

# Karena Vongampai

Product Design Portfolio

January 2024



# Evolving Convoy for medium and large carriers

CONVOY

< Back Refresh

OK, here's what we found

# of stops: **Any** Broker: **Any** Opportunity type: **Any**

**Matches for availability (32)** No matches (4)

| Truck availability                                                                             | Mon 07/20 |    | Tue 07/20                |    | Wed 07/20 |    | Thu 07/20 |                                                                      | Fri 07/20 |    |
|------------------------------------------------------------------------------------------------|-----------|----|--------------------------|----|-----------|----|-----------|----------------------------------------------------------------------|-----------|----|
|                                                                                                | AM        | PM | AM                       | PM | AM        | PM | AM        | PM                                                                   | AM        | PM |
| <b>#1023 Reefer</b><br>Cleveland, OH → Richmond, VA<br>Available starting Mon 07/20 @ 13:30    |           |    |                          |    |           |    |           |                                                                      |           |    |
|                                                                                                |           |    | Pickup @ 19:0 C... Book  |    |           |    |           |                                                                      |           |    |
|                                                                                                |           |    | Pickup @ 24:00 C... Book |    |           |    |           |                                                                      |           |    |
|                                                                                                |           |    | Pickup @ 21:30 C... Book |    |           |    |           |                                                                      |           |    |
| <b>#3923 Dry Van</b><br>Houston, TX → Jacksonville, FL<br>Available starting Mon 07/20 @ 13:30 |           |    |                          |    |           |    |           |                                                                      |           |    |
|                                                                                                |           |    |                          |    |           |    |           | Pickup @ 14:30 CST, Deliver @ 1... Book                              |           |    |
|                                                                                                |           |    |                          |    |           |    |           | Pickup @ 06:30 CST, Deliver @ 1... Book                              |           |    |
| <b>#208 Dry Van</b><br>Tampa, FL → Albuquerque, NM<br>Available starting Mon 07/20 @ 13:30     |           |    |                          |    |           |    |           | Pickup 1 @ 08:00 EST, Pickup 2 @ 11:00 EST, Deliver @ 15:30 CST Book |           |    |
|                                                                                                |           |    |                          |    |           |    |           | Pickup @ 08:00 EST, Deliver @ 17:30 CST Book                         |           |    |
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|                                                                                                |           |    |                          |    |           |    |           | Pickup @ 11:30 EST, Deliver @ 15:30 CST Book                         |           |    |
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|                                                                                                |           |    |                          |    |           |    |           | Pickup @ 06:30 CST, Deliver @ 1... Book                              |           |    |

What we'll cover

# Context on Convoy & Freight



## Shippers

Businesses that need to move goods to customers

# CONVOY

## Convoy (Broker)

Middleman who manages and arranges transportation services



## Carriers

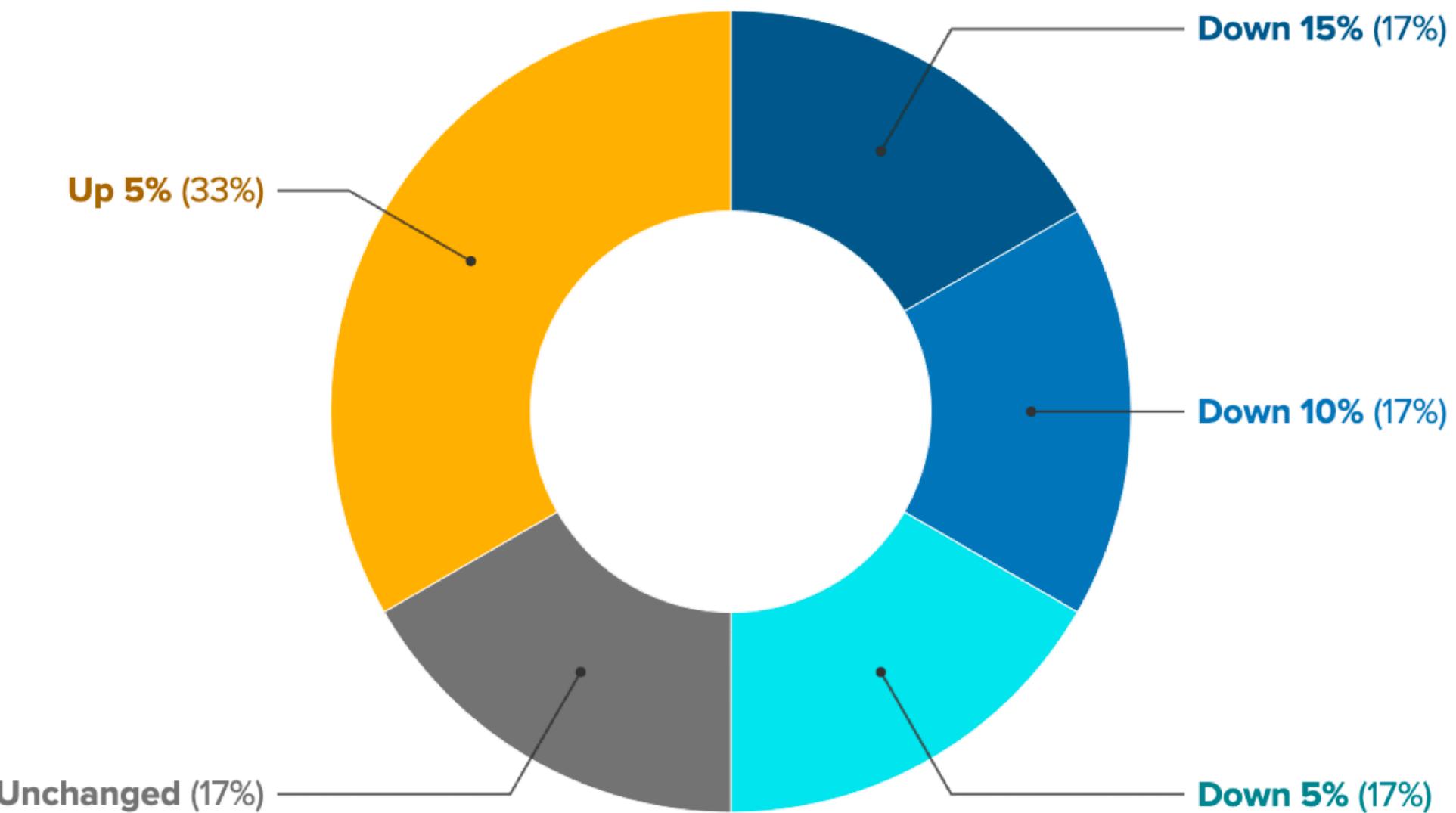
Businesses that have trucks, trailers and drivers to move goods

