

A close-up, low-angle shot of an Amtrak train moving rapidly, creating a sense of speed and motion. The train's blue body and white stripes are prominent, with the Amtrak logo clearly visible. The background is blurred, emphasizing the train's velocity.

Optimizing Amtrak's Efficiency through Business Intelligence

Teammates

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Why We Chose Amtrak

- Data-rich environment
- National importance
- Operational complexity
- Real-world value



Company Overview

- Amtrak (National Railroad Passenger Corporation)
- Founded: 1971, government-owned
- Service: 500+ destinations across 46 U.S. states
- Annual Riders: Over 30 million

Goals

- Improves customer satisfaction
- Enhance on-time performance
- Optimize operations & resource allocation
- Expand routes sustainably

Challenges

- Inefficient resource management
- Low profitability
- Fragmented data systems
- Delays due to poor scheduling

Data Sources & Frequency

- ARROW (Reservations & Ticketing)
- SAP (Finance & HR)
- CETC (Train control), Mobile App, Wi-Fi
- Surveys, Weather, External Infrastructure
- Real-time: GPS, Boarding, Delays





BI RECOMMENDATIONS



CENTRALIZE DATA
SOURCES INTO UNIFIED
PLATFORM



USE AI TO PREDICT
DELAYS AND OPTIMIZE
MAINTENANCE



BUILD SELF-SERVICE
DASHBOARDS FOR FAST
DECISION-MAKING



TIE CUSTOMER FEEDBACK
DIRECTLY INTO SERVICE
IMPROVEMENTS

BI Tools



Visualizations

Overview :

- Bar Chart shows top 10 Amtrak routes by ridership (FY 2024)
- Ranked from highest to lowest based on the number of passengers

Top Routes :

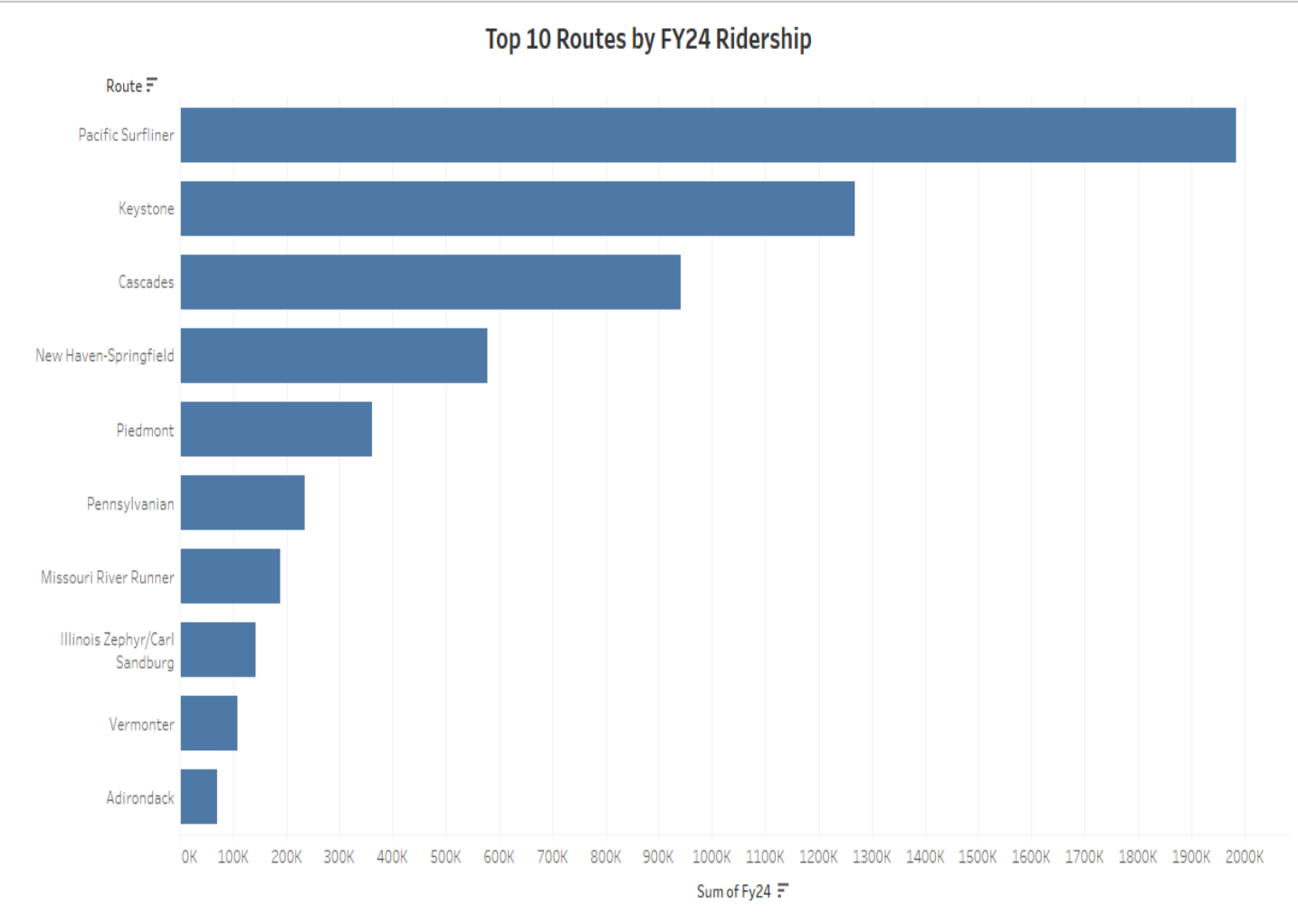
- **Pacific Surfliner:** ~2 million riders (highest)
- **Keystone:** ~1.2 million riders
- **Cascades:** Just under 1 million riders

