Roadmap for Bulk Distribution

A template for Distribution Efficiency for fuels, lubes, chemicals and hazmat pickup and delivery

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Executive Summary

The most efficient bulk distribution companies have used technology and business process changes to drive significant distribution efficiencies. We have seen reductions of 30% of total distribution costs versus manual systems - less trucks, labor and miles. Additionally, we have seen increases in delivery efficiency for keep full accounts where the best companies deliver > 90% of contracted amounts versus averages of manual systems at less than 70%.

With margins often being fixed, especially on national accounts, companies must improve distribution efficiencies in order to be competitive and profitable. This roadmap outlines the business processes and technologies BizSpeed has seen have the highest impact or interest. For each area, we present:

- ✓ What the efficiency is
- ✓ Why it is important
- ✓ Where it fits
- ✓ Symptoms for investigation

The areas addressed include:

- Distribution Efficiency Assessment – analysis of actual orders, distribution centers and efficiency
- Keep Full Analysis – analysis of auto-replenishment efficiency
- GPS – tracking, exception reporting, engine diagnostics, directions and plan-vs-actual analysis
- Wireless Tank Monitoring – remote tank monitoring
- Mobile – Proof of Delivery and automated field data capture
- Route Optimization – optimizing the scheduled stops for fewest miles, least trucks, least labor
- Dispatching – electronic dispatch board for managing deliveries and pickups
- Metrics and Data Warehousing – monitoring and analysis of current and historical distribution

BizSpeed provides solutions through our own software as well as through partner software and hardware to address all of the areas listed.

Distribution Efficiency Assessment

WHAT: A Distribution Efficiency Assessment is a 3-4 week analysis of a subset of pickups or deliveries. Typically it involves putting GPS tracking on 4-5 vehicles to analyze planned deliveries (pickups) versus actual, and comparing that to an optimized set of deliveries (pickups). An example would be to analyze 1000-2000 actual orders to see how well they are routed, how many trucks were used and comparing that to an optimized route generated via software.

Customers with a high number of stops per day (> 10+/truck) and dynamic schedules (order today, deliver tomorrow) have achieved a 10% reduction in total transportation costs. This comes in reducing trucks, labor, miles and inventory carrying costs.

WHY: A Distribution Efficiency Assessment is similar to an annual health check for your distribution network. It is important to perform an assessment on a periodic basis when the dynamics of your distribution change. Dynamics include changes in the number of customers, location of customers, inventory levels, number of orders, order size, fleet utilization, etc.

An assessment will help you answer:

- What is the most efficient distribution strategy?
- Should I add or close distribution centers?
- Do I have the appropriate fleet size?
- Is my fleet properly located?
- Are inventory levels appropriate for current demand?
- Are my vehicles operating efficient routes?
- Do I have the right technology to operate efficiently?

WHEN: If you manually dispatch or if you've never looked at your distribution efficiency, you should conduct this on annual basis. Frequently we hear that dispatchers believe they are efficient, but the assessment can use software tools to compare what was scheduled versus what should have been scheduled versus what the drivers actually did. We hear "I know my territory and drivers". The more stops per day per driver, starting at approximately 6 per day, makes the benefits more compelling.

The type of distribution assessment depends on the characteristics of your delivery network. If you have a fixed set of pickups or deliveries, such as a standard set of stops every T-Th for customer xyx, then a planning analysis can be done to confirm your current routes and propose new fixed routes based on past deliveries and constraints. This may be done on an annual or semi-annual basis to regenerate an optimized set of routes.

Customers that have dynamic routes (order today, deliver/pickup tomorrow) should perform this on an annual basis as well. The more stops per day per truck, the more potential benefits can be generated. In order to perform an assessment, companies should have a list of customers with valid addresses (addresses can be geocoded later), vehicles with vehicle constraints (capacity in lbs or volume), products with product volume or weight, and orders that match the products and customers.