Business goal

# To endure the on-going freight recession, Convoy needed to lower their rates

Experts predict that the recession will continue well into 2024

In the first quarter of 2024, full freight rates will be:



Source: CNBC Supply Chain Survey – October 2023



[CNBC article](#)

# Carriers with 20+ trucks have lower cost structures and charge less for their services

From July 2022–2023, only 5% of Convoy's shipments were executed by these larger and lower cost carriers

Table 14: Average Marginal Cost per Mile by Fleet Size

| Motor Carrier Costs                      | Small Carriers<br>2021 | Small Carriers<br>2022 | Large Carriers<br>2021 | Large Carriers<br>2022 |
|------------------------------------------|------------------------|------------------------|------------------------|------------------------|
| <i>Vehicle-based</i>                     |                        |                        |                        |                        |
| Fuel Costs                               | \$0.444                | \$0.723                | \$0.408                | \$0.612                |
| Truck/Trailer Lease or Purchase Payments | \$0.305                | \$0.330                | \$0.279                | \$0.336                |
| Repair & Maintenance                     | \$0.197                | \$0.212                | \$0.161                | \$0.186                |
| Truck Insurance Premiums                 | \$0.102                | \$0.136                | \$0.082                | \$0.072                |
| Permits and Licenses                     | \$0.016                | \$0.016                | \$0.016                | \$0.014                |
| Tires                                    | \$0.047                | \$0.051                | \$0.040                | \$0.045                |
| Tolls                                    | \$0.031                | \$0.024                | \$0.031                | \$0.031                |
| <i>Driver-based</i>                      |                        |                        |                        |                        |
| Driver Wages                             | \$0.603                | \$0.693                | \$0.629                | \$0.734                |
| Driver Benefits                          | \$0.135                | \$0.117                | \$0.185                | \$0.193                |
| <b>TOTAL</b>                             | <b>\$1.880</b>         | <b>\$2.300</b>         | <b>\$1.831</b>         | <b>\$2.223</b>         |

Small fleets spent 7.7 cents more per mile than large fleets in 2022. This gap was 2.8 cents larger than in 2021, but it was still less than in 2020 when small fleets spent 16.3 cents more than large fleets per mile.

[American Transportation Research Institute update](#)

## Objective

**I led the design and research for discovering how Convoy should evolve to meet the needs of medium and large carriers, over the course of one quarter**

### **My approach:**

- Clarify user goals
- Develop a shared vision
- Evaluate our vision



## Clarify user goals

I led a recruitment plan and research study to understand who medium and large carriers are

- Research goals
- Key findings
- User goals

Clarify user goals

# Research goals

I led a workshop to understand what questions my teammates had. This gave everyone a sense of ownership in the earliest stage of product development

## We sought to understand

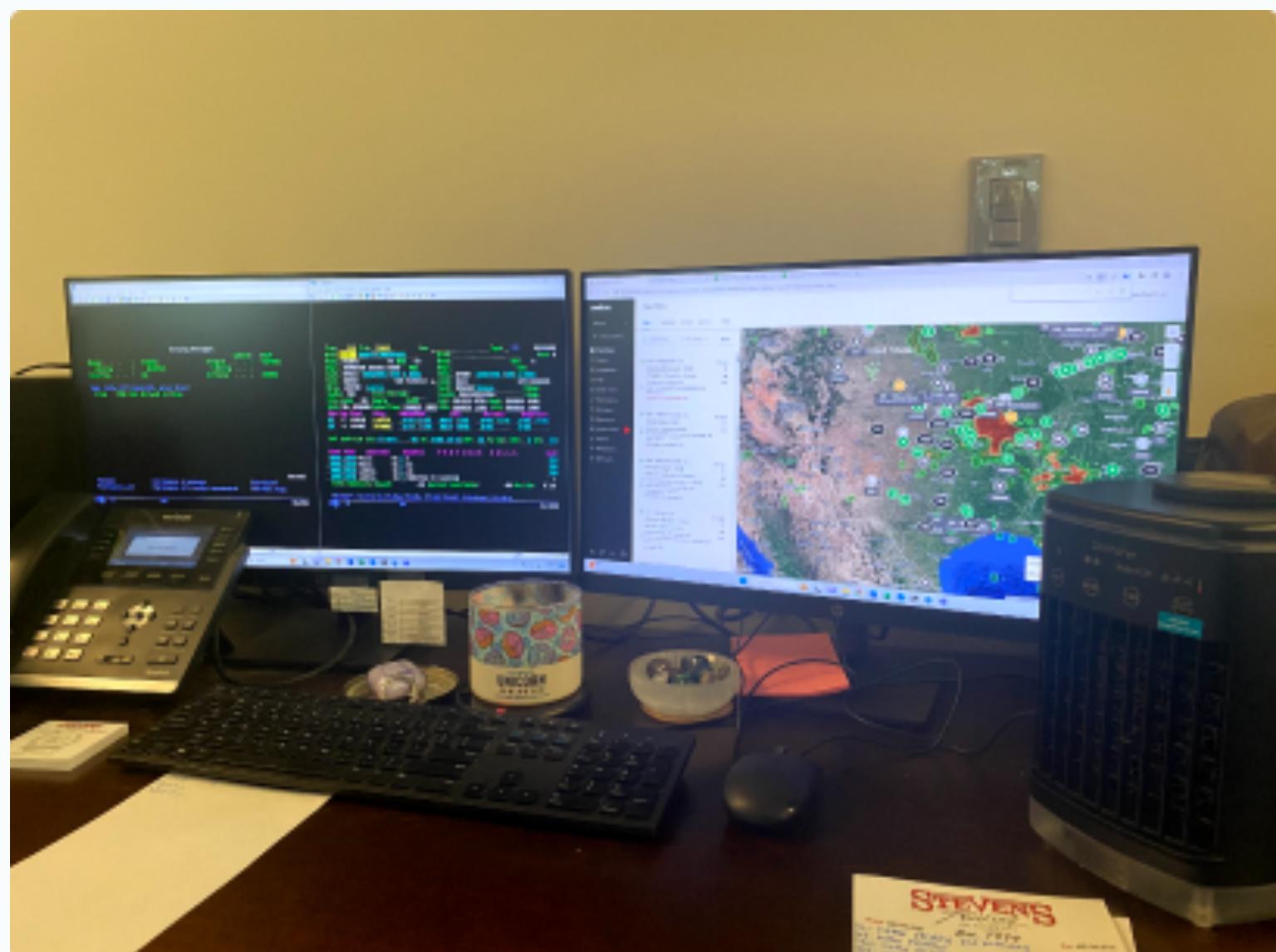
- How they run their business
- What their goals are
- How they work with freight brokers
- How they source loads
- Why they do what they do
- What technology they use

What ELSE do we want know?

