidation optimization by providing the required information infrastructure. An example of the Internet enabled TMS is Flow Logistics' eFlow system, which provides a virtual traffic management system to its customers accessed by any Web browser. Specifically a web-based TMS enhances the use of a load planning system through four vital functions:

- Process tracking
- Rate management
- Freight payment
- Communication

Process Tracking

Every company has its unique order fulfillment and sourcing processes. However those processes work, it is essential that no shipment ever be lost or forgotten during the transportation planning activities. This requirement must be met even when multiple cycles of optimization take place as new orders become visible and existing sales and purchase orders change or are cancelled.

A TMS system will help the traffic manager keep track of shipments that need to be planned, those shipments that are in the planning process, and those shipments that have already been dispatched. The TMS should allow the traffic managers to organize and view key shipment information such as ship and delivery dates, destinations, shipment size and existing loads (both pending and finalized) This way they can spot problems and make decisions about which shipments should be included in the load planning process and which shipments they must take immediate action on. A good TMS system will allow the traffic manager to go home knowing that all shipments which required action have been attended to.

Rate Management

The power of computerized load planning is its ability to compare and utilize the rates of many different carriers. Although a load planning system may use simplified internal rate tables to produce effective load plans, the use of a TMS system with an effective rate management module will greatly increase the number of possible solutions that can be considered. For example many shippers have truckload rates quoted to them state to state, Oregon to Florida $1.20 per mile, for example. This has been done to facilitate the ease of management and rating. However, additional rate advantages can be obtained by sub-dividing states into smaller geographic areas thereby allowing the carrier to offer greater discounts into geographic areas that are advantageous to it. Rates to Florida for example are frequently differentiated into north and south Florida. The same holds true of LTL discounts, where significant price concessions can be gained by letting the carrier

adjust its discount by specific lanes and geographic areas. In addition to geographic discount, different rates may be offered based on service levels and equipment types.

By incorporating this richness of rate detail into the inputs to the Shipment Consolidation optimizer, the TMS enables the optimizer to exploit fully the full range of all of these carefully negotiated rates. It is one of the great strengths of the typical TMS that they provide a full suite of computer tools to maintain and manage an otherwise bewildering array of carrier contract and rate tables.

Freight Payment

The ability of a Load Planning system to use a wide variety of carrier rates can also make the freight payment process more difficult and time consuming. The integration of load planning with rate management and freight payment in a TMS creates a self-monitoring, self-correcting process. Load planning works best when carrier rates are kept current and accurate. Rates maintenance is insured when freight bills are matched and compared with rated shipments, and discrepancies are resolved. Shippers can then be sure that the decisions they make based on the Shipment Consolidation optimization will translate to bottom line savings.

Communications

A TMS should assist the shipper to control, manage and execute the advanced transportation strategies that are made feasible by a load optimization system. The execution of these types of strategies requires solid communication that provides both online and historical reporting. Communications requirements include:

- Verification of load tender and acceptance
- Pick-up and delivery instructions for complex multi-stop loads
- Load status information en-route for multi-stop and multi-carrier deliveries

A good TMS package will not only facilitate communication through standard EDI transaction sets but should also make use of other common methods of communication such as Faxes, E-mail and web sites. This allows the shippers to implement multiple forms of communication with carriers depending on their degree of sophistication.

New Opportunities with Web-based Software

The benefits of an integrated load optimization with advanced TMS system have been well documented over the last decade. These benefits have included:

- Reduce transportation costs by an average of 10-40%
- Increase productivity and reduced labor costs
- Enhanced customer service through improved on-time delivery

But the new capabilities presented by Web-based software dramatically expand the horizon for the application of the TMS. Not only does the use of Web-based Shipment Consolidation optimization and a Web-based TMS help avoid the high acquisition and implementation cost normally associated with these systems. The exciting news is that these new tools can help your company exploit cost saving opportunities not previously considered or attempted:

- Multi-facility coordination

- More effective inbound traffic management programs
- Multi-Enterprise collaboration

Multi-Facility Coordination

One the first and most obvious application of this technology is to coordinate the shipping activities between multiple owned and contracted shipping and receiving facilities. The combination of the Internet plus a multi pick-up multi drop Shipment Consolidation optimization allows the traffic manager to plan and coordinate the shipping activities between several facilities. Formerly, only large companies with sophisticated IT support and robust internal communications technology could attempt this. Additionally, facilities like public warehouse were often unable to communicate with the company's own systems without a significant investment.

