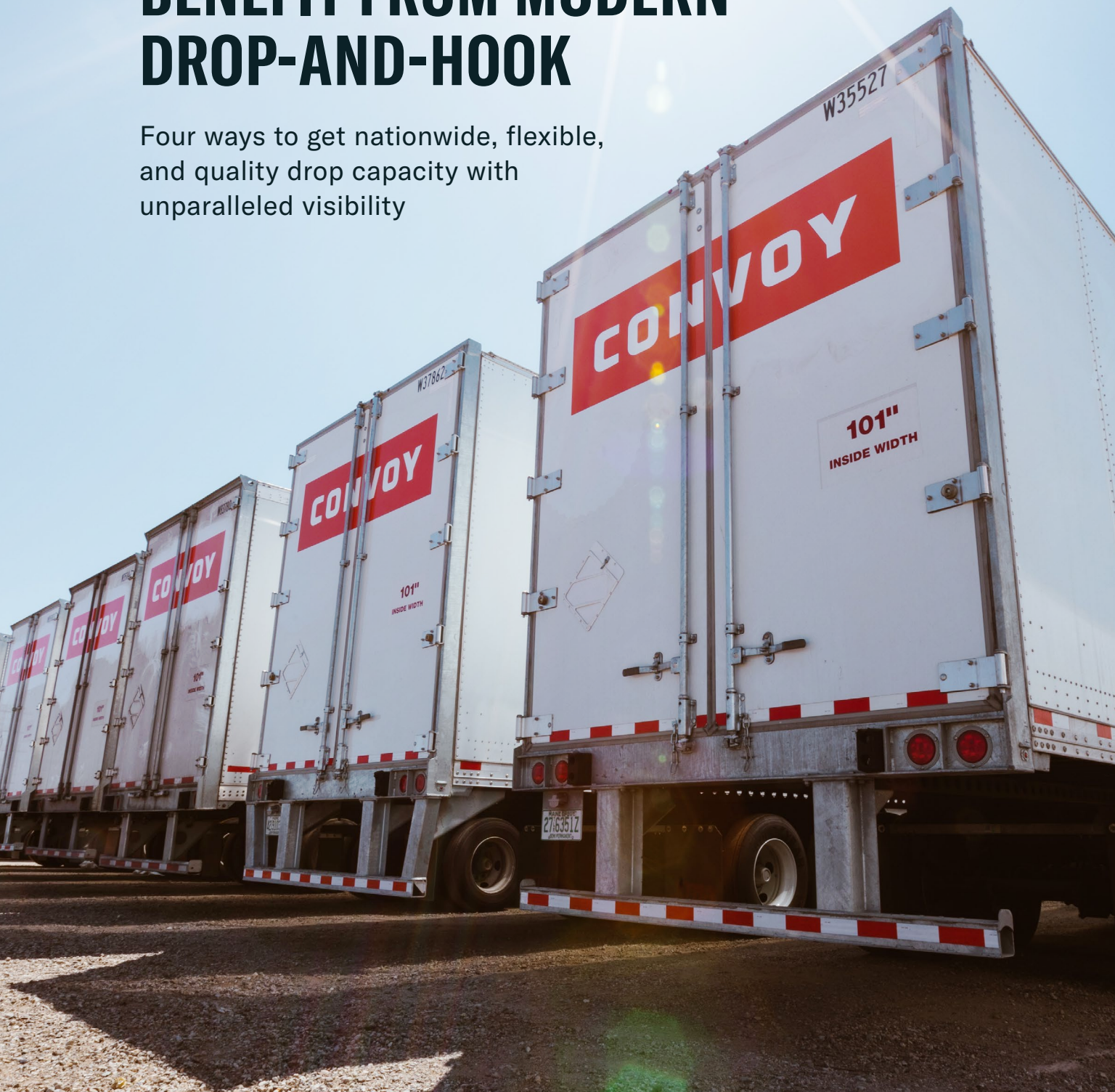
CONVOY

HOW EVERY SHIPPER CAN BENEFIT FROM MODERN DROP-AND-HOOK

Four ways to get nationwide, flexible, and quality drop capacity with unparalleled visibility



Speed. Flexibility. Simplicity.

It's no wonder that shippers and carriers love drop-and-hook. In fact, the majority of US Fortune 500 shipments are sent through preloaded drop trailers.

The challenge with drop has been one of scale. Traditional drop services are limited to specific lanes and regions, and when demand surges, they can't flex up to accommodate the additional volume.

In 2017, Convoy Go became the first drop-and-hook service that let carriers of all sizes, including owner-operators, haul power-only loads. This unique, modern approach to drop offered shippers flexible, nationwide capacity with the reliability they'd come to expect from asset-based carriers.

Over the last three years, technological advancements have further differentiated modern drop-and-hook services like Convoy Go. These services provide unmatched scale, flexibility, and visibility through the use of machine learning and automation.

In this white paper, we'll cover the differences between traditional and modern drop-and-hook programs, and how modern drop can benefit any company shipping more than 250 loads annually on any lane. We'll then recommend four things you should expect from a modern drop-and-hook provider. Finally, we'll drill into how Convoy uses innovative technology to address some of the challenges of building a nationwide drop-and-hook network.

Manufacturers and retailers are increasingly discovering how to succeed by adding drop-and-hook to their freight strategy. Read on to learn more about how you can join their ranks and get ahead with modern drop today.