## What else do we want to know?

1. Write down all of your questions about medium/large carriers





# Key Findings

I did my own analysis of the qualitative data across many tools like Dovetail and Figjam. After each interview, I did a debrief with my teammates who joined the calls as participants to talk about themes.

- 1 They source outbound loads from shippers and return loads from brokers
- 2 They have rate targets, but base their success more on about truck utilization and empty miles driven
- 3 Finding return loads that bring their drivers back to their home base is time consuming and difficult
- 4 Downloading an app to execute one broker's shipments is a hassle

Clarify user goals

# As someone who sources loads,

## User goal (I need to...)

Minimize the time and effort required to find return loads for drivers

Minimize the time it takes to know whether a broker has the loads I need

Minimize the effort it takes to make sure drivers setup to haul a broker's load

## Pain points (But experience...)

- Inefficient and time consuming search
- Search that clashes with mental model
- Lack of confidence in brokers network

- Many discussions and waiting periods
- Lack of transparency

- Cost to equip trucks with device/data plan
- Time/effort to train drivers on app

- Fear that I'm missing the market
- No help judging feasibility

- Brokers engaging with drivers
- Driver security concerns

Clarify user goals

# Prioritize what we do first

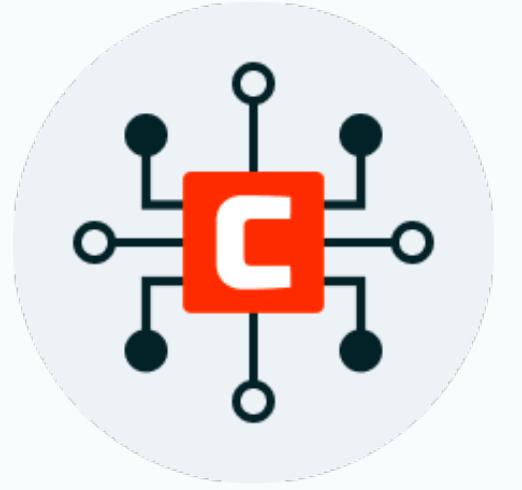
| User goal                                                                       | Pain rank | Design effort | Eng effort |
|---------------------------------------------------------------------------------|-----------|---------------|------------|
| Minimize the time and effort required to find return loads for drivers          | High      | L             | L          |
| Minimize the time it takes to know whether a broker has the loads I need        | Low       | L             | L          |
| Minimize the effort it takes to make sure drivers setup to haul a broker's load | Med       | M             | M          |

Clarify user goals

# We needed clarity on how this could work



Because all my teammates were engaged in research, it took very little effort for all of us to align on priorities! My research guided us toward what to build first.

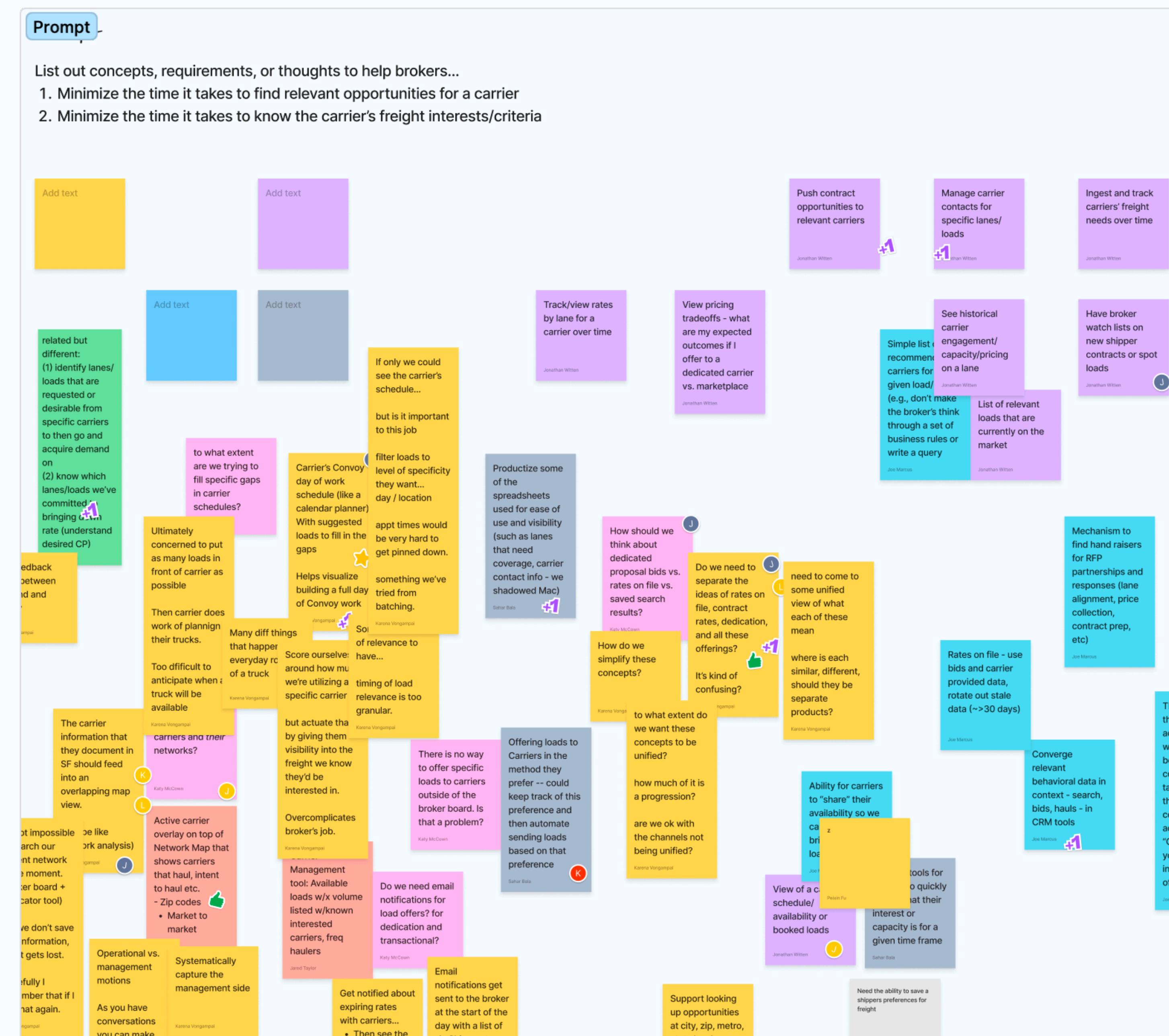


## Develop a shared vision

After I conducted research to build a better understanding of the user, their goals, and the problems to be solved, I moved forward with developing artifacts to help us visualize what a better experience could look like