Visual Insights

- Big gap between top 3 routes and others
- Top routes contribute major share of total ridership

Conclusion

- **Pacific Surfliner** is the leading route in FY24
- Data helps understand travel patterns
- Useful for planning and prioritizing service improvements



Comparison FY23 – FY24

1. Pacific Surfliner Leads All Routes

FY24 ridership exceeded 2 million, up significantly from FY23, making it the highest-performing route.

2. Strong Growth for Empire Service & Keystone

Both routes showed substantial increases, with Empire Service surpassing 1.35 million and Keystone reaching around 1.3 million in FY24.

3. Majority of Routes Saw Increases

Most routes show a year-over-year rise in ridership, indicating overall recovery or growth in rail travel demand.

4. Blue Water and Capitol Corridor Cross 1 Million Mark

These mid-performing routes showed strong gains and are now among the higher-ridership routes.

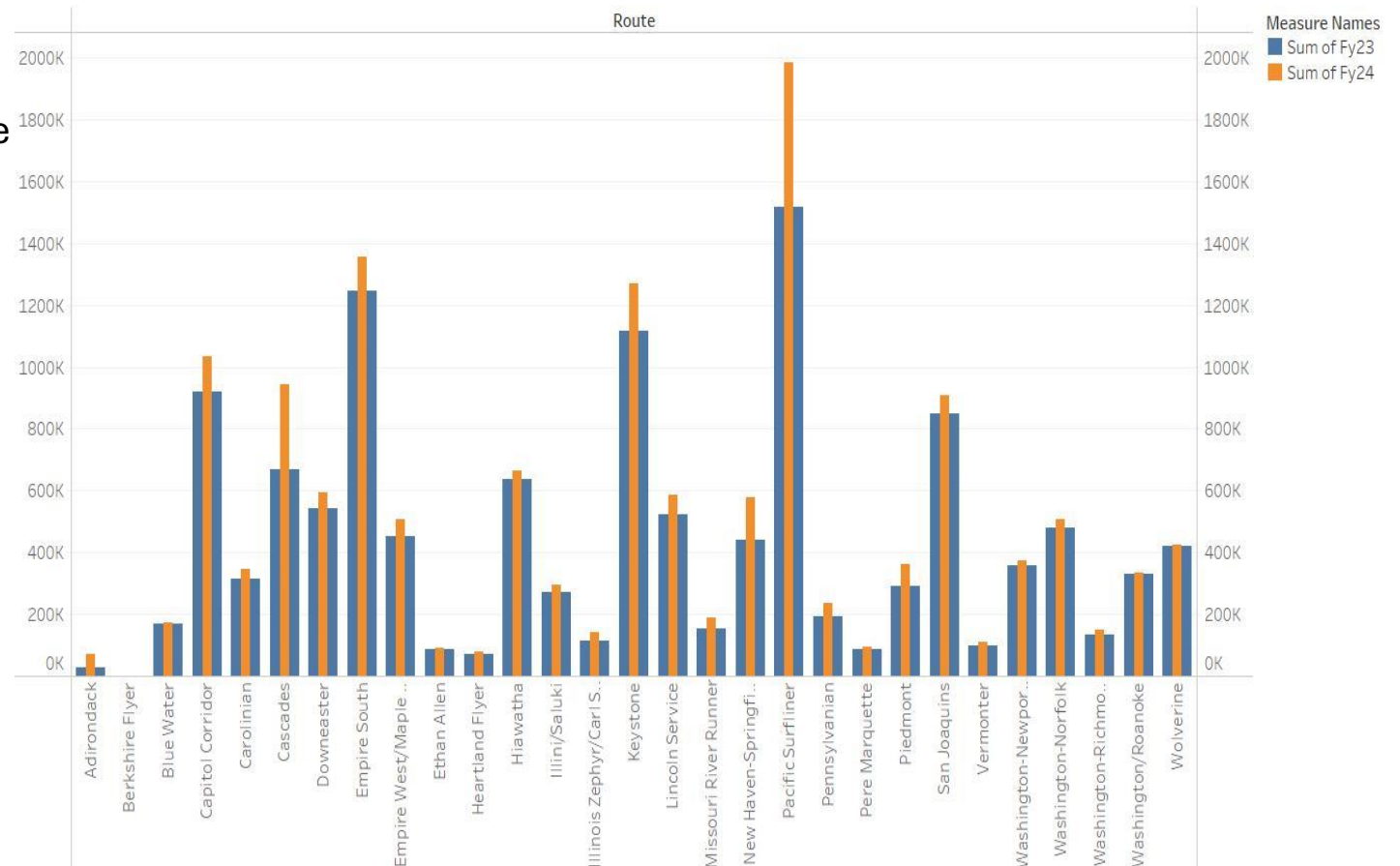
5. Minimal Change in Low-Ridership Routes

Routes like Adirondack, Berkshire Flyer, and Heartland Flyer have very low ridership with little year-over-year change.