Keep Full Analysis

WHAT: A Keep Full Analysis is a review of the agreements and fulfillment of customer tanks where distributors are responsible for ensuring the tanks are always 'kept full or at a minimum level'. Customer's want the minimum product to reduce inventory carrying costs, but also want to ensure enough product is on hand so they will not run out. Distributors need to ensure the distribution and selling costs are optimized and adhered to. A Keep Full Analysis reviews:

- ***Business rules - e.g. explicit customer agreements and de facto operating models***
- ***Process design - e.g. continuous versus batch versus event/trigger-driven***
- ***Field based tools - e.g. tank monitoring solutions (purchased and/or home grown)***
- ***Office based tools - e.g. tools to streamline and improve decision making around when to fill tanks***
- ***Data analysis - e.g. review of individual customer delivery history versus contracts.***

WHY: We have seen customers with 5000+ tanks save over $300k in a detailed 2-3 month Keep Full Analysis. The savings were the result of changing the delivery schedules based on what was required to keep them full – eg. 45 stops per year versus 52. Additionally, some contracts can be re-priced based on delivered versus contracted quantities.

A common metric is the amount delivered versus the contracted amount. For lubricant deliveries an efficiency of 85% or greater of contracted amounts would be considered efficient, but a large majority of deliveries are in the 55-60% range, i.e. you agreed to deliver 500 gals/wk but on average have delivered 325 gal/wk. Dispatchers with tank monitoring solutions often state they are effective at keeping the efficiency high, but dispatchers often do not compare against contracted amounts, just the fact that they placed orders when the tank hit a threshold.

The benefits of a Keep Full Analysis include:

- Higher gallons/delivery - via reduction/elimination of simplistic time-based delivery programs
- Fewer miles/delivery - via longer scheduling windows
- Fewer customer stock-outs and emergency runs
- Fewer delivery runs
- Higher customer satisfaction

WHEN: A Keep Full Analysis should be done on an annual basis or when your delivered (or pickup) versus contracted efficiency is less than optimal. Efficiencies vary by delivery profile – where lubricants and fleet fueling may involve many stops per day per truck, gas station fuel delivery is measured by the percent full of each delivery and avoiding split deliveries (one load to two or more customers). A high number of split loads would indicate the need for a review.

GPS

WHAT: GPS solutions provide vehicle location tracking. A 'basic' GPS solution mounts a device on each truck to receive basic reporting – where is a vehicle/fleet, show vehicle breadcrumb history, and provide basic exception reports such as speeding or breaking a geofence (e.g. a virtual fence drawn around a city or customer to see when the truck went through the fence). The next level involves installing an in-vehicle device that is wired to the ignition to get idle reports. The ignition is required to know if a vehicle is on when it is stopped. Advanced levels of GPS install in-vehicle and wire into the vehicle J-Bus to provide information such as hard braking, engine RPM and engine diagnostics such as engine hours.

GPS tracking can also be provided by mobile devices (handheld computers/scanners). The advantage of mobile GPS is that it provides the all the functionality of the basic solution in terms of location, exceptions, etc., as well as on screen navigation. For pickup and delivery, this allows dispatchers to schedule routes and have each stop automatically routed with turn-by-turn directions. The downside of mobile GPS is that you are monitoring the mobile device(driver) versus the truck.

WHY: Customers implementing GPS will see benefits in the following areas:

- 13% fewer miles due to monitoring
- 23% increase in on-time deliveries
- Reduction in insurance rates - with hard braking and acceleration history, you can prove what the driver was doing at the time of an accident (as well as whether they were even at the accident)
- Reduction in idling costs – an average cost to idle a truck is 1 gal/hr. Without idle monitoring you don't know how much idling is occurring. It is not uncommon to see up to 4 hrs/day in idling per truck.
- Ability to compare actual versus planned routes, including the order of stops, mileage and time taken.
- Improved dispatching to know where your fleet is to send the nearest truck for a stop.
- Automation of state mileage reports
- Customer geofencing and the ability to report all vehicles at a customer with time on-site
- Stolen vehicle tracking

WHEN: GPS solutions range in cost from $200-600+ per truck to install. A basic system at $200 provides vehicle location tracking and reporting as described above. At roughly $400 per truck, you are able to get the ignition and therefore idle reports. Engine diagnostics are usually $600+ per truck to install. The monthly costs range from $25-45/month per truck. Mobile GPS solutions are typically subscription based and range in price from $10-25/month. If drivers change routes or you have new drivers, the mobile components are important because they provide integrated navigation and directions. They are used in conjunction with vehicle mounted to allow unattended vehicle monitoring.

To determine the benefits of GPS, you can easily pilot GPS on a small set of vehicles to assess benefits.

