Always On

Peak Performance for Nonstop Businesses

By ChainLink Research

Market Leaders across industries are disrupting the status quo, redefining their business models with new ways to connect with customers and fulfill their needs. They are managing and serving their customer needs—same day, twenty four hours a day. This is an always-on business model. The new customer is also always on—mobile and social.

So the imperative now is to understand these disruptive forces. Why now? The new reality is that there is a profound change impacting logistics economics, consuming capacity and know-how to support—and lead—these new business models. And more to the point, these leaders may be driving the business to them—not you.

In this paper we will discuss the philosophies and methods being used to create these new capabilities. We will discuss the competitive response and how to provide customer service while maintaining or reducing costs. That is—becoming always on.

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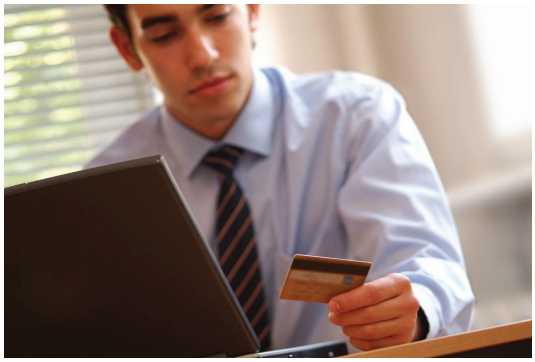
Are You Always On?

You know you are always on when customers log in at eight pm looking for a next-day delivery. You know you are always on when customers call 24/7 requesting repairs. You know that when your customer expects her groceries to be delivered *when she gets home* that you are always on. You are always on when you are open seven days a week, serving the health needs of your community. You are always on when you are serving the *nonstop* and changing needs on your customers.

Always-on businesses include online and traditional retailers. And not only retailers, but also industrial, maintenance or petrochemical companies. Other businesses not often thought of as always on are construction and building supplies. Not just B2C, but global B2B logistics with demanding customers, serving tight delivery schedules. Yes, all of these are examples of *Always-On* businesses.

In businesses such as these, in perpetual motion serving customers' unremitting and dynamic needs, the operations should also reflect that environment. In other words, the operations have to be *always on.*



Always on is not just a theoretical buzzword for discussion, but a current competitive imperative. Disruptors have already put their cards on the table, focusing on delivery services: whether Amazon's or eBay's logistics services, or even the venerable Sears' countermove of leveraging their expertise in procurement, transportation, and service. They, and others, are the game changers revolutionizing business. B2B businesses are also dealing with the unintended consequences of self-service websites. Customers are on these sites 24 hours a day. After all, with their mobile devices, *they* are *always on*, untethered from the fixed location and desktop computer.

At the same time, transportation costs are continuing to rise. Fuel prices are volatile and drivers are in short supply. The major ground carriers raised their rates,[1] while all carriers continue to have challenges adjusting to the impact of ecommerce. Can you pass those increasing costs on to the customer and remain competitive? Unlikely, for many sectors. Finding a cheaper transportation option that may not be as responsive? That won't work either.

With the customers' zeal for more responsiveness to support their lifestyle or business goals, the question becomes—*how will you respond?*

In this paper we will discuss the *always-on business*, proposing a new, dynamic business model for delivery—one that serves this new customer as well as creates profitability. We will look at always on from both the strategic and tactical perspective, offering instructive case studies relevant to both B2B and B2C business.

[1] Information on FedEx and UPS rates as of April, 2014. FedEx increases were around 3.9% and UPS 4.9%.

Always On? It's Fulfillment

Nowhere does *always on* impact the business more than in fulfillment. Gone are the days when the touch points to the customers were externalized from the business model. Fulfillment is no longer viewed as an afterthought left to third parties to design and execute. However, this may be a new endeavor for many businesses and as such, a big risk.