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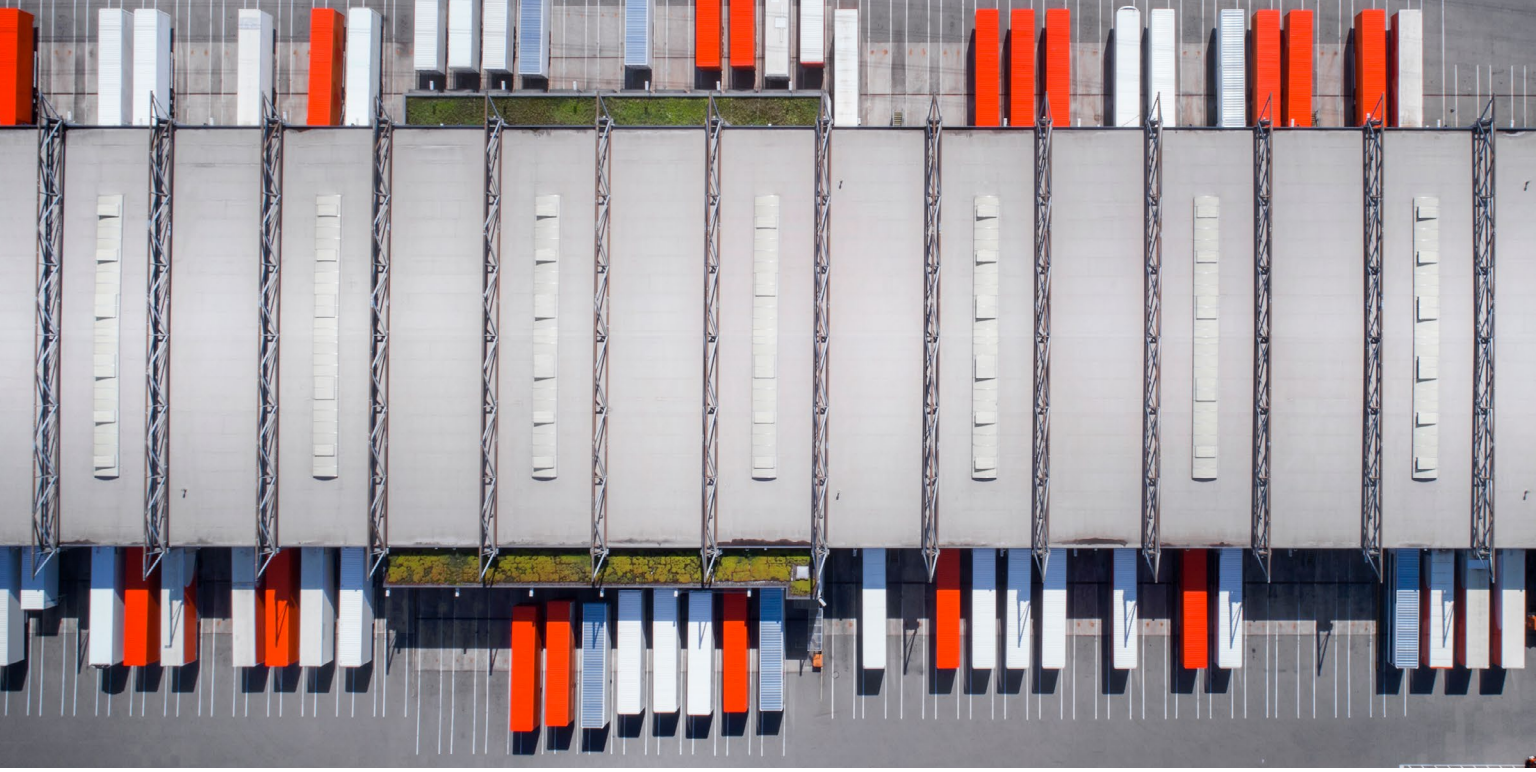


THE MODERN DROP

Drop-and-hook is having a moment, and it's not hard to see why.

By preloading trailers on their own time, shippers avoid the headaches that come with live shipments, such as coordinating driver appointments or paying detention fees from trucks waiting to unload. For carriers, drop is an opportunity to earn more in an industry that pays by the mile, and their overhead costs are lowered by not having to rent or own trailers. Drop also reduces average carrier unload wait times from three hours to under one hour, which results in fewer detention fees paid by shippers. A July 2020 survey[1] found that 35% of Convoy customers planned to prioritize drop over live shipments during the next year. There's often no more efficient way to move freight, and shippers and carriers alike can't get enough of it.

But that's the problem: they can't get enough of it, literally. It's a capacity challenge. For years, drop services were only available from large asset-based carriers. And with at least two trailers required per tractor, this traditional form of drop shuts out about 96% of the nation's carriers.[2]

So if the primary limitation is that there isn't enough capacity, why can't drop providers just add more?

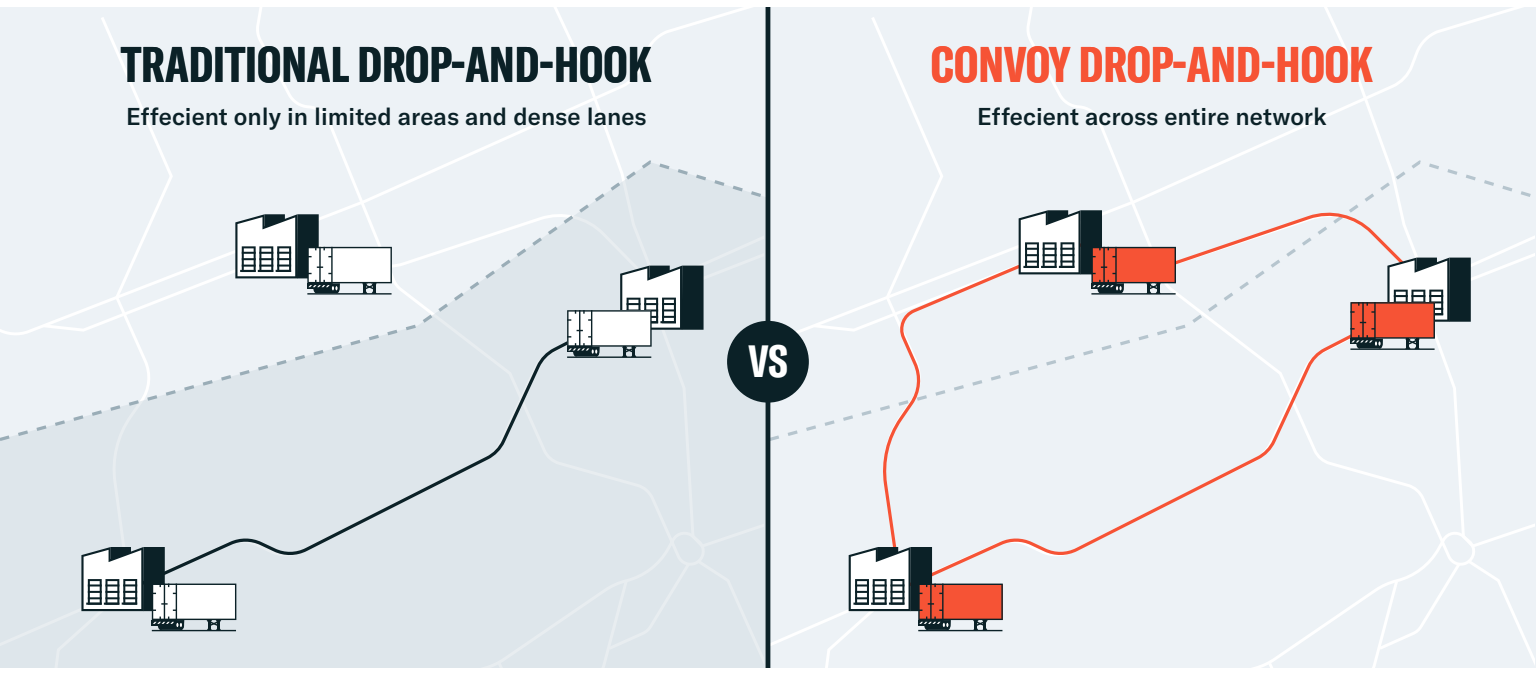
[1] Convoy customer survey, July 2020 [2] Wall Street Journal, Digital Freight Brokers Turn Physical With Truck Equipment Pools, Jennifer Smith, March 15, 2019.