Wireless Tank Monitoring

WHAT: Wireless Tank Monitoring involves placing a tank gauge probe or a sensor on a tank to periodically transmit readings to a central site. Tank strappings (calculations used to determine volume) or a lookup table are used for each tank, along with thresholds alarms on when you must fill the tank or when the tank crosses a warning threshold. For tank farms, tank monitors allow multiple tanks to communicate to a gateway where the gateway is the only communication device, so you are not paying for data communications on a per tank basis, but rather on a tank farm.

Newer tank monitors can be configured to use a local internet connection to report on a higher frequency basis (i.e. more than 1/hr per tank). Most existing monitors use cellular communications and report 2 times per day.

Tank monitors are used in both pickup and delivery. For deliveries, monitors are placed on high volume tanks to report when the volume hits an automatic refill level. For waste product pickup such as used motor oil, tank monitors report when the pickup threshold has been hit. Tank monitoring solutions usually take into account the utilization over the last 30 days to forecast levels for re-order.

WHY: Wireless Tank Monitor benefits include:

- Preventing run-outs
- Eliminating manual tank readings – reduces errors and labor costs
- Efficiently scheduling deliveries – deliver when needed vs. a fixed schedule.
- Forecasting inventory levels
- Inventory management and optimization
- Reduce shrinkage

WHEN: Most companies install tank monitors on high volume or problem tanks. Monitors can usually be installed by the driver in less than 30 minutes, depending on the type of monitor. The type of monitor (radar, ultrasonic, pressure, float) depends on the type of tank as well as the type of product (e.g. lubricants versus gasoline). Float monitors can be as little as $250/tank while pressure monitors can be closer to $2000/tank. There is a monthly monitoring fee per tank that ranges from $5 - $15.

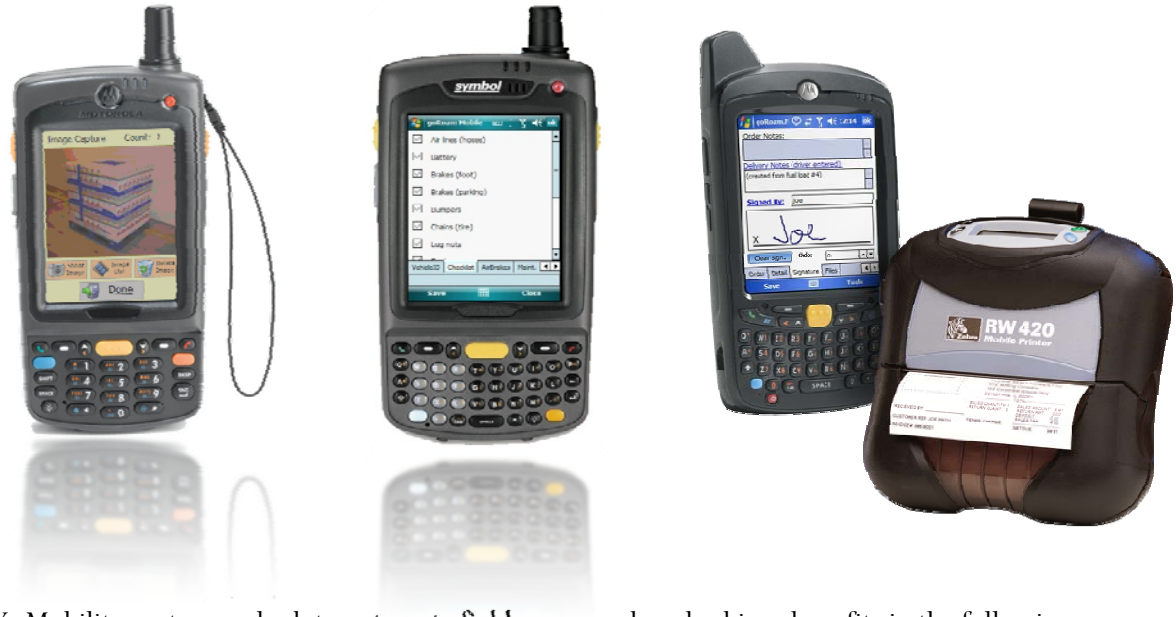
The typical reason for not monitoring tanks has been that the cost was too high; however, newer technology is driving the cost down and some solutions are well under $10/tank per month for larger volumes. Where you have longer routes, such as a 50 mile round trip, installing tank monitors can quickly pay for itself at $2.50/mile for a loaded delivery cost.