This has changed with the advent of Web-based systems. Now any location that has Internet access has the ability to effectively communicate with your traffic department. A single, centrally managed traffic function can now execute a sophisticated transportation strategy among company owned and contracted facilities, that are either permanent or temporary, with a minimum of information technology infrastructure.

Inbound Traffic Management

Inbound load planning programs have not been as common or as successful as outbound programs because of the difficulty of coordination and communication with vendors. Inevitably, the key stumbling block has been poor information on such essentials as product availability, shipment sizes, and dock schedule requirements. As with carrier communication, vendor communications must be enabled by the TMS via a variety of technologies. The most powerful of these is the use of the Internet itself for gathering vendor shipping information.

For every vendor that has EDI capability for sending Advance Shipping Notices (ASNs), there are two dozen that have no EDI capability but can easily access a Web browser, enter their PO number, and update shipment status, piece counts, weight, and product availability. This information can then be instantly available to the traffic manager for inclusion in the Shipment Consolidation process.

Partly as a result of the historic difficulties in planning and managing inbound freight, the potential savings for most companies in this area are quite high. All too frequently, the extensive cost reduction programs found in the outbound area: multi-stop truckloads, pool points, negotiated LTL rates, and so on, have been completely absent in the inbound arena. The TMS can change this situation dramatically, bringing all these techniques to bear – often with freight rate savings in the 20-30% range or more.

Shipper Collaboration

Fuel-driven cost increases are forcing shippers to look for more ways to collaborate with other shippers in utilizing carrier assets. This is not a new idea, but what is new is the much greater cost savings urgency. The innovations described in this paper can facilitate the formation and operations of collaborative shipping efforts. Three basic problems have served as obstacles for multi-enterprise collaboration:

- Sharing of shipment information was difficult or impossible
- Multi-pick/multi-drop Shipment Consolidation optimization was unavailable

- Sharing the benefits among the members was a continual source of disagreement.

Unless companies were willing to make significant and expense investment in in-house TMS systems, the ability to share information among multiple enterprises was both expensive and time consuming. Most companies view this type of investment as a distraction from their core business and simply refuse to pursue it. With the advent of the Web-based TMS, the ability to collaborate with other companies on the shipment of product has been greatly facilitated. Companies that have an Internet connection and the ability to load orders into the TMS, either by hand or by electronic download, can now participate in collaborative efforts. Additionally by feeding information into a common Web-based platform, such advantages as EDI, tracking and tracing, freight bill audit, and payment and common carrier rate management are available to all participants in the collaboration.

All the problems of manual Shipment Consolidation planning mentioned earlier in this white paper are compounded when multiple companies attempt to collaborate. Until recently Shipment Consolidation optimization did not work for this type of enterprise because they lacked the ability to route from multiple origins to multiple destinations. Without computerized optimization, individual company members were often (rightly) concerned that the full cost savings opportunities of the collaboration were being missed. Newer optimizers, such as the Web-based LoadOpt™, can handle any number of origins to any number of destinations, providing the assurance that the benefits of cooperation are being fully realized.

Finally the Web-based TMS can facilitate the sharing of benefits to all members. A TMS like eFlow™ with the ability to allocate freight costs from multi-stop loads down to the shipment level can help insure that the benefits of improved freight management are fairly shared by all member of the collaborative effort.

Real-world Examples

The following pages depict an example of actual Flow Logistics' client data, including actual costs incurred using the client's previous inbound freight management process and the improvement achieved by the use of Web-based Shipment Consolidation optimization and TMS systems.

The company is a retailer located in the Pacific Northwest. They managed their own inbound freight with some manually planned consolidation of large LTL shipments, but moved most freight either by truckload or using a major LTL carrier.

An analysis was first performed to determine the best transportation strategy given the company's shipping patterns and service requirements. This analysis included determining the number, location and service areas for inbound consolidation points or "pool points".

Analysis Process

1. Collected inbound shipping data for freight currently served by truckload and LTL carriers.
2. Utilized Optisite™, a facility site location model, to determine the location and service areas for regional cross-dock carrier, commonly referred to as pool points.
3. Determined actual or expected freight rates.