6. Regional Variations Matter

Northeast and West Coast routes dominate in ridership, suggesting regional preferences or operational focus.

Year-over-Year Change



Sum of FY23 and sum of FY24 for each Route. Color shows details about sum of FY23 and sum of FY24. Details are shown for Route.

The **donut chart** showing "**Share of Ridership by Region**" Represents various U.S. train routes

Regional Breakdown

Routes are grouped into 3 regions:

- Northeast Region
- South & Midwest
- West Coast

Each region has a distinct color

Route Representation

- Each chart segment = one train route
- Size of segment reflects ridership share

Major Contributors

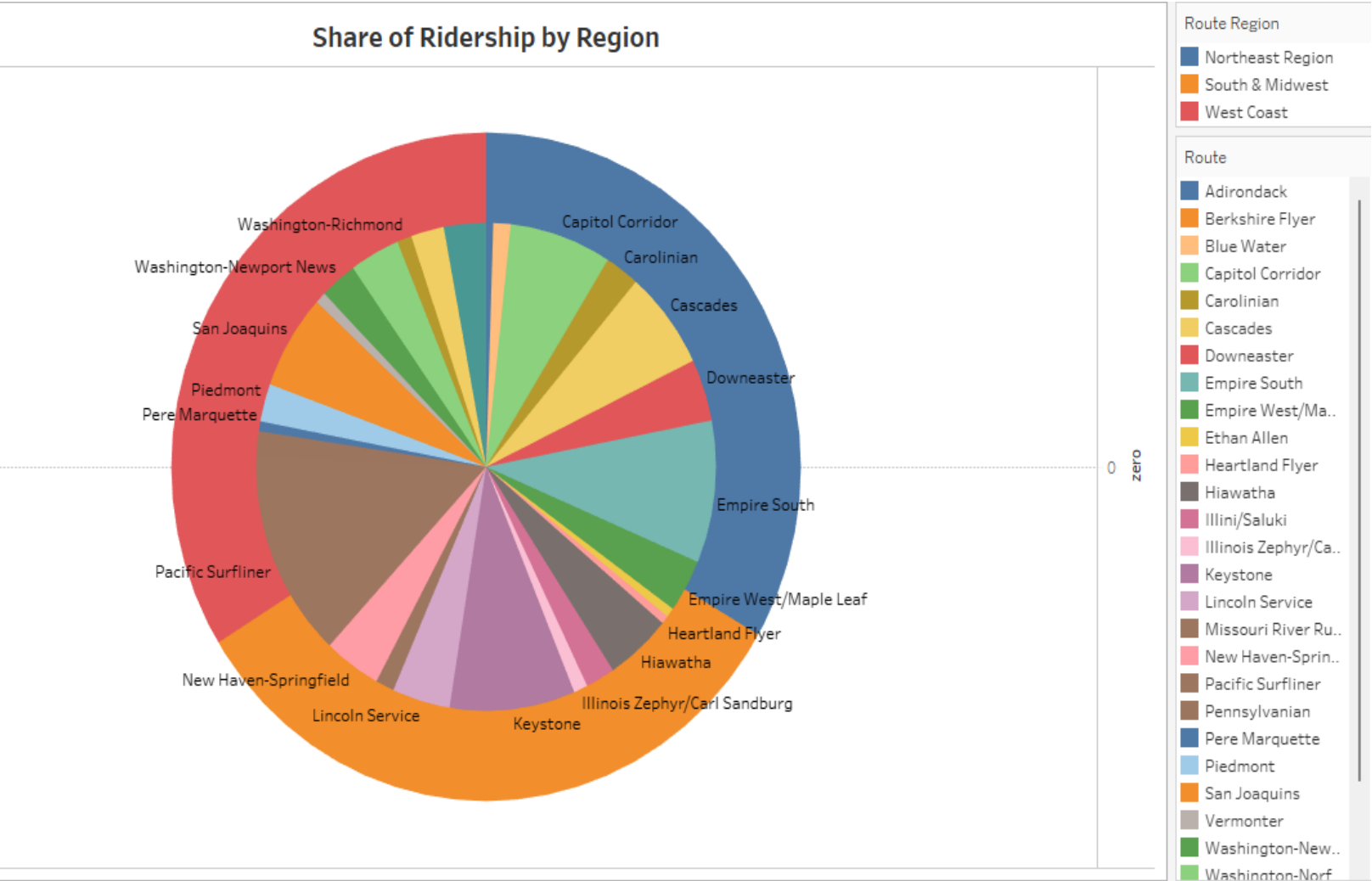
- Largest segments:
- Pacific Surfliner
- Lincoln Service
- Keystone

These routes have the highest ridership

Legend and Clarity

Legend matches routes to regions

- Easy to Identify route regions
- Compare ridership shares visually



Map Overview

- **U.S. map** showing **station ridership data for 2022**
- Each state is **color-coded** based on ridership levels