It turns out that adding capacity to traditional drop services is easier said than done.

Traditional drop's scale is limited by the very thing that makes it so efficient: it operates well in a vacuum with a set number of trailers and tractors moving between a fixed group of facilities. This all changes in volatile markets. When seasonal surges, inclement weather, or even black swan events like COVID-19 create demand shocks, companies who rely on traditional drop often struggle to find extra capacity. This threatens on-time performance, and can ultimately jeopardize customer relationships and bottom lines.

In 2017, Convoy introduced Convoy Go, a unique drop-and-hook service that turned the traditional drop model on its head, solving the capacity problem while maintaining high efficiency and reliability. Unlike traditional drop's rigid structure and fixed equipment, Convoy Go operates a shared pool of smart trailers that can be hauled anytime by hundreds of thousands of independent carriers in Convoy's digital freight network.

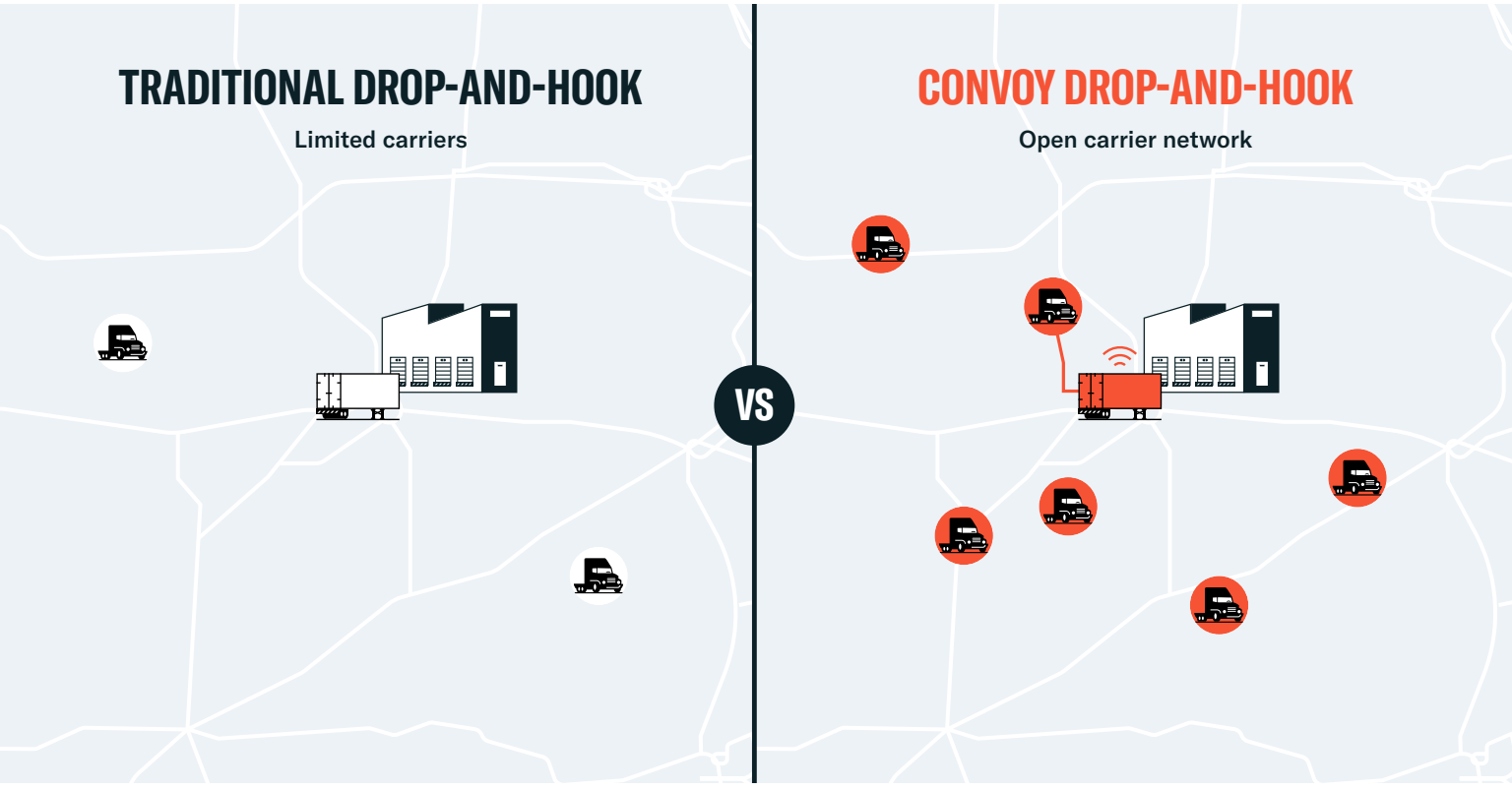
A year later, we expanded Convoy Go nationally, and in doing so, we had to solve a number of new and complex scaling challenges. For example, anyone in logistics knows that supply and demand are unequal between facilities, let alone between states. Outside traditional drop-and-hook's vacuum, trailers can clump up in cities with high demand, resulting in low trailer supply elsewhere. And beyond major shipping hubs, it's sometimes difficult to find carriers who are willing to drive less-dense lanes for a reasonable price, especially if they have to deadhead on the backhaul.



Solving these problems can't be accomplished by individuals or teams of people due to the complexity.

Instead, they require technology to analyze billions of permutations every day—forecasting hundreds of facilities' demand for thousands of trailers, coordinating thousands of drivers to move trailers along the most efficient routes, finding backhauls for headhauls, and balancing empty trailers to meet the next day's demand.

In 2020, Convoy has uniquely solved these problems with updates to Convoy Go that only a digital freight network can provide through machine learning and automation. With these updates, transportation teams can easily add new drop capacity or supplement their existing drop at nationwide scale. Carriers are offered round-trip loads to earn more and better utilize their tractors. And trailers are automatically rebalanced and ready for any Convoy customer with a 99.9% equipment availability rate and 93% on-time delivery rate. The unmatched flexibility and reliability of trailer capacity is what defines modern drop-and-hook programs.



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FOUR THINGS TO EXPECT FROM A MODERN DROP-AND-HOOK SERVICE

Shippers looking to improve the efficiency of their freight by adding modern drop capacity should expect four things.