## Develop a shared vision

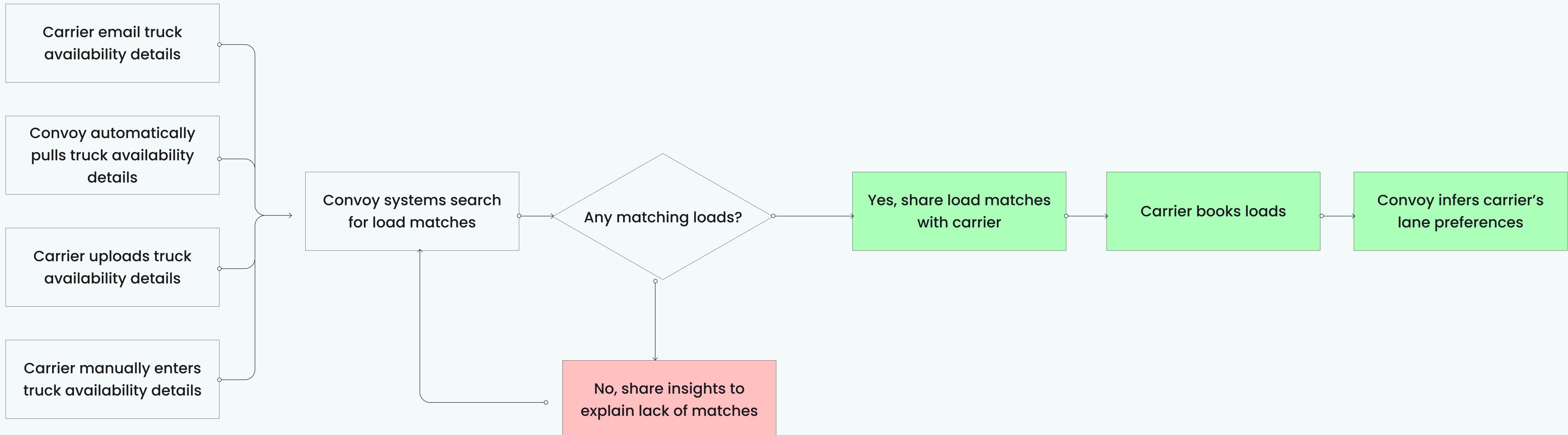
# Gathered my teammates to brainstorm solutions



Develop a shared vision

# Visualize the future

I created a user flow diagram as a low-fidelity way to gut check my thinking with my product manager. This was the fastest way to get an idea on paper to drive alignment.



Develop a shared vision

# Visualize the future

01

**Carrier uploads their truck  
availability in any format  
that's convenient for them**

Welcome to Convoy!

**Find loads** Identify network overlaps

Save time by finding loads that match your truck availability

Upload or drag a .csv, .xlsx, jpg, png here and we'll find loads that match your needs.

Select file

Search myself

The screenshot shows the Convoy software interface. At the top, there is a dark header bar. Below it, the main area has a light gray background. On the left, there are two tabs: "Find loads" (which is underlined in blue) and "Identify network overlaps". In the center, there is a large dashed rectangular area. Inside this area, there is a circular icon with a document and an upward arrow. Below the icon, the text "Save time by finding loads that match your truck availability" is displayed. Underneath that, it says "Upload or drag a .csv, .xlsx, jpg, png here and we'll find loads that match your needs.". At the bottom right of the dashed area, there is a blue button labeled "Select file". At the very bottom of the main area, there is a small blue link labeled "Search myself".

Develop a shared vision

# Visualize the future

02

**Convoy shows the carrier feasible loads options for each of their available trucks**

< Back Refresh

OK, here's what we found

# of stops: Any Broker: Any Opportunity type: Any

**Matches for availability (32)** No matches (4)

| Truck availability                                                                             | Mon 07/20 |    | Tue 07/20                |    | Wed 07/20 |    | Thu 07/20 |    | Fri 07/20 |                                                                      | > |
|------------------------------------------------------------------------------------------------|-----------|----|--------------------------|----|-----------|----|-----------|----|-----------|----------------------------------------------------------------------|---|
|                                                                                                | AM        | PM | AM                       | PM | AM        | PM | AM        | PM | AM        | PM                                                                   |   |
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|                                                                                                |           |    | Pickup @ 24:00 C... Book |    |           |    |           |    |           |                                                                      |   |
|                                                                                                |           |    | Pickup @ 21:30 C... Book |    |           |    |           |    |           |                                                                      |   |
| <b>#3923 Dry Van</b><br>Houston, TX → Jacksonville, FL<br>Available starting Mon 07/20 @ 13:30 |           |    |                          |    |           |    |           |    |           | Pickup @ 14:30 CST, Deliver @ 1... Book                              |   |
|                                                                                                |           |    |                          |    |           |    |           |    |           | Pickup @ 06:30 CST, Deliver @ 1... Book                              |   |
| <b>#208 Dry Van</b><br>Tampa, FL → Albuquerque, NM<br>Available starting Mon 07/20 @ 13:30     |           |    |                          |    |           |    |           |    |           | Pickup 1 @ 08:00 EST, Pickup 2 @ 11:00 EST, Deliver @ 15:30 CST Book |   |
|                                                                                                |           |    |                          |    |           |    |           |    |           | Pickup @ 08:00 EST, Deliver @ 17:30 CST Book                         |   |
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|                                                                                                |           |    |                          |    |           |    |           |    |           | Pickup @ 11:30 EST, Deliver @ 15:30 CST Book                         |   |
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|                                                                                                |           |    |                          |    |           |    |           |    |           | Pickup @ 06:30 CST, Deliver @ 1... Book                              |   |