Consider This:
Retailers have already learned that online shoppers often abandon their shopping carts if the preferred delivery time cannot be met. They also know about buyer's remorse. The longer out the delivery schedule is, the more likely the customer will cancel the order.
Always on logistics provides:
- Later cut-off, which means more sales
- Preferred ship times reduce shopping cart abandonment
- *Capture and ship* reduces changes and cancellations of orders

Just look at the moves of Amazon, eBay, and others who are leading the new market realities: always on, instant gratification, and a respect for the customer's intelligence and involvement. The customer wants transparency from the source to the point of consumption. They want instant access, information, and service. And the leaders are creating logistics models that truly represent this reality, supporting their value and brand.

Fulfillment is part of the overall cost to serve. Even if customers may pay for transportation (in certain sectors this is becoming less true), there are still significant operating costs in the form of systems, processes, personnel, and assets that must be assembled, what to say of management's time and attention, and the means to design and evaluate the success of the new model. Many firms have found themselves flat-footed, either with no strategy, or with outdated methods of managing delivery.

If fulfillment is part of the overall business model, and in fact, critical to competitive advantage, then it has to be managed as such. It has to support topline growth with the highest performance standards that customers have come to expect, yet add—not detract—from the bottom line.

Think of this: If my business is *always on*, then the processes and systems that support that model must also be on—*always.* That means when the customer comes calling, the information provided must reflect current status—real-time, all the time. The problem is that many systems, especially in transportation, are a composite of disjointed processes and data. Making promises means keeping promises—while keeping costs in check to achieve advantage.

If you agree that these issues are critical considerations for your business now, then you must also be asking yourself what you are doing to become an always-on business.

Always On—Two Views: John Lewis and Ferrellgas

Let's look at two interesting examples of *always on* to illustrate an important point: Always on is not just for the mega-enterprises like Amazon.

John Lewis, in the UK, is the poster child for home delivery services *with profit*.[2] While the customer is still in the process of shopping, John Lewis' technology is determining the resource requirements for services such as installation and recovery while dynamically calculating the delivery costs and presenting choices to the customer. John Lewis' system goes even farther to incentivize delivery pricing based on lower cost alternatives. Of course, the customer wants it when they want it, so that might mean charges for the delivery service. In this way, John Lewis ensures that each delivery's cost is controlled—or even is profitable for them.[3] John Lewis knows the new reality: they know that *when* I want it is just as important as *what* I want.

Another interesting and everyday market is gas, oil, and propane delivery. Ferrellgas, the second largest propane gas provider in the United States, serves nearly one million residential, commercial, and agricultural customers. These types of companies are more complex than they appear on the surface. Customers cannot be without fuel. Yet no company has unlimited funds for an unconstrained delivery schedule.

Weather changes and other factors impact consumption. Ferrellgas, therefore, needs to continuously evaluate their best options based on fluctuating customer demand to determine when to deliver to achieve customer service, yet at a lower cost to serve. Through their technology platform, they continuously evaluate their options to achieve an economical logistics schedule that has high customer service. This has allowed them to increase customer service and add new customers, all with a double-digit reduction in operating costs.[4]

So, always on is not just for on demand, but also for replenishment. What is important in both of the examples above is the recognition of *delivery as part of the overall business model.* The transportation technology infrastructure, therefore, is one that is continuously sharing information rather than being a latent process disconnected from customers or other front-office activities.

[2] You can hear more about John Lewis here.

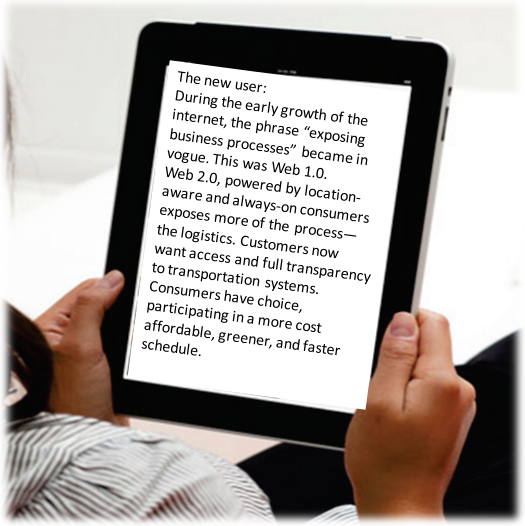
[3] Read Winning at Home Delivery for a discussion of methods and technologies for home delivery.