Data Representation

- **Color-coded system:** Each state's color reflects its ridership volume
- Helps visualize data intensity by location

Geographical Distribution

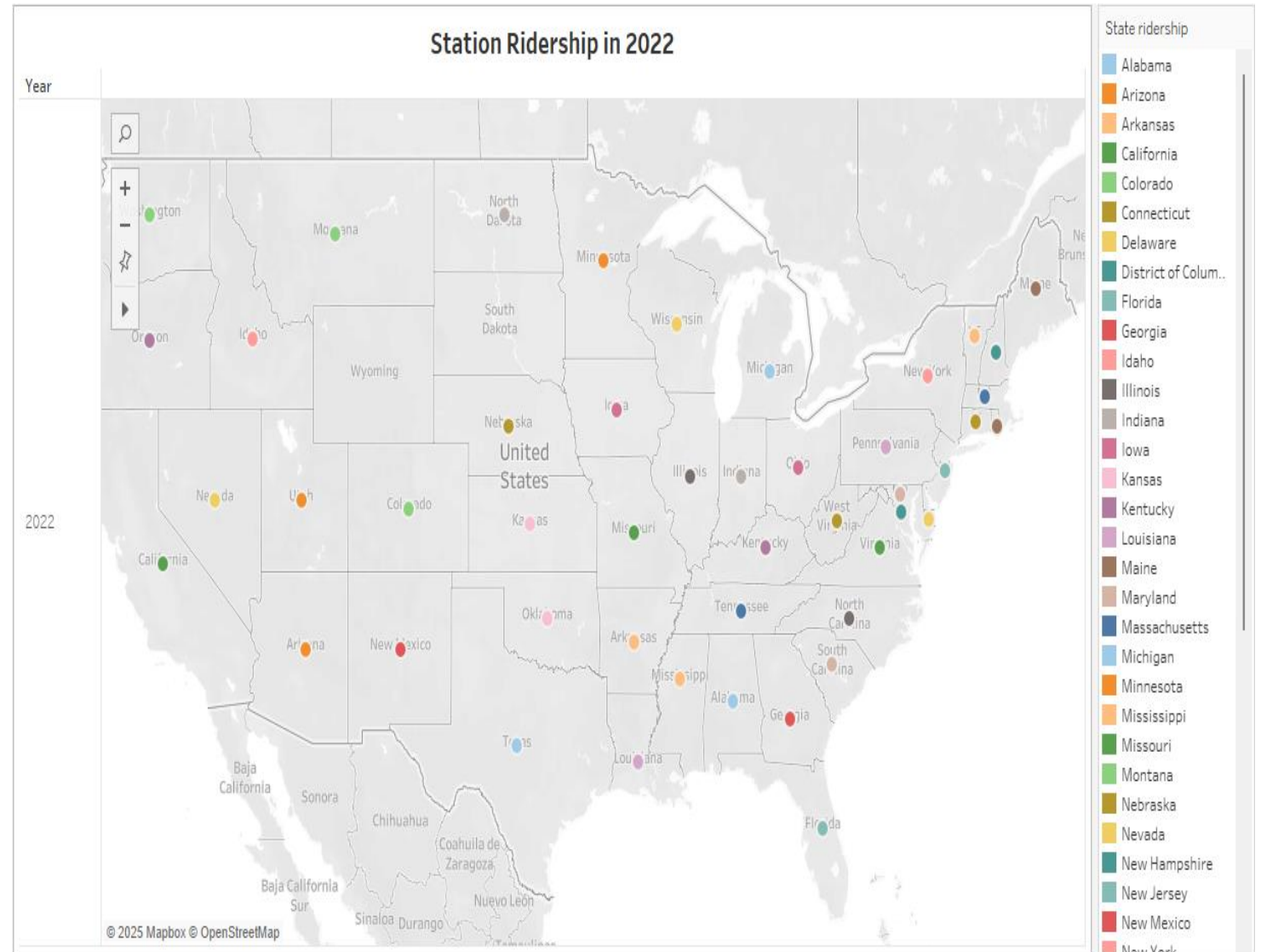
- Enables **easy comparison** across states and regions
- Highlights **regional ridership patterns**

Interactive Elements

- **Year selection tool** present
- Allows users to view **trends over time** (e.g., 2021 vs. 2022)

State-Specific Ridership

- **Legend** identifies each state and its ridership color
- Viewers can easily match colors to **specific data values**



Stacked bar chart displaying station ridership trends from 2019 to 2022

Individual Stations

- Each colored segment in the bars represents a **specific station's ridership**
- Visualizes individual station contributions to yearly totals