# Visualize the future

03

**Carrier understands why Convoy doesn't have load matches right now, but feels confident that they'll be notified later on**

< Back

OK, here's what we found

Refresh

# of stops: Any      Broker: Any      Opportunity type: Any

Matches for availability (32)      No matches (4)

We'll email you as loads come on the market in the next 48 hours      Disable for all trucks

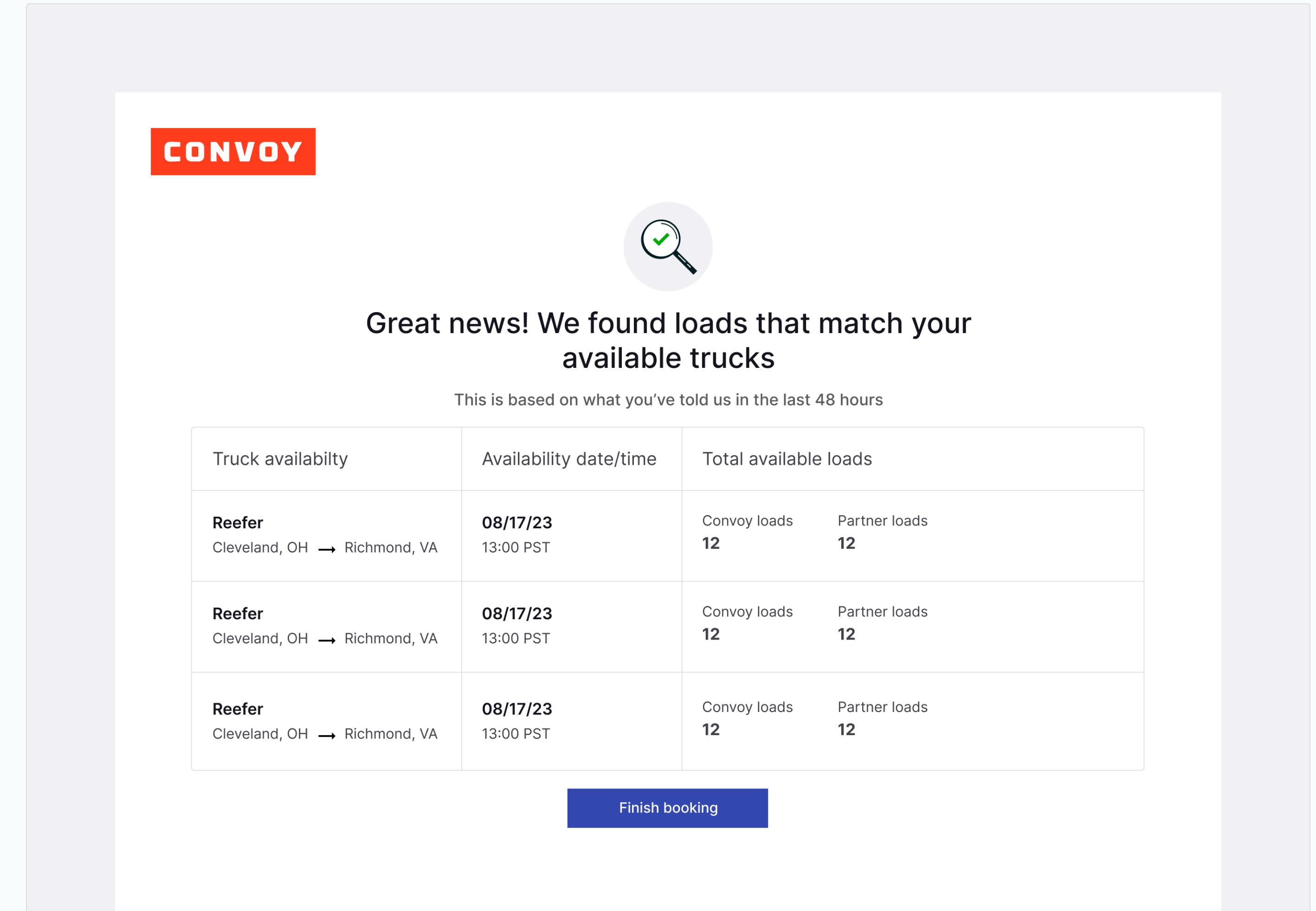
| Truck availability                                                                                    | Insights into L12W volume                                                                                                                     |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>#1039 Reefer</b><br>Cleveland, OH → Richmond, VA<br><i>Available starting Mon 07/20 @ 13:30</i>    | Avg loads per week<br><b>34</b><br>Hot market time<br><b>Monday mornings</b><br>Est. carriers interested<br><b>12</b><br>Somewhat competitive |
| <b>#1043 Dry Van</b><br>Houston, TX → Jacksonville, FL<br><i>Available starting Mon 07/20 @ 13:30</i> | Avg loads per week<br><b>34</b><br>Hot market time<br><b>Monday mornings</b><br>Est. carriers interested<br><b>4</b><br>Less competitive      |
| <b>#502 Reefer</b><br>Tampa, FL → Albuquerque, NM<br><i>Available starting Mon 07/20 @ 13:30</i>      | Avg loads per week<br><b>8</b><br>Hot market time<br><b>Monday mornings</b><br>Est. carriers interested<br><b>2</b><br>Less competitive       |
| <b>#2039 Dry Van</b><br>Atlanta, GA → Albuquerque, NM<br><i>Available starting Mon 07/20 @ 13:30</i>  | Avg loads per week<br><b>2</b><br>Hot market time<br><b>Monday mornings</b><br>Est. carriers interested<br><b>24</b><br>Highly competitive    |

Develop a shared vision

# Visualize the future

04

**Convoy notifies carrier about load matches as they come on the market**



The screenshot shows a mobile application interface for Convoy. At the top left is the Convoy logo in white on a red background. To the right is a circular icon containing a magnifying glass with a green checkmark. Below these elements is a message: "Great news! We found loads that match your available trucks". A smaller note below it states: "This is based on what you've told us in the last 48 hours". The main content is a table with three rows, each representing a load match. The columns are: "Truck availability", "Availability date/time", and "Total available loads". Each row contains a "Reefer" entry from Cleveland, OH to Richmond, VA, dated 08/17/23 at 13:00 PST, with 12 loads each. The table also includes columns for "Convoy loads" and "Partner loads", both showing the value 12.