[4] Ferrellgas success story.

Always On? It's Availability

Whether you are an online retailer, home healthcare provider, or propane gas provider, being always available on the customers' terms is now key to surviving and thriving. Availability is the crucial mindset.

If we see customer requirements as a *continuous stream of demand,* the major issue is availability. This is a new way of thinking and a new capability for many. Think of it this way: When people used to shop only in physical stores, whatever was on the shelf was *available* to them. So now, for web businesses, the race is on to attempt to emulate, or replace, as much as possible, that instant experience. Furthermore, customers don't just want to locate an item or service. They want to know *when* and *how* they will get it. That means that transportation services' capabilities need to move to the front of the process. *Availability means translating information into service.*



Ironically, businesses themselves have led customers to expect real-time service. Customers, for example, can see if a product is *currently* in stock and have that item allocated to them. The order transactions can be immediately processed as they occur—one at a time. But not the actual delivery. Transportation routing and scheduling is relegated to a latent process.

Traditionally, the actual scheduling of routes is a batch process, disconnected from the promised delivery appointment. Customers are given appointments based on past information or posted rates. They are not based on *real* schedules and costs. After some arbitrary cutoff period, orders are batched and the system processes for the next day's deliveries. This is when, finally, the *real* schedule is produced—and the realities of cost and time are confronted, leaving transportation services over- or under-committed, over- or under-capacity, and often, facing additional operating costs.

Always On means:

Continuous intelligent information is accessible to a wider user base. Whereas, traditional optimization paradigms limit use to planners and schedulers.

This "black box" process for planning has been the standard modus operandi for the supply chain market for over two decades.

Maybe it's time to look at some other approaches.

Always On Anywhere—US Supply

An example that demonstrates availability is US Supply, a provider of plumbing and contractor equipment. Theirs is an example of responsiveness: US Supply differentiated themselves with their "*We are always where you need us*" messaging. In order to beat the local competition of wholesale or retail distributors, US Supply has achieved 99.5% on-time and completed deliveries. Rather than contractors waiting for distributors or retailers to open their doors, US Supply can respond on demand.

Many logisticians think responsiveness is a high-cost model. Yet, plumbing supplies is not the kind of market in which excessive pricing will lead to success. In fact, through their on-demand, continuous technology, US Supply reports, "We made our routers and drivers more effective, resulting in annual savings of over USD $400,000."[5]

Managing the Inbound—Tazedirekt.com

With so much focus on the outbound, we may lose sight of the inbound challenges. Increased demands due to product variability, or service dynamics such as same-day shipping, put pressure on businesses for more frequent inventory replenishment. This is most evident in fresh produce. Tazedirekt.com, one of Turkey's most innovative online grocery retailers, now relies on this continuous model—end to end. Inbound has to be flawless to ensure that their fresh produce stays that—fresh. This model continues right to the point of delivery, integrating, streamlining, and optimizing the delivery process from appointment scheduling to proof-of-delivery (POD) in order to maximize customer service in a cost-effective manner."[6]

[5]Kevin Hollinger, Director of Operations at US Supply. You can read the case study on US Supply.

[6] More on the Tazedirekt.com case study here.

Continuous vs. Batch—What's the Difference?