Mobile – Field Data Automation

WHAT: Mobile field data automation uses rugged handheld devices, with barcode scanners, to wirelessly dispatch orders to drivers and enable drivers to capture deliveries or pickups completely on the handheld. This streamlines deliveries, eliminates errors and allows orders to be sent to accounting in near real-time for immediate invoicing and a reduction in the Order to Cash cycle.

BizSpeed's goRoam mobile application allows drivers to logon, start a trip (route), view and record loads and orders, capture order details and customer signatures, print receipts, record tank readings, barcode scan package deliveries, barcode scan tanks or vehicles for fleet fueling, capture metered deliveries wirelessly with LCR-II meters, record the GPS location of a delivery, navigate to an order by on-screen GPS navigation, log events (e.g. waiting on dock, waiting on signature, etc.) and send messages to dispatch.

goRoam runs on Windows Mobile devices and multiple wireless carriers, or in batch with store-and-forward support. Sample screens and devices are shown below.



WHY: Mobility customers look to automate field paperwork and achieve benefits in the following areas:

- Shorten the Order to Cash (OTC) cycle – reductions from 12 days to less than 5
- Eliminate field paperwork
- Accurate data entry and orders – eliminate issues with handwritten orders and field-based calculations
- Eliminate redundant data entry – key an order one time and just update quantities.
- Reduce data entry clerks
- Centralize dispatch – dispatchers can easily see and manage routes via an electronic dispatch board versus waiting on field paperwork and phone calls
- Eliminate phone calls from/to dispatch for status and order updates

- Accurate time tracking of field activities – automatically track shift, trip and order start/stop times
- Proof of Delivery – provide legible electronic proof of delivery (POD) to customers
- Reduce employee theft

WHEN: Mobility solutions are a good fit for companies where accurate proof of delivery and shortening the Order to Cash cycle is important. The case is more compelling the more valuable the product.

Mobility is a good fit if you have:

- ✓ Personnel dedicated to re-keying data
- ✓ Delays in your OTC cycle due to field paperwork
- ✓ Issues providing Proof of Delivery from field paperwork
- ✓ Errors in pickup and delivery from manual data entry
- ✓ Dispatchers spending significant time on the phone with drivers to coordinate pickup and delivery
- ✓ Inventory reconciliation issues from manual tracking of inventory
- ✓ Difficulty tracking and managing what drivers did in the field (e.g. driver said they arrived at 10am)

Route Optimization

WHAT: Route optimization is the process of creating a schedule of routes based on using the fewest trucks, drivers and miles. Route optimization software creates the most efficient set of routes based on a given set of orders, delivery windows, vehicles (including capacity constraints), and customer locations.

Route optimization is most applicable the more stops/truck and the more trucks per depot. As an example, route optimization will take 1000 orders and 100 trucks across multiple distribution centers, and based on the customer delivery windows and truck constraints, create a set of routes. If a dispatcher does this manually, they may use all 100 trucks and have each truck work an average of 8 hrs. An optimized route may only use 85 trucks and take fewer miles. Route optimization tools can take 15% or more out of distribution costs by reducing the number of trucks, labor and miles.

Different routing engines apply to different distribution scenarios. Some routing engines are better at handling multi-compartment vehicles, while others are better at handling dynamic routing where orders come in today and need to be delivered today.

WHY: Route optimization can take 15% or more out of total distribution costs. We have seen customers with close to 20 stops per day receive a 30% reduction in transportation costs versus manual dispatch. Additionally, route optimization allows dispatchers to focus on exceptions rather than manual order assignment. Most software allows dispatchers to put orders on trips manually to show the delivery cost associated with making a non-optimized stop. When a customer calls and requests immediate delivery, dispatchers know what it will cost to make the delivery.

WHEN: Route optimization should be considered when there are at least 5 trucks per depot and each truck makes at least 6-7 stops per day. If there are only 1-2 trucks per depot, a dispatcher can manually make assignments and get good results in terms of delivery efficiency. Once companies get beyond 10 stops per day per truck, significant savings can be achieved by automating the routing function. When combined with product forecasting, route optimization can determine what time is best to schedule a delivery based on forecasted inventory levels at a customer.