Overall Trend

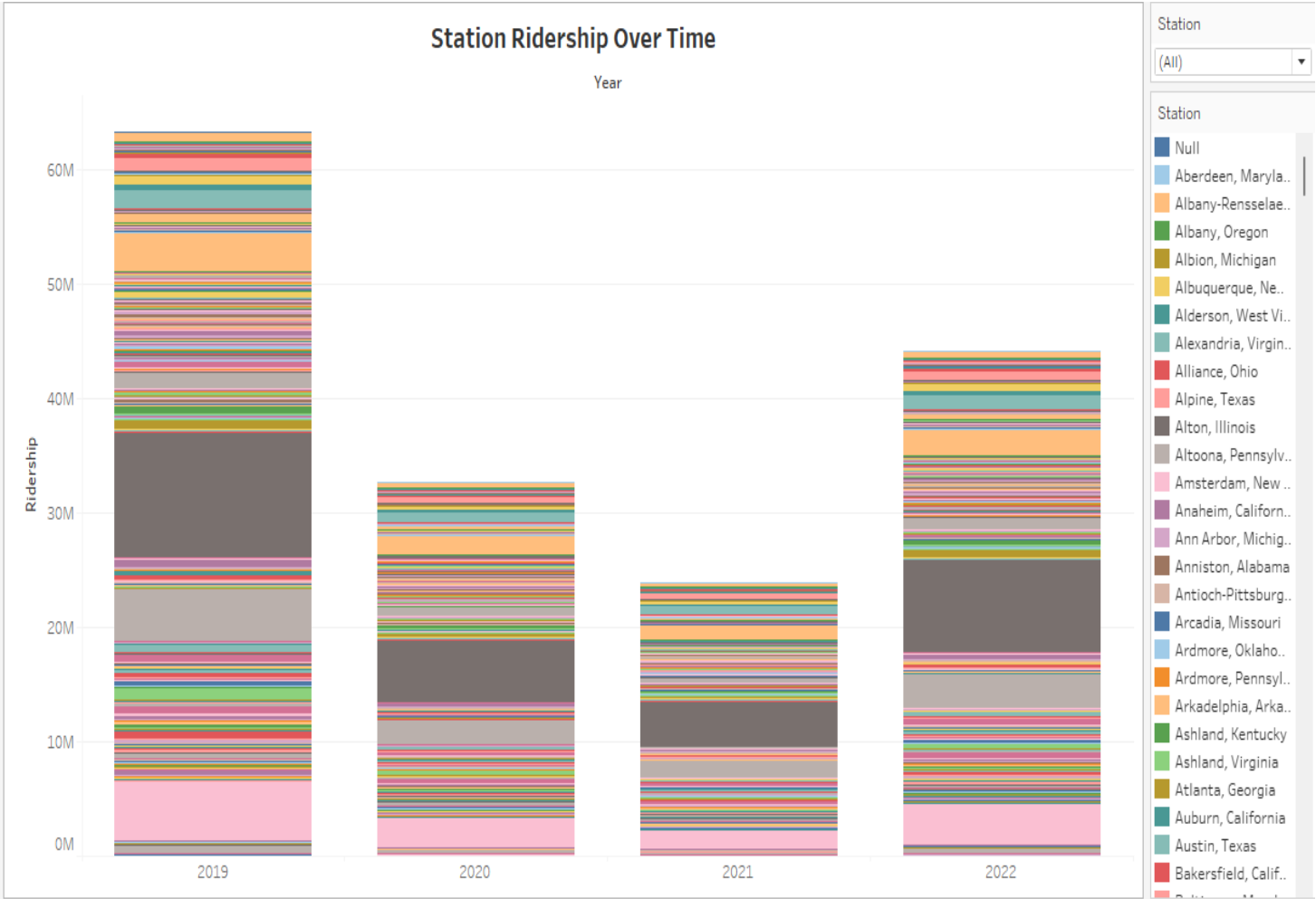
- Total bar height = overall annual ridership
- Noticeable drop in 2020 and 2021, followed by partial recovery in 2022

Station Selection

- Users can select specific stations from the list on the right
- Enables focused analysis of station-level trends

Comparative Analysis

- Facilitates comparison across stations and years
- Shows how ridership evolved over the 4 years