Let's take a closer look at traditional batch vs. a continuous model. The batch model accumulates all the orders until the cutoff point and then, based on the allotted time, derives the best possible answer based on the objectives.[7] If you contemplate Figure 1, there are several other critical points that should jump out at you:

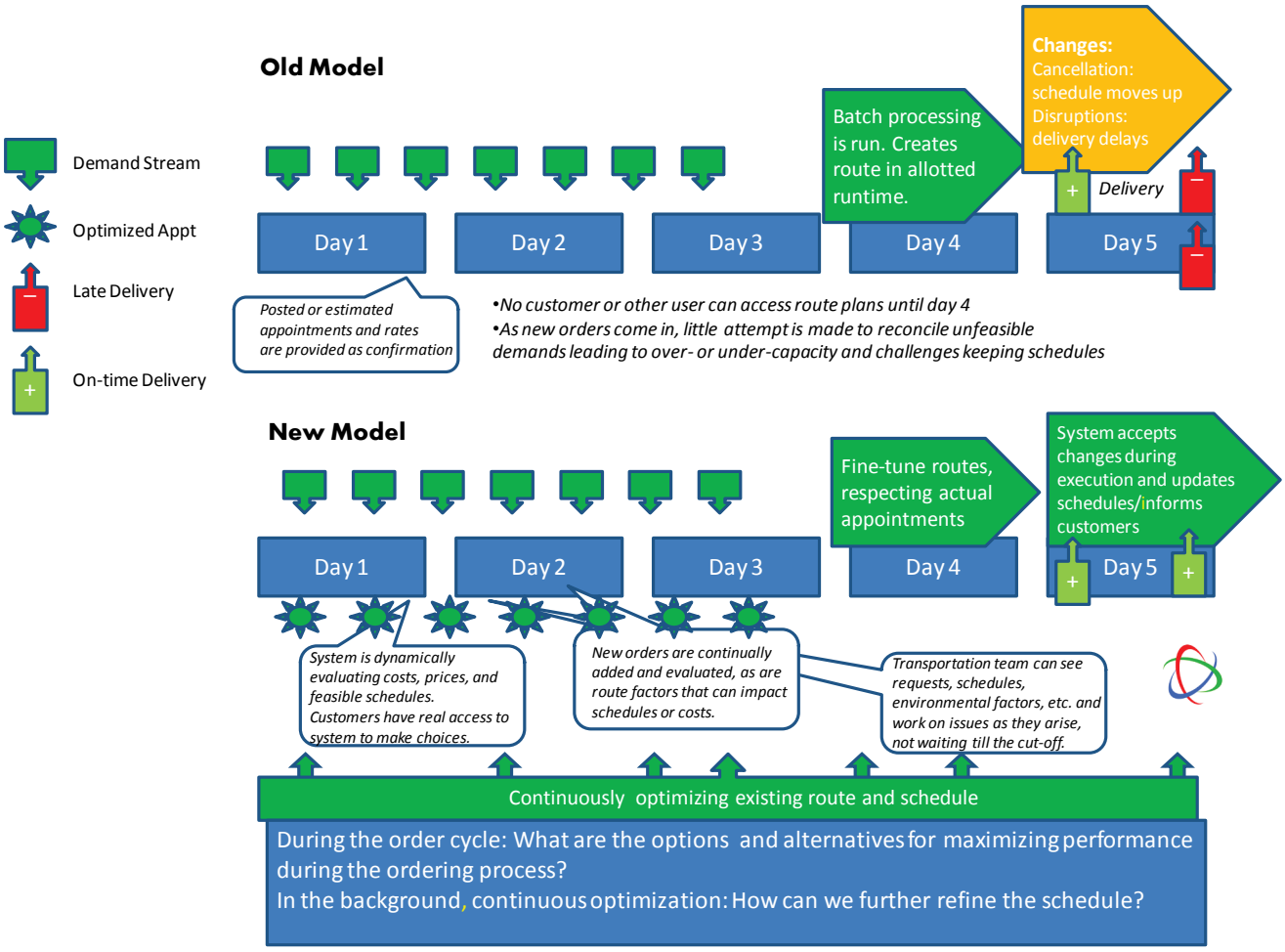


Figure 1: Old promising and scheduling models vs. Always on

Inclusive—continuous optimization is a multi-user environment, with real-time information *always available to a variety of users*. It's interactive. In traditional batch (black box) mode, information is only latently available to schedulers.