Nationwide Capacity

Flexibility for Shifting Demand

Visibility into Trailers and Performance

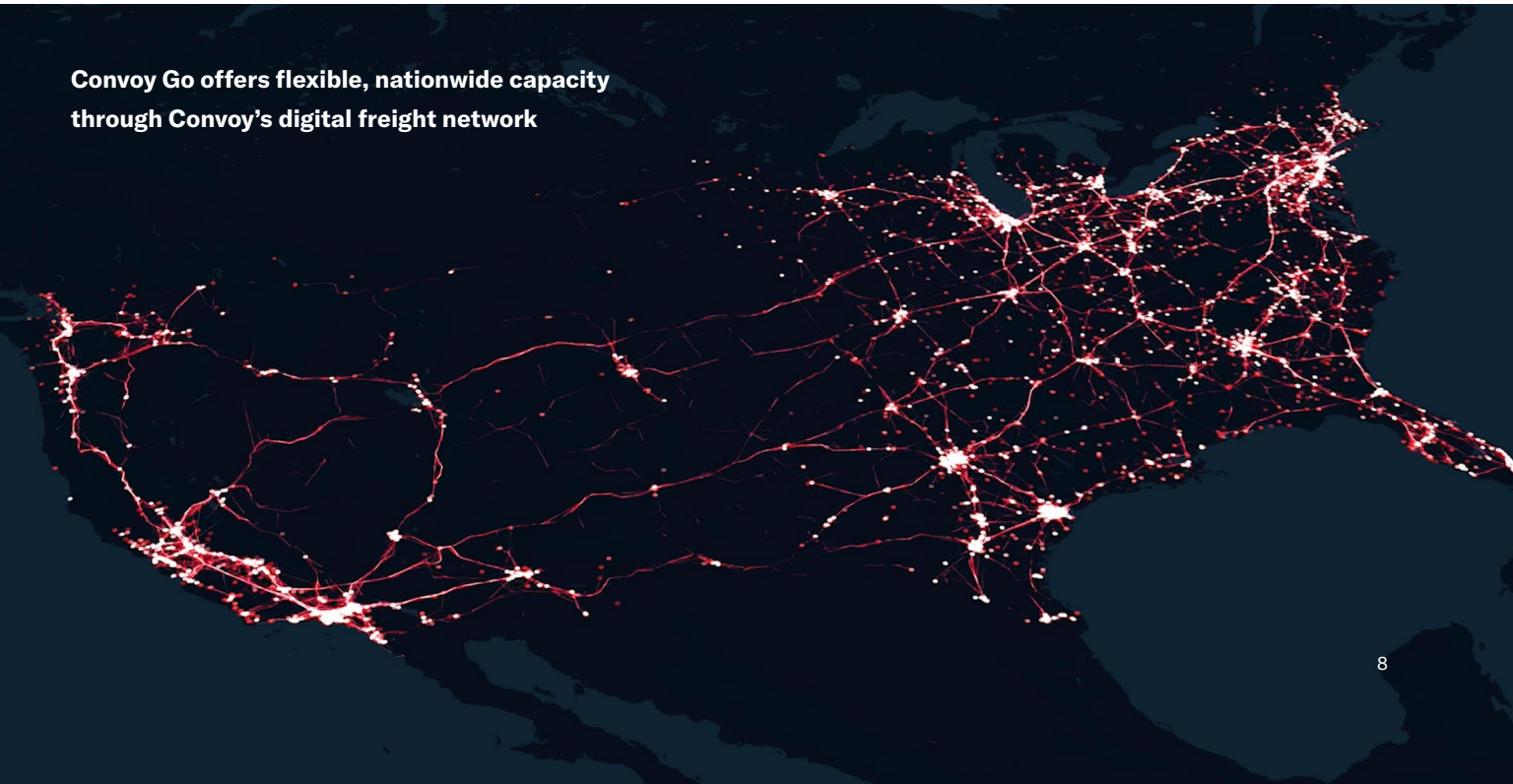
Stringent Quality Standards

Nationwide Capacity

One of the biggest benefits of modern drop is its ability to source reliable capacity from practically anywhere. For example, Convoy Go offers power-only loads to tens of thousands of independent carriers nationwide. This reduces the number of freight companies your transportation team needs to manage, lowering overhead costs and providing consistent reporting on your drop freight performance, which we discuss more below.

As part of offering nationwide coverage, your drop provider should offer capacity on dense and less-established lanes, over regional and long-haul routes. One of traditional drop's shortcomings is that it's often confined to dense lanes where the asset-based carrier is already well-established. With a modern drop-and-hook program like Convoy Go, we're able to source tractors from across our nationwide network and route trailers to facilities on any lane.

Finally, nationwide capacity shouldn't come at the cost of efficiency. Specifically, modern drop programs shouldn't leave carriers to deadhead their backhauls. Reliable backhaul loads provide clear benefit to the carrier in the form of better truck utilization and higher income, but they also provide important benefits to shippers. Convoy has found that by combining headhauls with backhauls, we're able to lower carrier falloff by between 9 and 11%, providing shippers with higher quality service at lower cost. And for shippers with sustainability goals, combining headhauls and backhauls reduces empty miles driven by 45%, saving millions of pounds of carbon emissions to date.



Convoy Go offers flexible, nationwide capacity through Convoy's digital freight network

Flexibility for Shifting Demand

One of the biggest benefits of modern drop is its ability to flex capacity to meet unexpected demand at a moment's notice.

To illustrate this, let's imagine a shipper who runs traditional drop freight out of their facility in Dallas, Texas. They typically need three trailers to service their loads. One day, they experience a demand surge and suddenly need six trailers over the next three days. Their asset-based carrier only keeps one surplus trailer in their yard, leaving two loads without coverage.

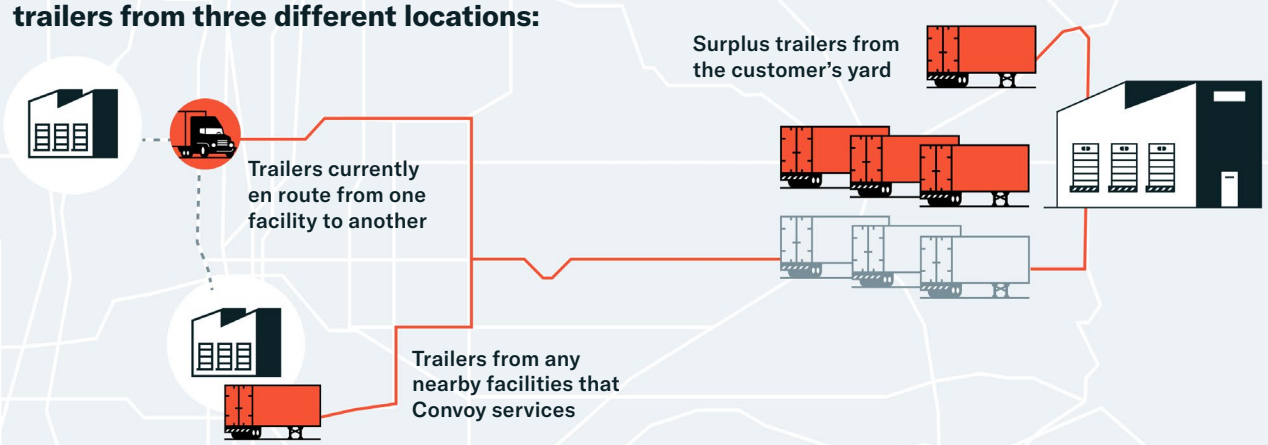
Modern drop programs like Convoy Go were built to solve this sort of problem. During a demand surge, Convoy's shared trailer pool provides access to trailers from three different locations:

1. Surplus trailers from the customer's yard
2. Trailers from any nearby facilities that Convoy services
3. Trailers currently en route from one facility to another

In this example, the demand surge requires that we find three additional trailers. By tapping into our shared trailer pool, we see that we have one surplus trailer already located at the customer's Dallas facility. We see another available trailer located at a different shipper's facility in Irving, Texas. And we see a third trailer currently being hauled to a facility in Arlington, Texas. Over the next day, we find a power-only tractor from our network of independent carriers to to reposition the trailer from Irving to Dallas. And while en route, we reroute the Arlington-bound trailer to the Dallas facility as well. With more than 24 hours to spare, our shipper now has all six trailers needed to meet their demand surge.

As you evaluate modern drop-and-hook providers, it's important to ask about their equipment availability rate and their scheduling buffer for the loads they accept. Equipment availability rate measures how often trailers are available at your facility to be preloaded—this figure should be at or near 100%, which is the level of reliability shippers have come to expect from traditional drop. And the scheduling buffer measures how far in advance of the preload date the empty trailers are delivered to your facility. For reference, Convoy Go's equipment availability rate is 99.9%, and we deliver empty trailers 24 hours ahead of preload dates 99% of the time.

Convoy's shared trailer pool provides access to trailers from three different locations:



Visibility into Trailers and Performance

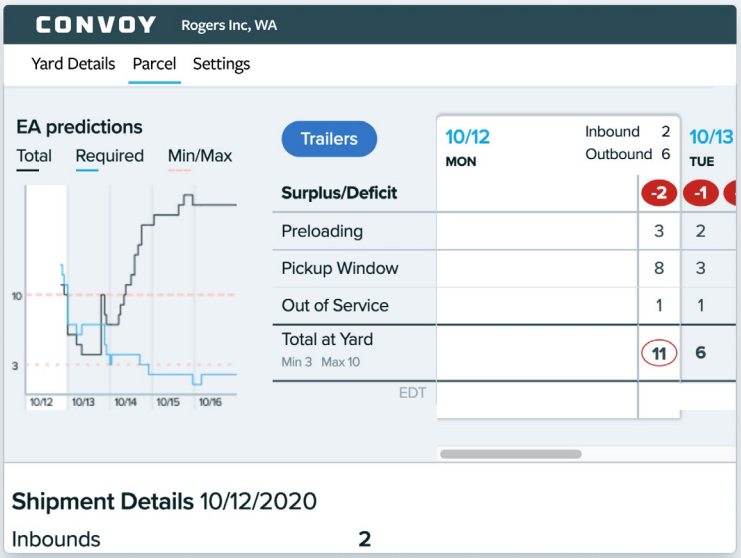
Because modern drop programs are managed primarily with machine learning and automation technology, you'll benefit from improved supply chain visibility on three levels.

First, you'll be able to track the location and status of loads currently en route. For example, with Convoy Go's pool of smart trailers, you can see:

1. Where the trailer is at any time
2. How fast it's moving
3. Its projected and confirmed arrival time
4. Whether it's loaded
5. What it was carrying previously
6. What it's slated to carry next

With this transparency, you'll never need to wonder where your loads are, and you'll get peace of mind knowing that your upcoming shipments are covered.

Second, you can get a granular view into your facility yards. This includes how many trailers are parked in the yard and overflow lots, the spot each trailer is parked in, whether the trailers are empty or full, and which are ready to be unloaded or dispatched. While traditional asset-based carriers have dedicated equipment teams whose job it is to manually and continually check trailer status, modern drop programs provide this information automatically, anytime, and without manual error or the overhead costs of managing a dedicated team.

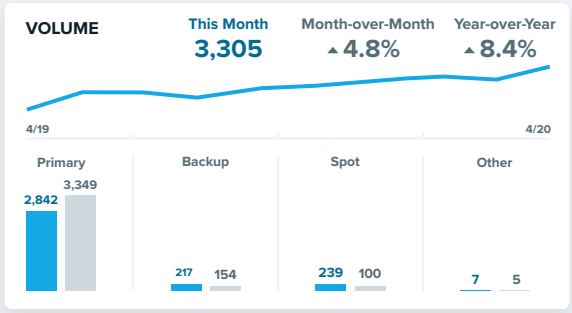


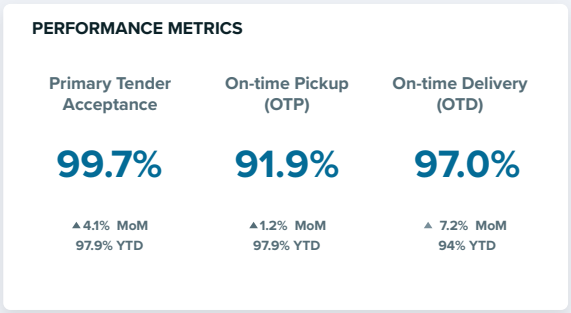
Convoy sends daily reports letting you know:

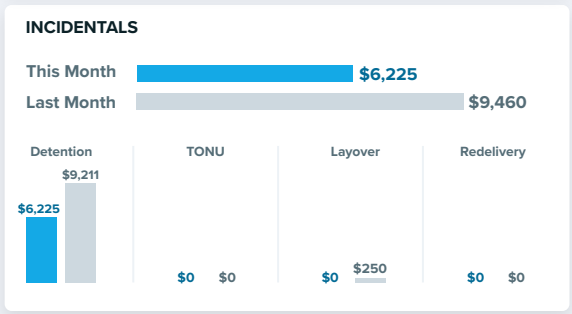
- How many trailers are in your yard
- The condition they're in
- How long they've been there
- How many additional trailers are headed inbound
- When they'll arrive

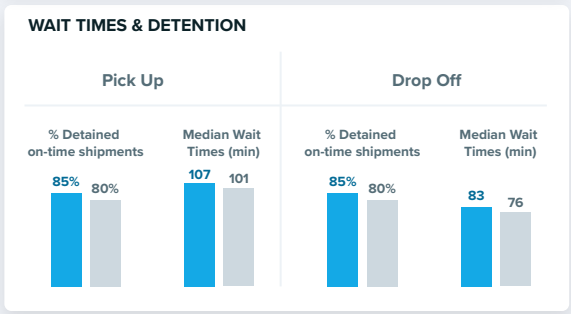
Finally, your modern drop provider should provide insights on opportunities to improve the performance of your facilities, save money, and improve carrier preference. For example, Convoy collects more than 1,000 data points on every shipment, and as of September 2020, we've gathered more than 1.2 million facility ratings across 25,000 locations. We provide monthly business reports and online tools that provide information such as individual facility dwell times and incidentals as well as facility ratings and carrier feedback. Through this data, we've worked with shippers to eliminate inefficiencies within their facilities, create a better carrier experience, and save hundreds of thousands of dollars annually. For more information on Convoy's unique data and insights, check out the white paper, Supply Chain Visibility and the Digital Freight Network.