| Truck availability                     | Availability date/time | Total available loads                                |
|----------------------------------------|------------------------|------------------------------------------------------|
| Reefer<br>Cleveland, OH → Richmond, VA | 08/17/23<br>13:00 PST  | Convoy loads<br><b>12</b> Partner loads<br><b>12</b> |
| Reefer<br>Cleveland, OH → Richmond, VA | 08/17/23<br>13:00 PST  | Convoy loads<br><b>12</b> Partner loads<br><b>12</b> |
| Reefer<br>Cleveland, OH → Richmond, VA | 08/17/23<br>13:00 PST  | Convoy loads<br><b>12</b> Partner loads<br><b>12</b> |

Finish booking

# Visualize the future

04

**Carrier finishes booking a load for this truck and can easily move onto the next**

The screenshot shows a mobile application interface for managing truck loads. On the left, a sidebar displays a list of available loads, each with a title, origin, destination, and transit time. On the right, a main panel shows the details of a selected load, including load ID, total miles, trailer type, and stops. A red dashed line highlights the route from Cleveland, OH to Richmond, VA. The bottom right corner features a large blue button labeled "Book now \$1,390".

< Back

OK, here's what we found

Matches for availability (32) No matches (4)

Truck availability Mon 07/2

AM PM

Reefer

Cleveland, OH → Richmond, VA

Avg transit time ~13 hrs

Dry Van

Houston, TX → Jacksonville, FL

Avg transit time ~13 hrs

Dry Van

Tampa, FL → Albuquerque, NM

Avg transit time ~13 hrs

Dry Van

Atlanta, GA → Albuquerque, NM

Avg transit time ~13 hrs

Finish booking

▼ Available load to book

Load details

| Convoy ID    | Total miles             | Out of route mi |
|--------------|-------------------------|-----------------|
| 89302932     | 1,093                   | Less than 20mi  |
| Total weight | Trailer type            | Total stops     |
| 37,900       | 53' Dry Van (no Reefer) | 2               |

How this load fits into your schedule

- Houston, TX → Phoenix, AZ  
Avg transit time ~15 hrs  
Requires HOS reset  
Available for next load Wed 8/16
- Drive to pickup for next load  
Avg deadhead 30 mi on I5 highway
- Phoenix, AZ  
123456 Peachtree Industrial Boulevard  
Cleveland, OH 30295  
Live pickup | Thu 8/17/23 09:00 PST
- Atlanta, GA  
123456 Peachtree Industrial Boulevard  
Richmond, VA 30295  
Live pickup | Thu 8/17/23 09:00 PST

▼ Compare to my truck availability It's a match!

| Pickup          | Delivery       | Trailer   | Pickup date      | Pickup time |
|-----------------|----------------|-----------|------------------|-------------|
| Cleveland, OH ✓ | Richmond, VA ✓ | Dry Van ✓ | Tue - 08/23/23 ✓ | 09:00 PST ✓ |

Place a bid

Book now \$1,390



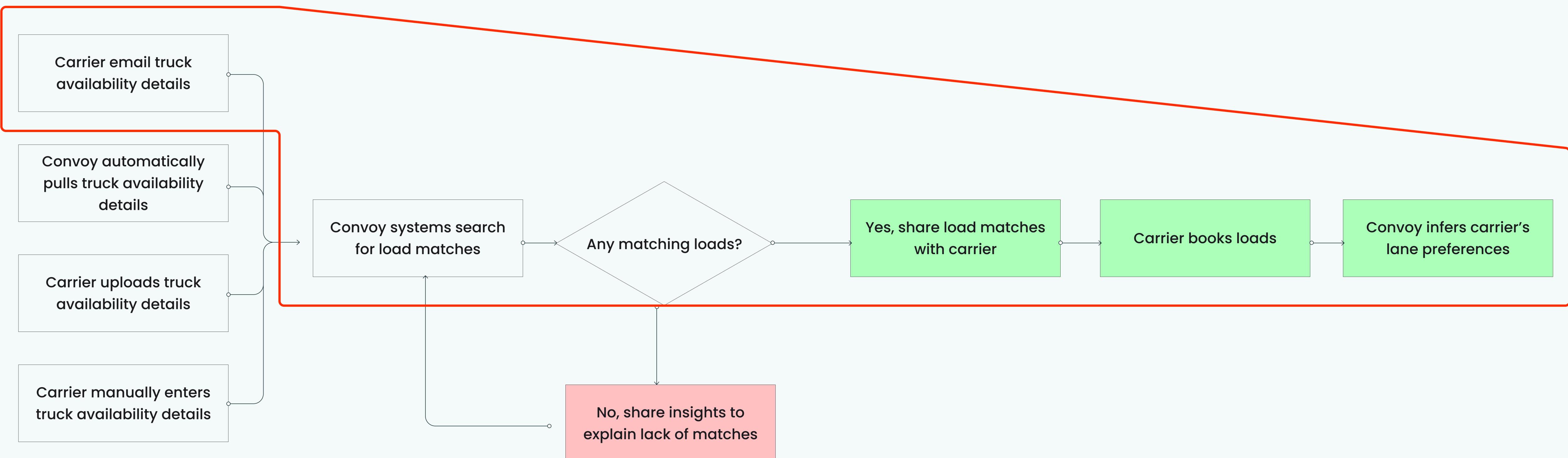
## Evaluate our vision

We ran a pilot to really evaluate our idea and get a taste for the size of the opportunity