Appointment Choice—in the new model, customers can select an appointment, which is the result of collaboration between the provider and customer. It achieves a *balance of desire and price.*

[7] You can read more about the math and technology behind this in the Appendix on page 11.

Replenishment Cost—continuous mode provides a wider choice of options for the best time and day to replenish stocks, reducing costs and congestion.

Incentivized Optimization vs. Objective Point Optimization—a batch model does attempt to render a schedule based on a few user-driven objectives such as minimal miles per truck, cost per route, etc. So far so good. But it can't dynamically consider other options that might be just as, or more, important. The incentive-centric model also works on objectives, but it can also dynamically consider and present other options to the user/customer—for example, a high-priority delivery. The customer then makes the choice. The system is continuously assessing various choices and providing appointment and pricing options—lower cost so the carrier can increase route density, for example; or higher-cost options to meet the customer's preference and meet the carrier's profitability targets.

Actual promises vs. advertising—of course, logistics is fraught with unexpected challenges from weather, traffic, lack of parking, customers' shipments that are not ready at the scheduled pick-up time, to name a few. But in the batch world, *companies are making promises and appointments without a real schedule.* In the continuous world, the schedule is *always on,* i.e., there is a schedule that is being enhanced and updated over time. This might seem like a nuance, but with the growing number of speed bumps and challenges in logistics,[8] hypothetical schedules have led to late/wrong delivery times more and more often.

Continuous vs. Batch Processes

Continuous means:

- Data is always fresh and accurate-- continuous and current—always
- Interactive system
- Real-time and continuous processes
- Data is available to all users
- Options are always available to users
- Updates and changes can be made as needed

Batch means:

- Fresh schedules are created only after a cutoff period
- Black-box processing
- User base is exclusive to a few
- Data and best options are not always available

More time—more time means schedulers have the time to identify and work on any problems that might arise. More time means better solutions. Finding out at 6 a.m. that there are problems for the 7 a.m. dispatch is not the best time to uncover a profitable option. That's a *high stress approach* in which schedulers have limited time to assess and modify schedules based on their best judgment. At that point, the goal just becomes finding any reasonable schedules. Often these fail to achieve the objective.

[8] More traffic, late inbound shipments to consolidate, port delays, shorter driver hours, back-ups in the yard/loading dock, and customer service issues that just take a bit more time at the stop.

Continuous Doesn't End at the Door—Goto AZ

Another element of the continuous model that we have alluded to in this paper is service deployment. Services can be regularly scheduled events or requested and delivered on demand. Goto AZ provides medical equipment to facilities for the aging, as well as at home and, therefore, has to assist with setup and other services. Thus, assigning a skilled resource adds more complexity to scheduling the truck routes.

In this case, the continuous model has to extend from sales, resource allocation, and scheduling through proof of delivery, and include the on-site service time variability in the optimization model.[9] Thus, the system has to continuously be in step through the whole process, not just during planning.

Always-on Technology Is Not an Event—It's Continuous

As we stated, a continuous model is one that is continually processing, unlike batch, which is a scheduled black box optimization. So, you may ask, are you just proposing running the model longer? This can be done with existing software, right? In fact, traditional optimization models are not designed for an always on model. Rather, typical routing optimization software is designed with a stop and start.[10] The engine is inaccessible while the optimized schedule is created. While the software works toward an output, the users wait. They have no access.

In a continuous process, there really is no end—from planning through execution. An always on approach also recognizes that change is always coming—new orders, new customer requirements, disruptions on the road that impact the current schedule, or shorter or longer service calls.

[9] More on this story at Descartes; or at Logistics magazine.

[10] Optimization engines are single threaded. They usually run in memory with a single user mode.