Dashboards

Amtrack Tracking Trends

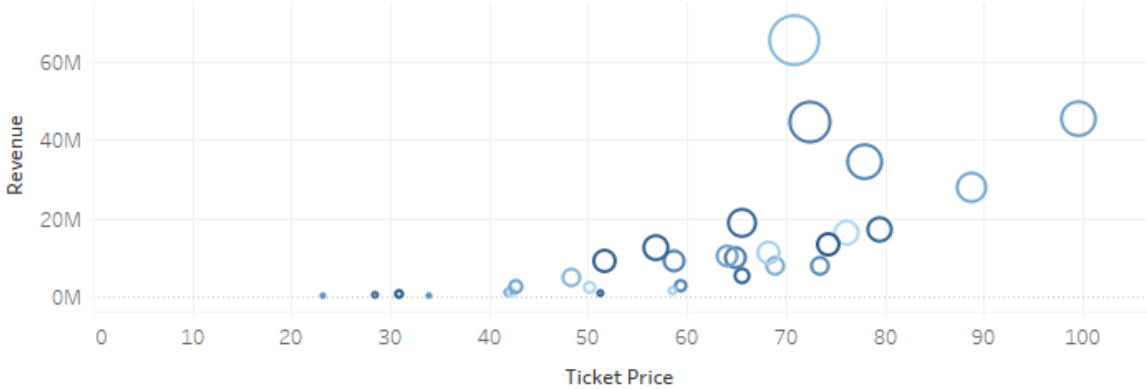
Average Delay

72.77

Total Revenue

\$382.38M

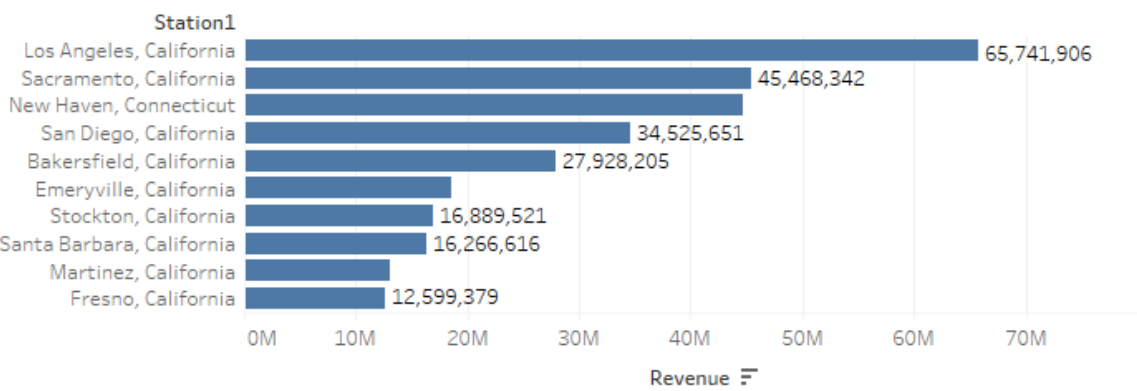