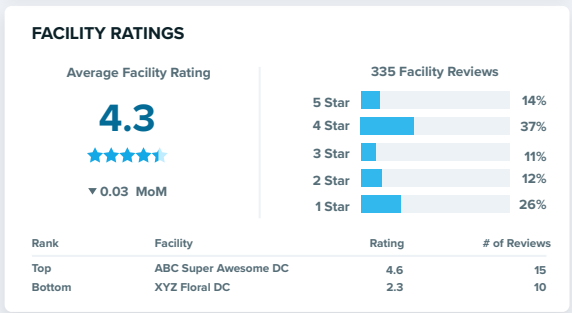
Convoy Go provides online tools and monthly reports to help you improve performance

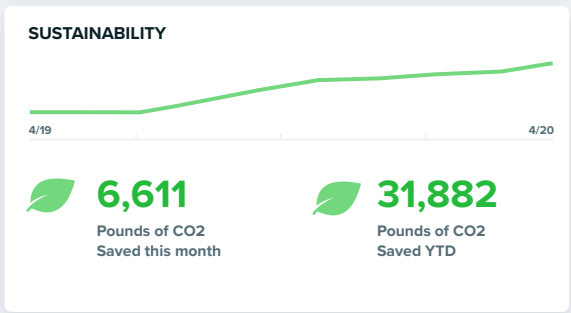












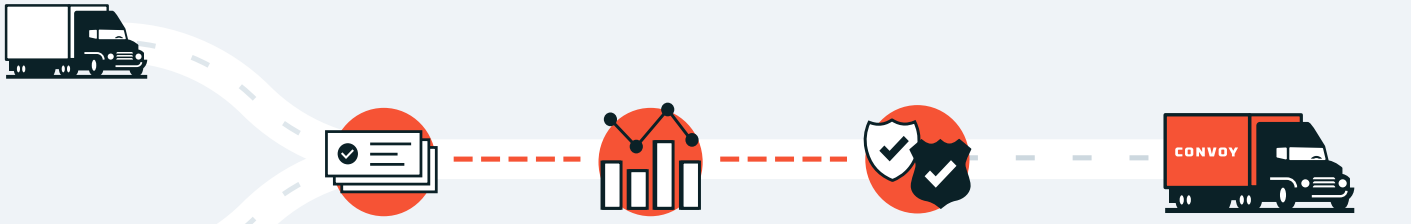
Stringent Quality Standards

One of the hallmarks of traditional drop-and-hook is high-quality service with reliable drivers. Asset-based carriers are able to provide this by hiring a small pool of full-time drivers who can be screened before hiring and whose performance can be closely monitored. One of the downsides of this is an inability to cost-effectively scale the drop program nationwide.

By contrast, modern drop programs like Convoy Go provide nationwide power-only capacity through a network of hundreds of thousands of independent carriers. This places a different requirement on these programs to ensure the safety and reliability of independent carriers who aren't full-time employees. Convoy has taken a unique approach to this rooted in machine learning and automation that results in independent carrier safety and performance that meet or exceed traditional asset-based providers.

Before any independent carrier in our network can accept a load, our system automatically checks crash history, vehicle maintenance, speeding tickets, traffic violations, and a range of other inputs. If the independent carrier doesn't meet our stringent requirements, they can't accept your shipment. Our algorithms run these compliance checks continuously, analyzing thousands of inputs across millions of driver records to ensure that every carrier is properly bonded, insured, licensed, and in good standing. The result is a crash rate 16% lower than the industry, and a cargo claims rate that is just 1/20th that of the industry. For shippers, this translates into fewer service delays and missed deliveries, fewer fees and chargebacks from your customers, and lower remanufacturing and redelivery costs.

PREDICTIVE CARRIER CRASH CAPABILITY



COLLECT CARRIER DATA

Convoy combines rich carrier data from government, insurance, and safety organizations with our own digital freight network statistics.

IDENTIFY SAFEST DRIVERS

Machine learning processes thousands of inputs across millions of records spanning the past 10 years to identify carriers who are least likely to crash.

VERIFY SAFETY STATUS

Through automation, we vet the tens of thousands of carriers in our network against our rigorous standards, daily, with every load.

A SAFER CARRIER NETWORK

As a result, Convoy carriers have a **16%** lower crash rate with **1/20th** of the cargo claims vs. the industry average.

CONVOY

A LOOK UNDER THE HOOD

How it works

Now that we've discussed the benefits of modern drop-and-hook, let's look under the hood. In this section, we'll discuss a few of the ways that Convoy Go uses big data, machine learning, and automation to provide shippers with a unique, modern drop service.

Trailer Rebalancing

Automated Reloads

Smart Trailers, Powered by the Internet of Things

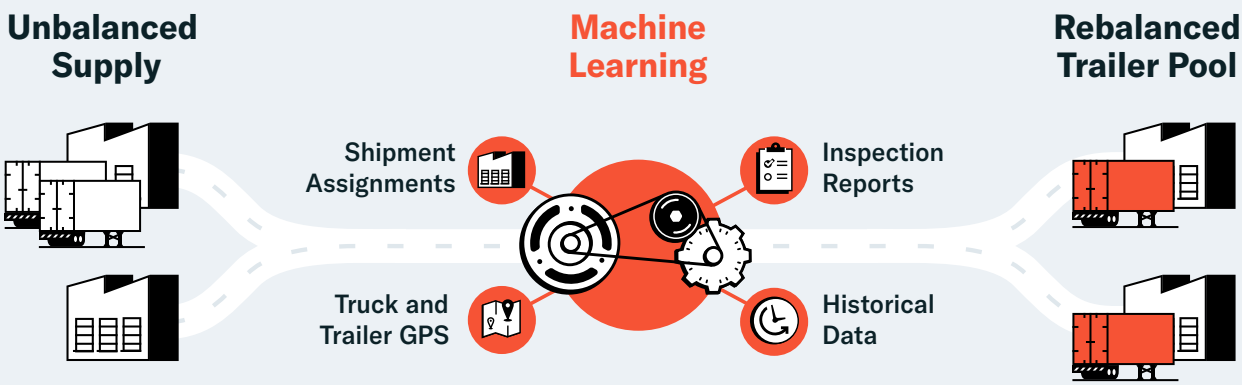
Trailer Rebalancing

If you've ever been to a city that has one of those many app-based rental bike services, you may have noticed an interesting phenomenon at the top and bottom of hills. In the morning, there are plenty of bikes at the top of hills, but by day's end, there is a clump of bikes at the bottom. Not surprisingly, fewer people are interested in biking up a steep hill than those who are happy to coast down. And at some point—often in the evenings—the bikes need to be "rebalanced" by people in vans who collect and then place them back at the top of the hill.