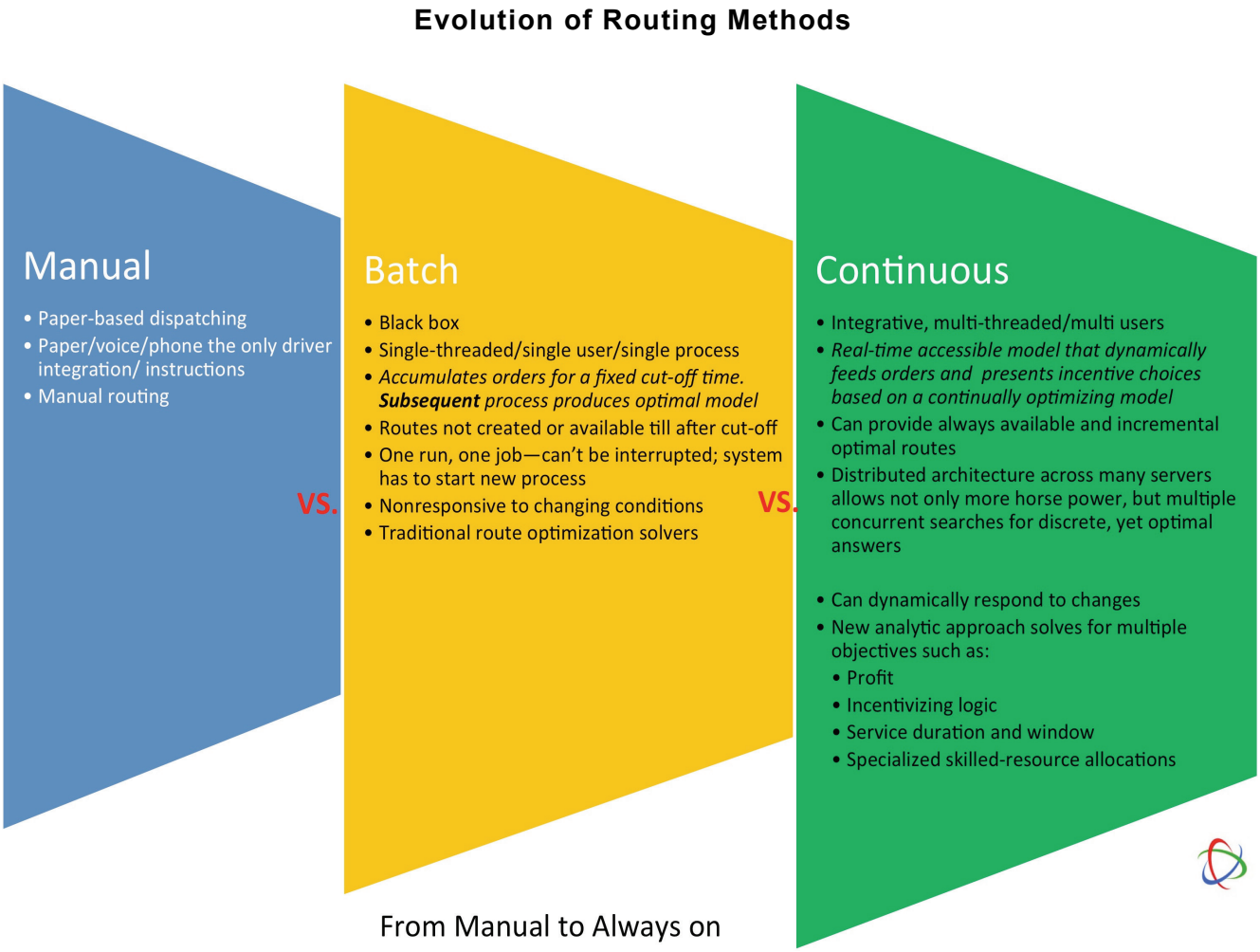


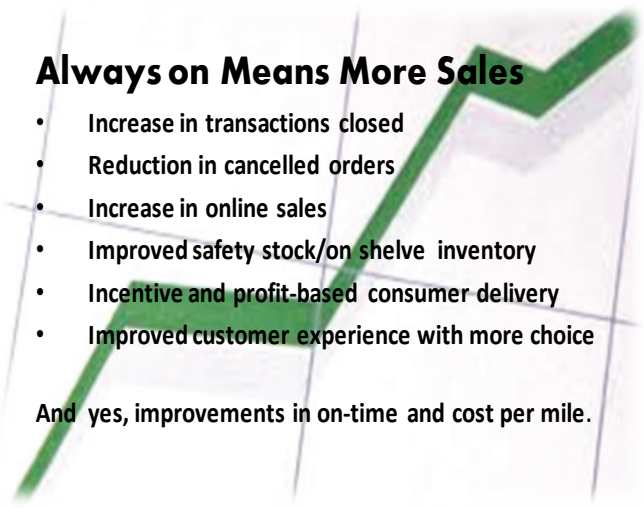
Figure 2: Batch vs. Continuous—What's the Difference?

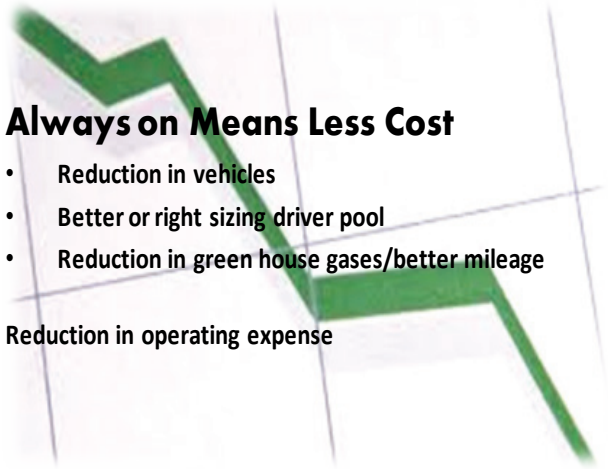
What we are talking about is a different architecture and algorithmic changes to the software. In Figure 2 we compare and highlight the differences between the batch and continuous models.

(For those interested in the algorithms/optimization methods employed, they are discussed in the Appendix, on Page 11. We have attempted to make that discussion easily understandable for the reader, so we encourage you to review it.)

Conclusion—Profitable Choice

Ultimately, the goal is profitable choice, whether your business has regular or dynamic routes. We rarely achieve that today in logistics. With so many "inputs" that happen over time, it is often difficult to find those better choices. To do so means leveraging technology in more effective ways. That means *the technology models should reflect our way of working*. Logistics in motion is a continuous model, yet the mode which most businesses work in is batch. Since the rest of the world is *real-time*, *responsive,* and *always on,* shouldn't our logistic systems reflect that?





Companies that have switched to an always on model are transforming, achieving an improved competitive position in their markets. Their results go beyond typical logistics systems benefits to include increased sales and revenue. In an *always-on business*, logistics comes to the forefront; it's not an afterthought.

In order for logistics to play that greater role in the business, they have to be part of the business. That means their systems and information should be integrated and useful to a greater user base. And in order to integrate with sales and customer service, the supporting information has to be always available to those groups too, not just to logistics.

Traditional optimization approaches just don't allow for this kind of information infusion in the front-office business processes. Always on, in contrast, makes logistics part of the strategic thinking about the business model—not just an after-sales afterthought. And that strategic thinking is what has led to the transformations we are now witnessing in the market. It's your choice now—create, transform, be always on—or ultimately, be left behind as the world moves *on*ward.

Appendix: What About Optimization and Technology?

If we look at various approaches to route planning and schedule optimization, there are several aspects to consider with today's rapid deployment/always on mode.