Evaluate our vision

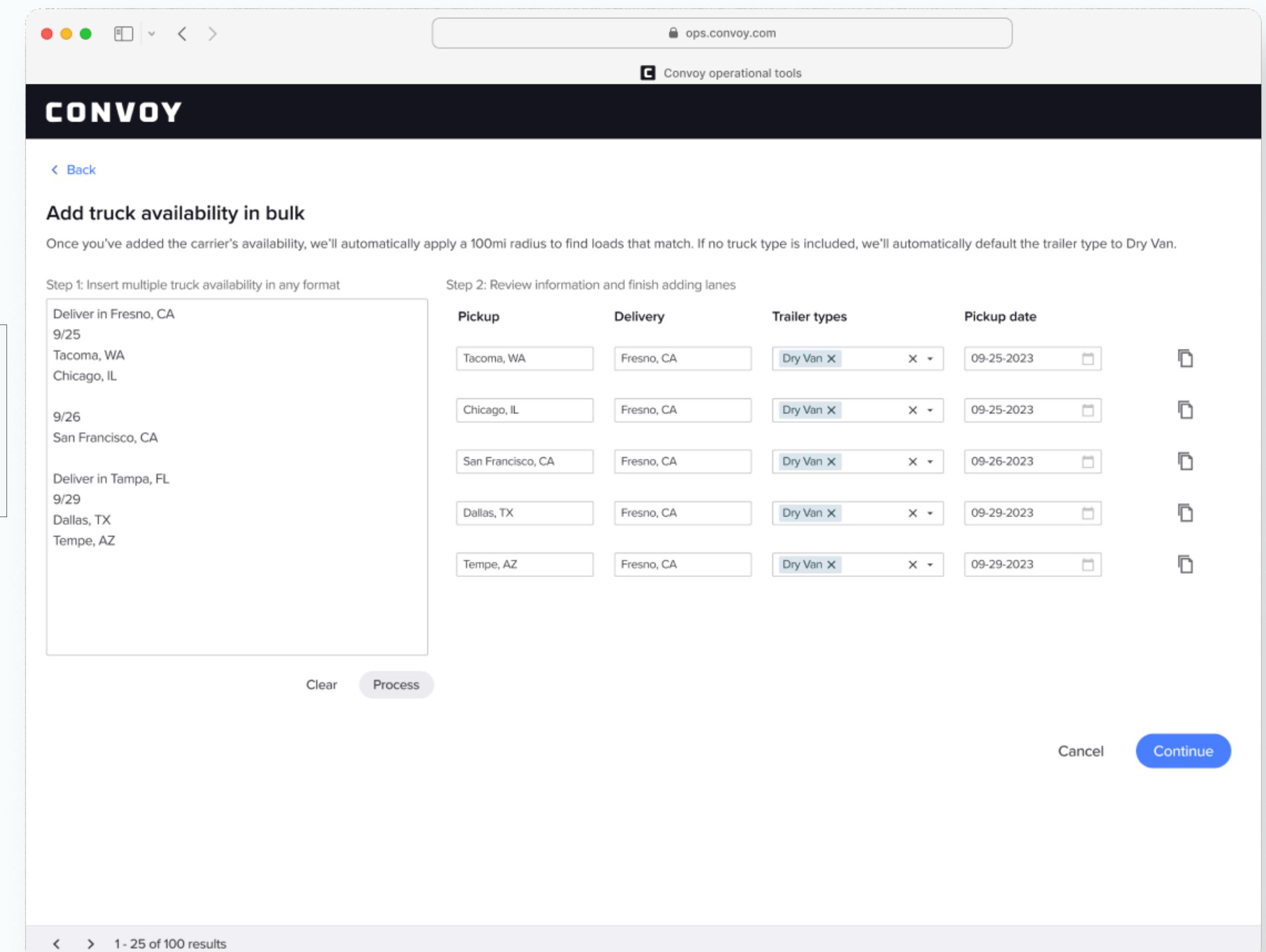
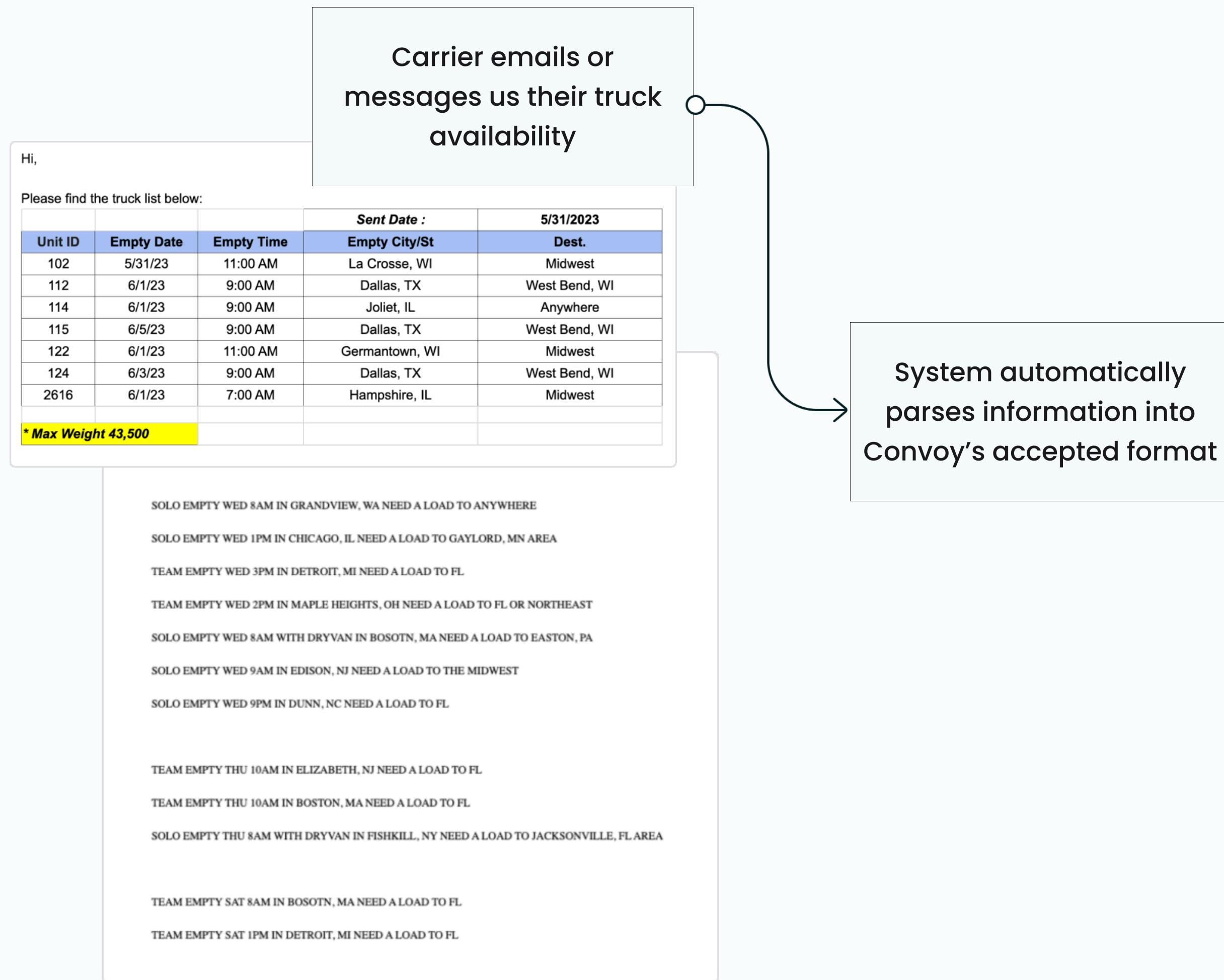
# Scope out a pilot experience