4. Constructed a sample shipment file for freight that moved during a six-week test period.
5. Used LoadOpt™ Shipment Consolidation optimization software to consolidate shipments for each week of inbound freight.
6. Based on the resulting inbound load plans, freight costs were allocated back to the individual shipment and compared with the actual freight cost.

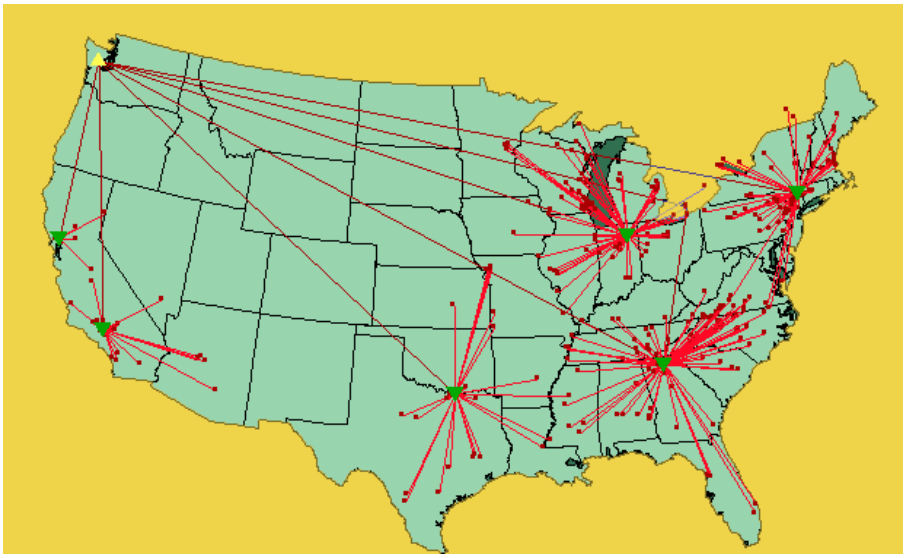
Key Modeling Parameters

1. The Optisite™ model for pool point locations and service areas was based on shipments of less than 15,000 pounds.
2. It was assumed that this program was implemented, the current favorable LTL discount would not remain in effect for freight that could not be consolidated. A lower discount for LTL freight was used in the model for freight that could not be moved via consolidation and would have to be moved on an alternative LTL carrier.
3. Stops per truckload movement were limited to a total of five.
4. Each of the six weeks was modeled.
5. Consolidations to regional pool points were performed twice weekly.
6. Rates for the cross-dock facilities were set conservatively at 5% above what might reasonably be expected.

Results

Based on an analysis of a six-week sample, an inbound consolidation program showed that it could reduce freight costs by an average of nearly 15% over the current inbound freight management program. Savings ranged from a high of over 30% to a low of 10% in each of the 6 weeks of the test period.

Figure 5 – Inbound Consolidation Program Example Map



The table which follows shows a summary of the client's shipments for the six-week period. The un-optimized charges indicate what the company paid using its current

planning methods. The next column shows what the charges would be, using load optimization plan created specifically for the client's shipping patterns and business rules.

Table 3 – Actual Cost Savings from Inbound Freight Consolidation

Week	Number of Shipments	Un-optimized Charges	Optimized Charges	Savings	Percent Saved
1	445	$158,568	$138,451	$20,117	14.53%
2	418	$147,019	$130,328	$16,691	12.81%
3	411	$141,057	$128,052	$13,005	10.16%
4	391	$158,873	$121,721	$37,152	30.52%
5	455	$165,873	$141,695	$24,207	17.08%
6	445	$165,102	$138,474	$26,628	19.23%
		$936,521	**$798,721**	**$137,800**	**14.71% Avg. for the 6 weeks**

Conclusion

The Internet revolution is alive and well, transforming the way traffic managers drive down the costs of LTL transportation. Aggressive companies are already beginning to exploit the powerful opportunities presented by new optimization technology and second generation TMS software delivered via the Internet.

About the Authors

Tom Livernash is owner and founder of Flow Logistics, LLC, a logistics consulting, and application service provider located in Bend, Oregon. He has over 25 years experience in Logistics Management, including positions with Schneider National, Ryder Dedicated Logistics and John Labatt Foods. Since 1993 he has directed the logistics consulting and management activities of Flow Logistics, LLC. In 2002 Flow Logistics introduced eFlow™, a web-based transportation management system. For more information, see www.flowlogistics.com or contact him at (541) 330-0222.

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