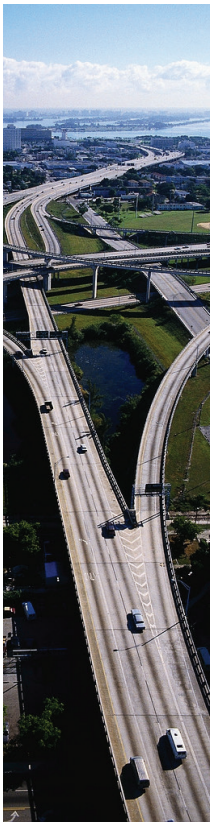
Technology

Traditional optimizations are single-threaded, single-user systems. Past architectural black box approaches make the data and process inaccessible until the job is done. If users are not satisfied with the answers, they can propose new objectives and restart the engine. Again, no data is accessible during this process. Most often, manual changes are made.

Conversely, continuous optimization is an innovation that supports multi-threaded, multi-user. Part of the critical difference here is its dynamic and accessible nature. Like other real-time responsive systems such as order management, current data is available to modify, update, and report.

This multi-threading allows for a distributed architecture (multiple CPUs) so that more horsepower and sub-process analytics and optimization run to evaluate many alternatives and approaches.

But Is the Math Better?



Without going into depth about optimization theory (and that complex math), there are a few elements we can highlight:

Heuristics limitations—Most transportation routing solutions use heuristics to develop routes. These tend to be useful in point-to-point delivery where the number of variables or constraints is low. The heuristic model looks for an answer that meets the "common good." That is a schedule that is lowest cost, or fastest route, and so on. This can be useful for a foundation schedule and can work adequately for point-to-point, but faces limitations as the number of constraints and complexities increase.

Greedy algorithm—This type of problem solving looks to solve "localized" problems. It looks at combinations of requirements or opportunities. For example, I have three trucks serving Manhattan. I want each truck to not only have the shortest miles (heuristic approach), but also I want to assess the wait times and traffic they may confront such as bridge, narrow streets, or lack of parking. Therefore, the "non-intuitive" answer may be to have one truck do a north/west route. It may travel more miles, but can actually achieve more stops in less time. Or this customer insists on this delivery time. So the system will work to solve for that specific constraint.

GRASP—The Greedy Randomized Adaptive *Search* Procedure is another approach that can layer on top of the greedy algorithm. This is an area in which an optimizing effort that can *run continuously really comes to the forefront.* GRASP is an iterative process that *keeps searching* for better and better answers (users define what *best* is). Unlike typical optimization with a start and stop, GRASP can have multiple entry points—be multi-threaded, if you will. If a system is constructed well, it looks for the best fits for profit or other objectives, for example.[11] Many of those objectives are not typically looked at in transportation scheduling systems. GRASP can also allow the problem to be distributed across multiple servers, something not often seen in traditional optimization models, allowing for faster run times.

Service delivery presents unique problems, since special additional resources may be required at the customer site. For example, all your trucks may be the same, but only one driver is equipped to install a particular customer's equipment. So the algorithm will change a route to accommodate this kind of need. Including these types of requirements in the schedule is critical to meet customer service goals.

These concepts may be difficult to grasp, but in practice, a firm like Descartes leverages these combination approaches in an ongoing *background optimization* operation. As an order comes in, it is processed and alternatives are presented. This is critical for both choice-based, incentivized appointments [12] and where real-time promises are being made to customers based on actual resource requirements and schedules. The viable slots presented to users are based on real and current schedule options rather than a fixed schedule. (But as we mentioned earlier, the cost and the schedules, in reality, are not fixed. Someone eats the time and or the cost variance.)

In truth, multiple methods need to be used for specific problems.[13] We know the diversity of issues is extreme, so one-sized optimization is not going to work.

[11] For example, adding (or eliminating) one more delivery. Though a driver might be paid overtime, that would be cheaper than adding another truck into the mix.

[12] Read about optimizing home delivery: *Home Delivery for Retailers—More Sales, Less Cost*

[13] Read about *Fleet or For Hire Transpiration* here

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