I collaborated with engineering to scope out an experience that required minimal engineering effort, but still allowed us to evaluate our idea and learn



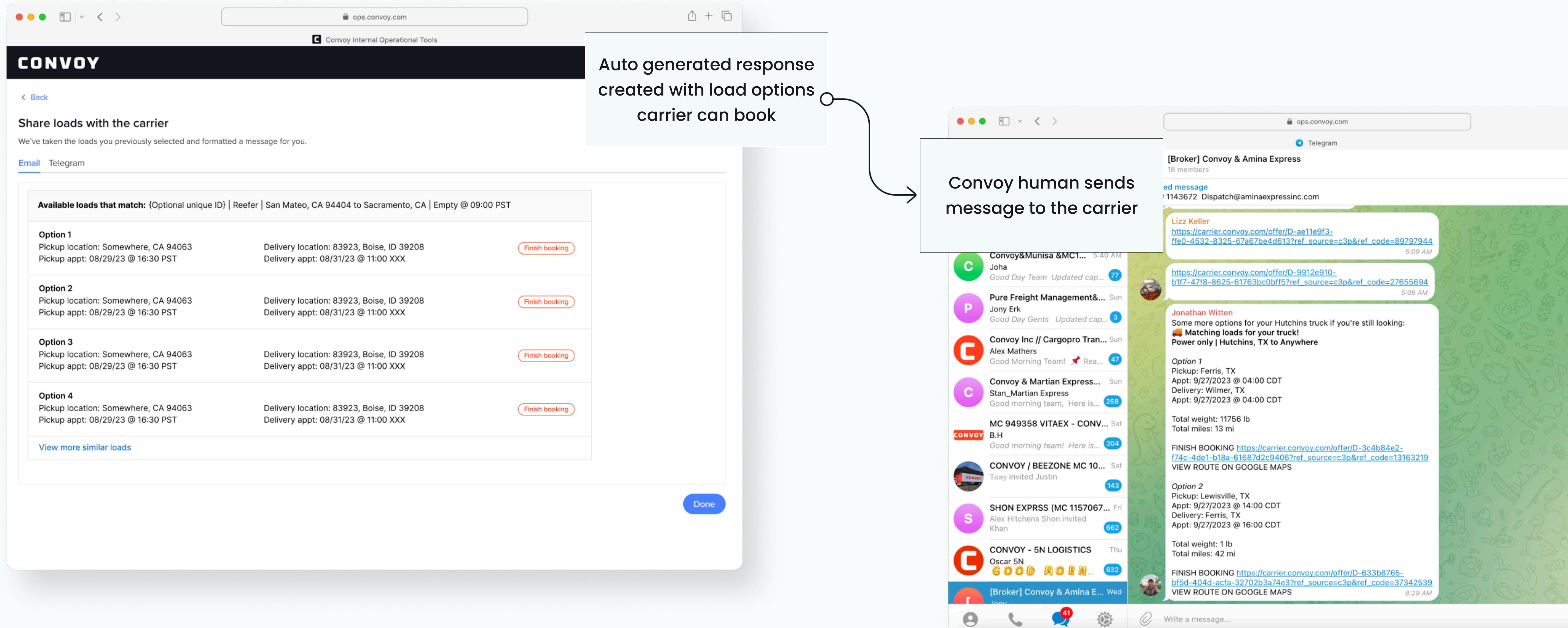
Evaluate our vision

# Pilot experience



Evaluate our vision

# Pilot experience



Evaluate our vision

# Pilot experience

Carrier finishes booking through carrier website

The screenshot shows a web browser window for 'ops.convoy.com' with the Convoy logo at the top. On the left, a dark sidebar menu lists: CONVOY, Load Board (selected), Saved Searches, My Bids, Accepted, Countered, Bid Again (with a red notification badge '1'), Booked Loads, and Completed Loads. The main content area displays a map of the Northeastern United States with markers for Boston, Massachusetts, and Seaside Heights, New Jersey. Below the map, detailed information about the load is provided:

| BROKER      | Boost Brokerage<br><a href="#">View Policy</a>                                                                     |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| CONVOY ID   | 76835013                                                                                                           |
| DISTANCE    | 296 miles                                                                                                          |
| WEIGHT      | 39500 lbs                                                                                                          |
| SHIPPER     | Convoy Boost                                                                                                       |
| LIVE PICKUP | ① Boston, Massachusetts<br>21 Boston Fish Pier<br>Ideal Seafood Inc<br>Tue 2/22/22 15:15 EST appt                  |
| LIVE UNLOAD | ② Seaside Heights, New Jersey<br>800 Ocean Terrace<br>Casino Pier & Breakwater Beach<br>Thu 2/24/22 19:15 EST appt |
| TRAILER     | 53' Dry Van (no Reefer)                                                                                            |

A modal window titled 'Bid Only' is open on the right, showing a bid of \$2,000 from 'Boston, Massachusetts' to 'Seaside Heights, New Jersey'. It includes a 'Edit Bid' button.

# **After 2 weeks in the pilot, I was curious about one question**

## **Why weren't carriers booking loads?**

Engagement through the pilot experience was really good. 50% of the loads we sent to carriers (via email or messaging platforms) were viewed on the website.

I sat down with one of the engineers and our data scientist to hypothesize why carriers weren't booking. Then, I cold called 8 out of the 60 carriers in our pilot study over the course of 3 days and found 6 reasons why.

# Reasons why carriers weren't booking loads

- 1 There are additional or new load requirements they did not tell us about upfront
- 2 They've already booked another load for their truck
- 3 They were too slow to book the load
- 4 Convoy's rates are too low
- 5 The person we're working with has to get approval to book the load
- 6 Email communications are slower than instant messaging platforms

# Conclusion

## Takeaways

Convoy needed to win significantly more freight to stay alive and sustain the needs of medium carriers.

Convoy needed to start this initiative much earlier

## What I would've done next

Find solutions to lower the barriers to booking

Fix legacy issues to have a better foundation

Find way to evaluate the self-serve experience, see if it would've driven more efficiency