This is a problem of uneven supply and demand, and nationwide drop networks face the same challenge, albeit at a much larger scale. Facilities in cities with high demand have a tendency to accumulate trailers, leaving less supply in other locations. This requires periodically rebalancing trailers between the facilities.

The only way to solve this challenge at nationwide scale is to use machine learning. Specifically, we use machine learning models to predict how many trailers our customers will need across hundreds of facilities nationwide over the next few weeks. We combine our own historical shipment data with instant reporting from trailer GPS, shipment assignments, inspection reports, and drivers' locations. We then feed this data into our optimization models that analyze billions of trailer route permutations and pick the most efficient solution. Our technology enables us to constantly evaluate this information at a scale that no individual or team of people could do. This is in contrast to traditional drop providers who manually plan trailer routing using relatively limited information, significantly limiting the scale of their programs.

REBALANCING TRAILERS USING MACHINE LEARNING



Deep Dive: Trailer Optimization

To rebalance our thousands of smart trailers across the country, we developed what's called a mixed-integer programming (MIP) optimization model. MIP is used to find optimal solutions to extremely complex problems that can include thousands of variables and hundreds of constraints. The technology has been used to transform the way manufacturers optimally staff their factories, power companies distribute electricity, sports organizations plan their schedules, and in our case, the way logistics companies plan routes. When it comes to solving complex problems, MIP is a perfect complement to machine learning—machine learning is first used to predict a set of possible outcomes based on historical and current data, and then MIP is used to recommend the best solution.

Every time our MIP optimization model runs, it reviews more than 3,000 shipments, including a subset of currently available and upcoming loads. It also uses the real-time location of every smart trailer as an input, generating over 20 possible alternative routing options for each shipment. These routing options result in $20^{3,000}$ permutations.

It goes without saying that calculating this many different permutations is beyond what any individual or team of people could do. Instead, through the use of machine learning and MIP optimization, we cut the solution into smaller segments, and then use automation to search for the best routing option for every trailer and every load. We repeat this process every hour, everyday.

Automated Reloads

In 2019, Convoy announced automated reloads for live shipments. This enabled carriers in our digital freight network to instantly match their headhaul with a backhaul, earning more money on each run while achieving better truck utilization. For shippers, the automated reloads program results in 9-11% lower carrier falloff rates, and it reduces carbon emissions from empty miles, helping shippers achieve their sustainability goals.

In October 2020, we announced automated reloads for our drop-and-hook program. This provides the same benefits as live automated reloads, but it tackles a much more complex problem because it combines the need to find backhauls with the need to continually balance our trailer pool.

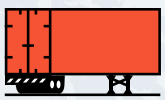
In the example below, the carrier drives approximately 55 miles empty—45 miles between Portland and Salem to pick up the backhaul, and an additional 10 miles between Seattle and Bellevue after dropping the backhaul. This is compared to driving approximately 175 empty miles from Portland to Seattle had we not found a backhaul load. On average, automated reloads reduce empty miles by 45%, helping drivers earn more money and achieve better truck utilization while helping shippers improve service quality, reduce carbon emissions and achieve their sustainability goals. As of October 2020, automated reloads have prevented more than 2.5 million pounds of CO_2 emissions from entering the atmosphere.

HOW AUTOMATED RELOADS WORK

PICKUP 1

Carrier drives to Bellevue facility and hooks a pre-loaded trailer.

Convoy's models determine that a facility in Salem, Oregon will need an extra trailer in the next few days and find an available backhaul load from Salem to Seattle.



DELIVER 3

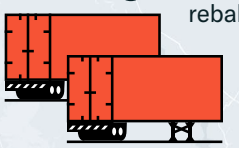
Carrier completes the backhaul, dropping the trailer at the Seattle facility.

DELIVER 1

Carrier delivers trailer to a facility in Portland.

PICKUP AND DELIVER 2

Driver hooks an empty trailer in Portland and hauls it to Salem, rebalancing Convoy's trailer pool.



PICKUP 3

At the Salem facility, the carrier drops the empty trailer and hooks another pre-loaded trailer bound for Seattle.

Smart Trailers, Powered by the Internet of Things

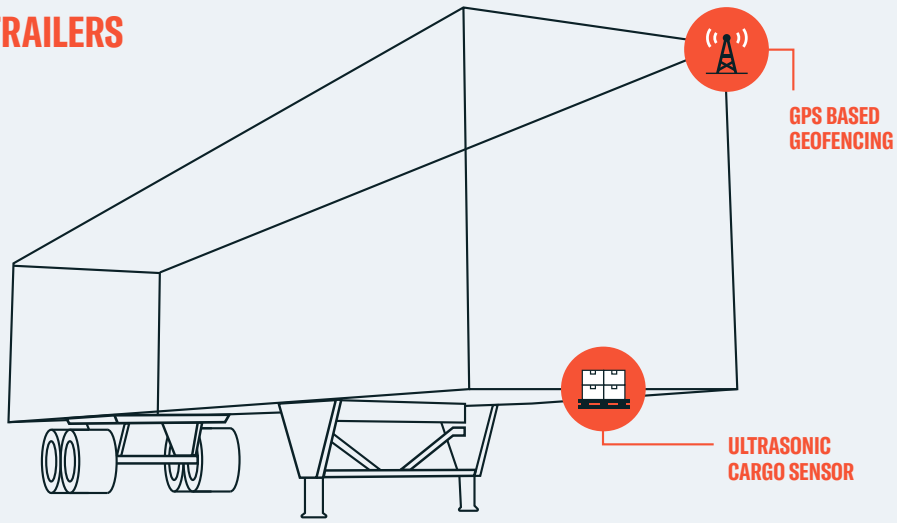
We're witnessing an exciting point in freight logistics, where the Internet of Things (IoT) is becoming more prevalent in our equipment. The IoT is a system of connected computing devices where unique identifiers are used to transfer data over a network without needing human interaction. The first-ever IoT device was likely a modified Coke machine at Carnegie Mellon University in 1982 that was able to report its inventory, and whether newly loaded drinks were cold or not.[3] Today many of us think about our smart homes when we hear about the IoT, such as our smart thermostats or doorbell cameras.