Ticket Price Vs Revenue



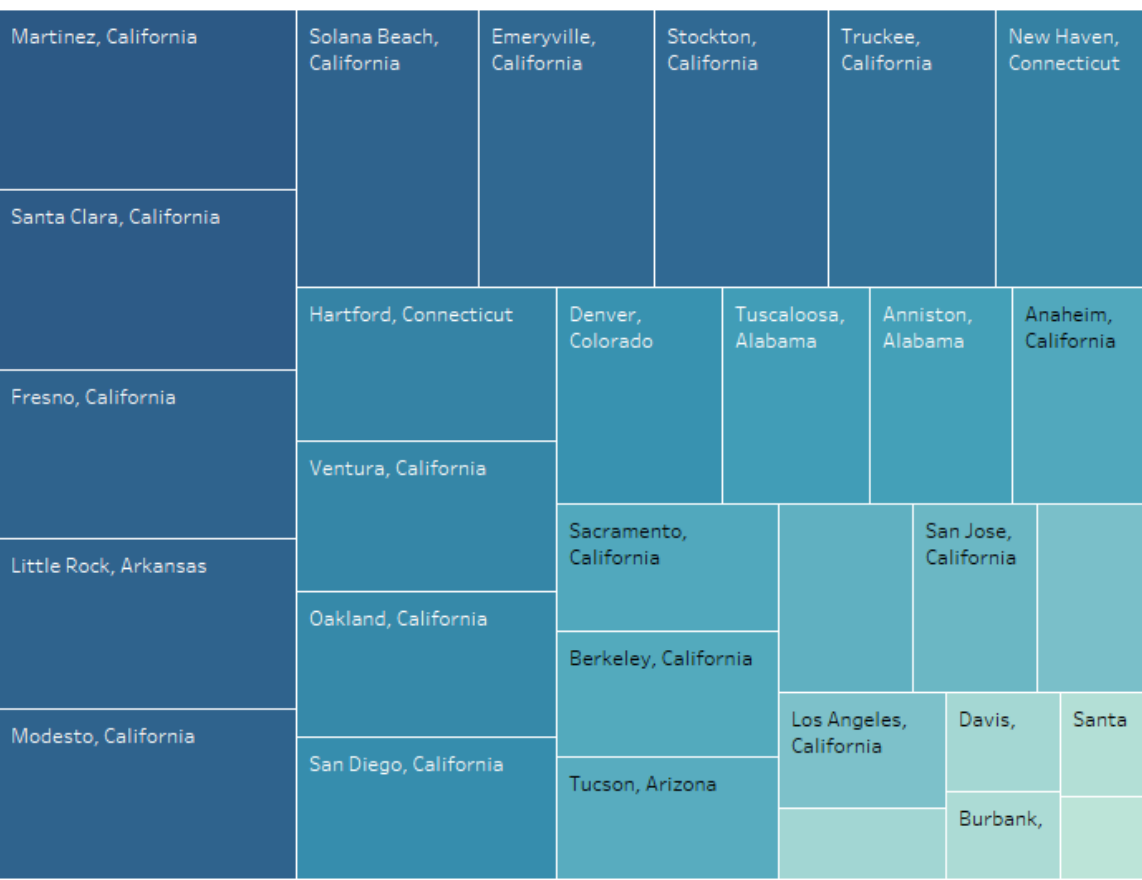
Delay Minutes



Top 10 Generating Revenue Stations



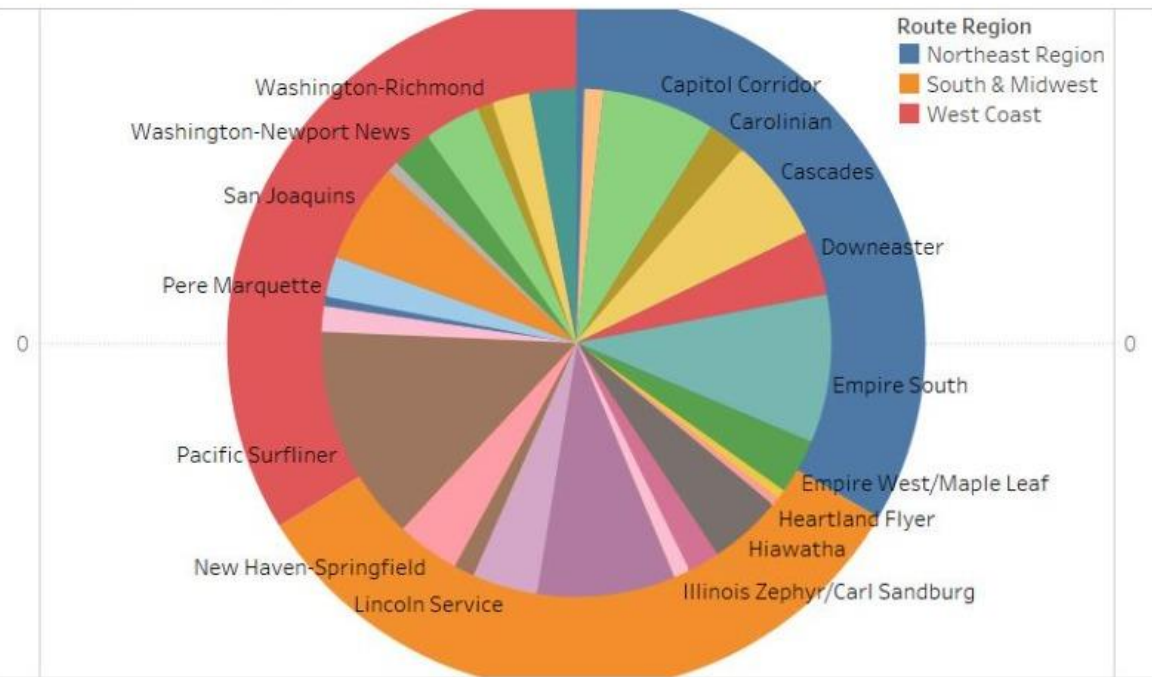