Dispatching – electronic dispatch board

WHAT: An electronic dispatch board is software that allows dispatchers to manage and display routes in near real-time. Stops can include loads, orders, pickups, inspections or other functions. An electronic dispatch board is typically fed from a mobile field data capture system.

Some companies use GPS systems as dispatch boards, but the dispatch board needs to also show the status of deliveries as well as quantities, so dispatchers know what is left on the truck. An example of this would be an emergency order where a dispatcher needs to view multiple trucks to see what products and capacity are left to determine which truck to schedule.

WHY: Electronic dispatch boards allow:

- Dispatchers to manage more trucks by graphically displaying routes and route status.
- Centralized dispatch – if dispatch is manual or paper based, each depot typically schedules and manages their own trucks. When dispatch is centralized, fewer dispatchers are required and all dispatchers can have visibility into all routes.
- Improved management
- Better coverage across more shifts
- Fewer dispatchers
- Prevent dispatching to customers on credit hold

WHEN: Electronic dispatch boards should be considered when companies have:

- Multiple dispatch locations, especially if there is excess dispatch capacity
- Difficulty covering dispatch across all shifts
- Limited management visibility into remote locations' dispatch

Metrics and Data Warehousing

WHAT: Data warehousing provides a central view and set of management reports to analyze key business metrics. Many companies have operational data across multiple systems – customers and invoicing in accounts receivable (AR), dispatch and routing in a dispatch system, GPS tracking on a hosted solution, inventory in a Warehouse Management System, etc. A data warehouse consolidates key operational data into one system that is used for reporting and analysis.

Data warehousing allows business and operations management to analyze metrics and make informed tactical and strategic decisions. Examples include truck utilization, average time per route, planned versus actual time/miles per route, average volume delivered per day/week/month etc., volume per product per day/week/month etc., and average time per stop.

WHY: As margins get smaller or in the case of national lubricant contracts where margins are fixed, companies must improve their distribution efficiencies. In order to make improvements, companies have to establish baselines and benchmarks. To quote Tom Peters, "What gets measured gets managed."

WHEN: A metrics program and data warehouse cannot be established until companies have some level of automation throughout their company. For example, if dispatchers manually schedule routes on paper, there will not be planned trip and stop times to compare them to actual times. Similarly, in order to compare things like planned versus actual, field data capture needs to be automated with mobile and GPS so data is available in electronic formats.

A metrics program should be established when bulk companies want to establish benchmarks to improve in areas such as:

- Scheduled versus actual
- Average quantity per stop
- Asset utilization:
  - % trucks used
  - % trailers used
  - Delivery miles
  - Fuel used
  - # stops/truck
- Personnel utilization
  - # personnel used
  - Hrs/week per employee
  - Average time/stop
- $/mile
- $/stop

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BizSpeed is an enterprise software and services company focused on extending business applications to mobile, wireless and web users. Our solutions provide and collect information at the point of need, which helps our clients achieve a "faster business", or "biz speed". BizSpeed provides complete mobile solutions for field sales, field service, pickup and delivery, asset management and inspections.

GoRoam is BizSpeed's line of mobile products designed to automate key field operations. goRoam includes mobile modules and a web-based suite of server modules, each of which can be configured to meet specific business process requirements.

goRoam.Sales - Route accounting, sales orders and invoices
goRoam.Delivery - Delivery/pickup of bulk and packaged products
goRoam.Service - Work orders, parts and material
goRoam.Assets - Asset audits and tracking
goRoam.Inspections - Create and conduct inspections

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Compsee, Inc. is a leading full service integrator of wireless and mobile computing and network solutions. Compsee will design, integrate and support an end-to-end wireless solution - from the backbone to the mobile worker. The company's unique blend of best-of-breed hardware and professional services provides solutions for a full range of demanding mobile environments.

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Zebra Technologies Corporation (NASDAQ: ZBRA) provides the broadest range of innovative technology solutions to identify, track, and manage the deployment of critical assets for improved business efficiency. Zebra's core technologies include reliable on-demand printer and state-of-the-art software and hardware solutions. By enabling improvements in sourcing, visibility, security and accuracy, Zebra helps its customers to put the right asset in the right place at the right time.

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