Convoy Go incorporated IoT into its shared pool of "smart trailers" in 2017, and has since worked with sensor manufacturers to push the limits of their capabilities to better track and gather insights on the freight we haul. Through the use of IoT, we're able to get critical information about our drop trailers and shipments across the country without needing a large team of people to manage them. This reduction in overhead enables us to focus our teams on strategic relationships with customers rather than on routine operational tasks.

Our smart trailers report their pinpoint location using GPS and geofencing, as well as whether the trailer is moving and, if so, how fast. Combinations of ultrasonic, optical, laser, and radar sensors let Convoy understand whether the trailer is loaded, which in turn lets our system understand if a trailer is ready to be picked or if the cargo isn't ready yet. We've also developed an algorithm that confirms whether trailers are being hauled by the driver assigned to the load—this enables us to quickly identify and correct situations in which a driver accidentally hooks the wrong trailer. And with cargo and trailer theft becoming an increasing concern for shippers and freight companies, this algorithm can also tell if a trailer has been stolen.

CONVOY GO SMART TRAILERS

- Pinpoint location
- Speed
- Expected arrival time
- Actual arrival time
- Time in yard
- Trailers en route to yard
- Loaded status
- Trailer condition

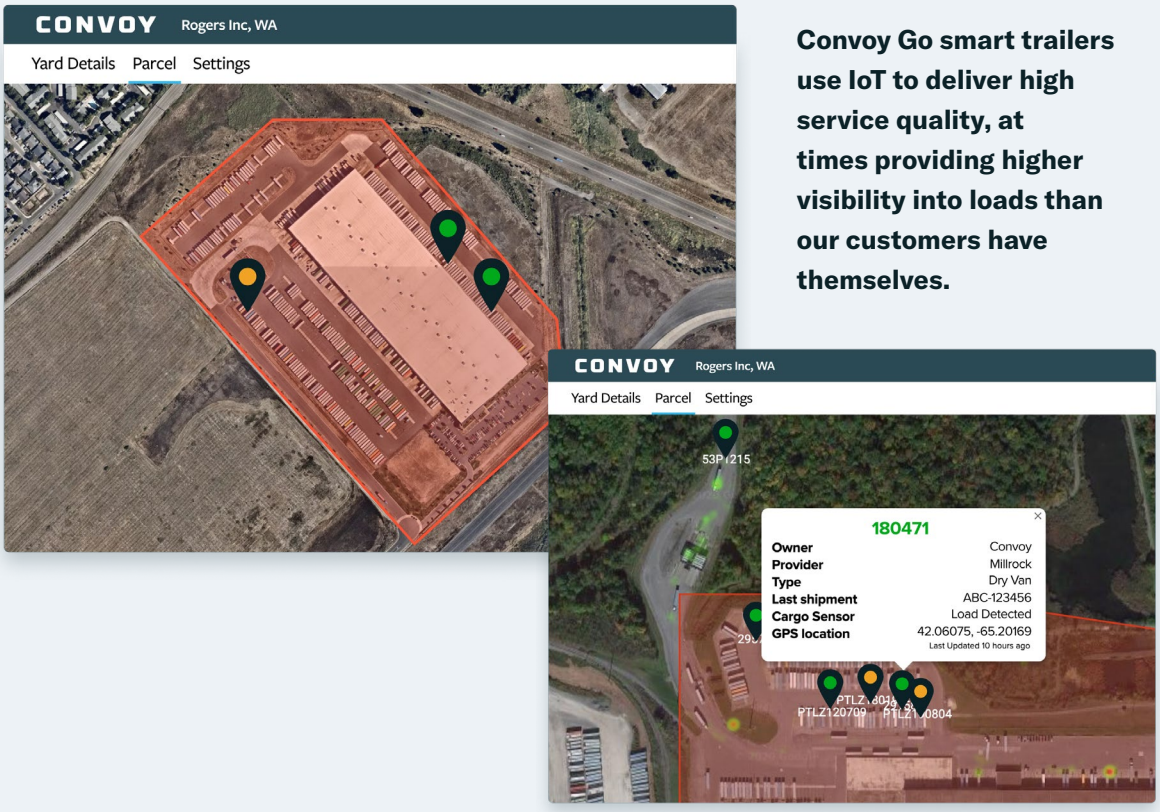


[3] "The 'Only' Coke Machine on the Internet". Carnegie Mellon University. Retrieved 10 November 2014.

The use of IoT in our trailers also enables us to provide higher service quality to our shippers, sometimes knowing more about their shipment status and facility yards than they have access to themselves.

One day, a large consumer packaged goods customer called our operations team requesting four smart trailers, stating they didn't have any in their yard. We were able to instantly see a map of this customer's facility, with four pins representing these available trailers in an overflow lot just one block away. They were able to move these trailers to their loading docks within minutes.

Another time, a large, national retailer emailed to let us know their drop shipments were loaded in our trailers and ready to be picked. We were able to provide the good news that our smart trailers had notified us of this 12 hours earlier, and we had already made arrangements to move the freight, saving them time.



Convoy Go smart trailers use IoT to deliver high service quality, at times providing higher visibility into loads than our customers have themselves.

WRAP UP

Get more of what you deserve: quality drop and peace of mind

For many shippers, drop freight offers the promise of greater efficiency with less hassle. But traditional drop-and-hook programs have been limited by their scale and flexibility—specifically, they don't provide nationwide coverage and they can't scale to meet shifts in demand.

In 2017, Convoy set out to address the problems of traditional drop with the launch of Convoy Go, the industry's first modern drop-and-hook program. Since then, we've expanded the program nationwide and added capabilities like our unique data and insights that can only be offered through a digital freight network.

Whether you're looking to introduce new drop capacity or improve the performance and flexibility of your existing drop freight, Convoy Go is accepting customers who move at least 250 full truckloads per year—contract or spot—for dry van service throughout the contiguous US.

Get started today by visiting **convoy.com/shipper**

ABOUT CONVOY

Convoy is the nation's most efficient digital freight network. We move thousands of truckloads around the country each day through our optimized, connected network of carriers, saving money for shippers, increasing earnings for drivers, and eliminating carbon waste for our planet. We use technology and data to solve problems of waste and inefficiency in the $800B trucking industry, which generates over 72 million metric tons of wasted CO2 emissions from empty trucks. Fortune 500 shippers like Anheuser-Busch, P&G, Niagara, and Unilever trust Convoy to lower costs, increase logistics efficiency, and achieve environmental sustainability targets.