Delays By Station



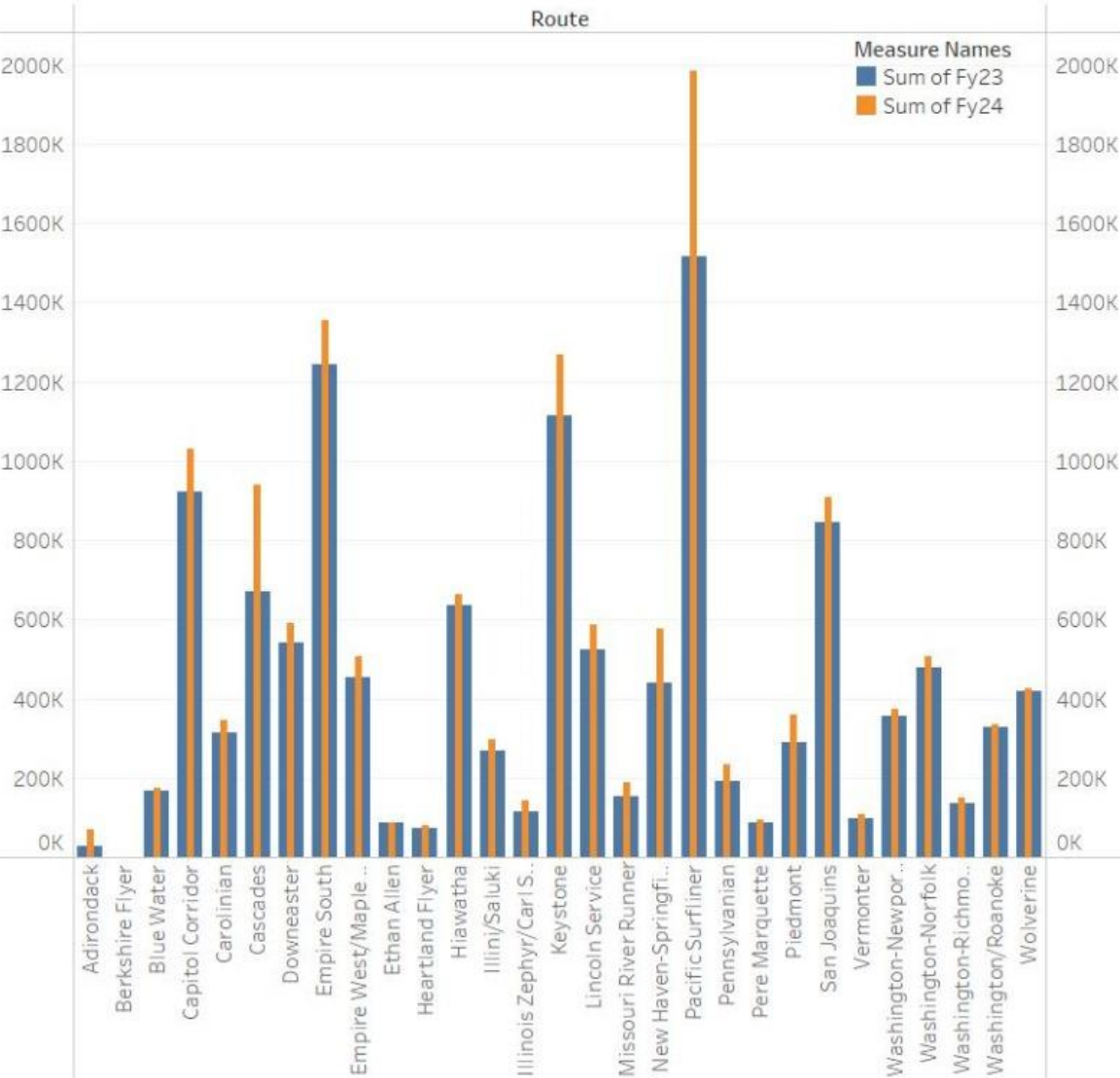
Top 10 Routes by FY24 Ridership



Share of Ridership by Region

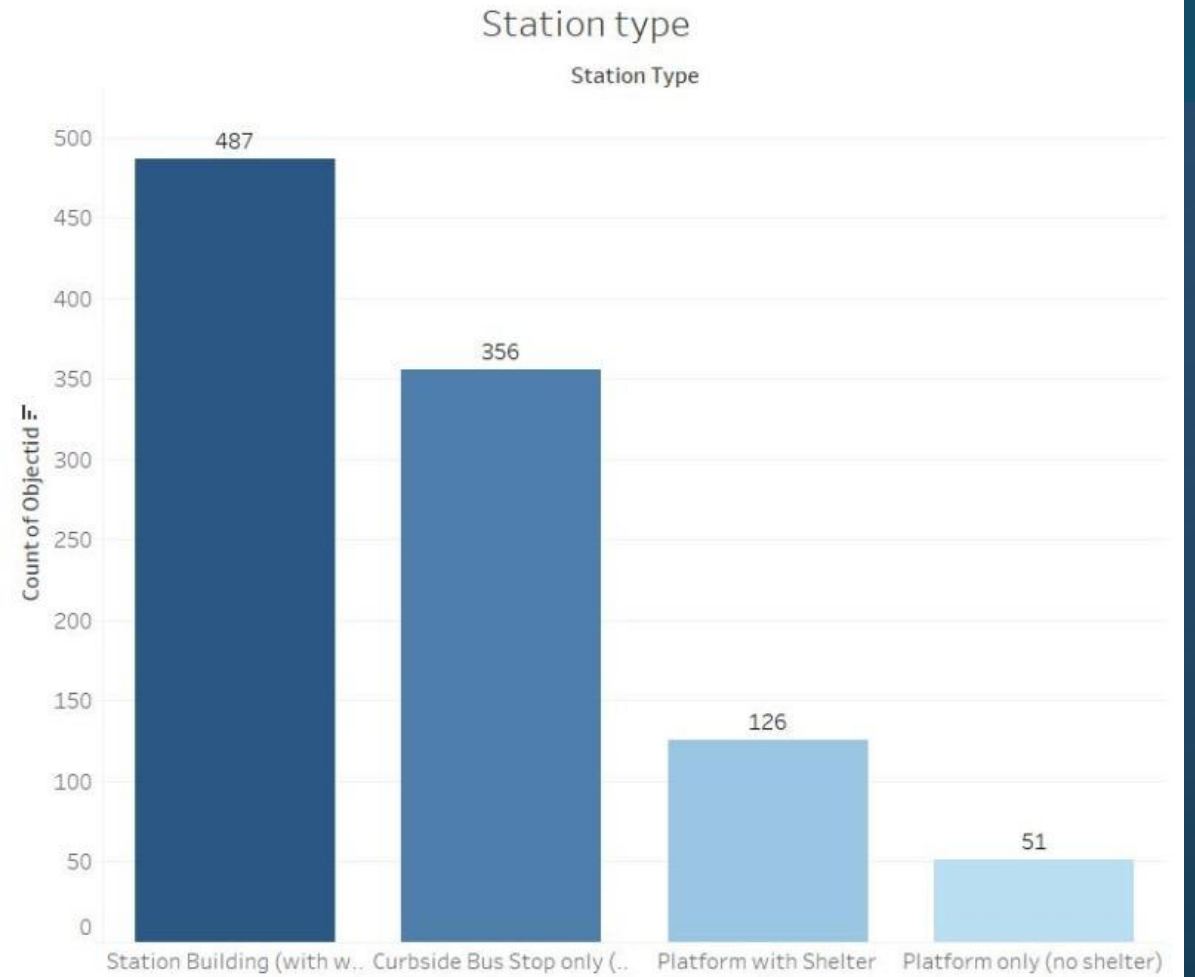
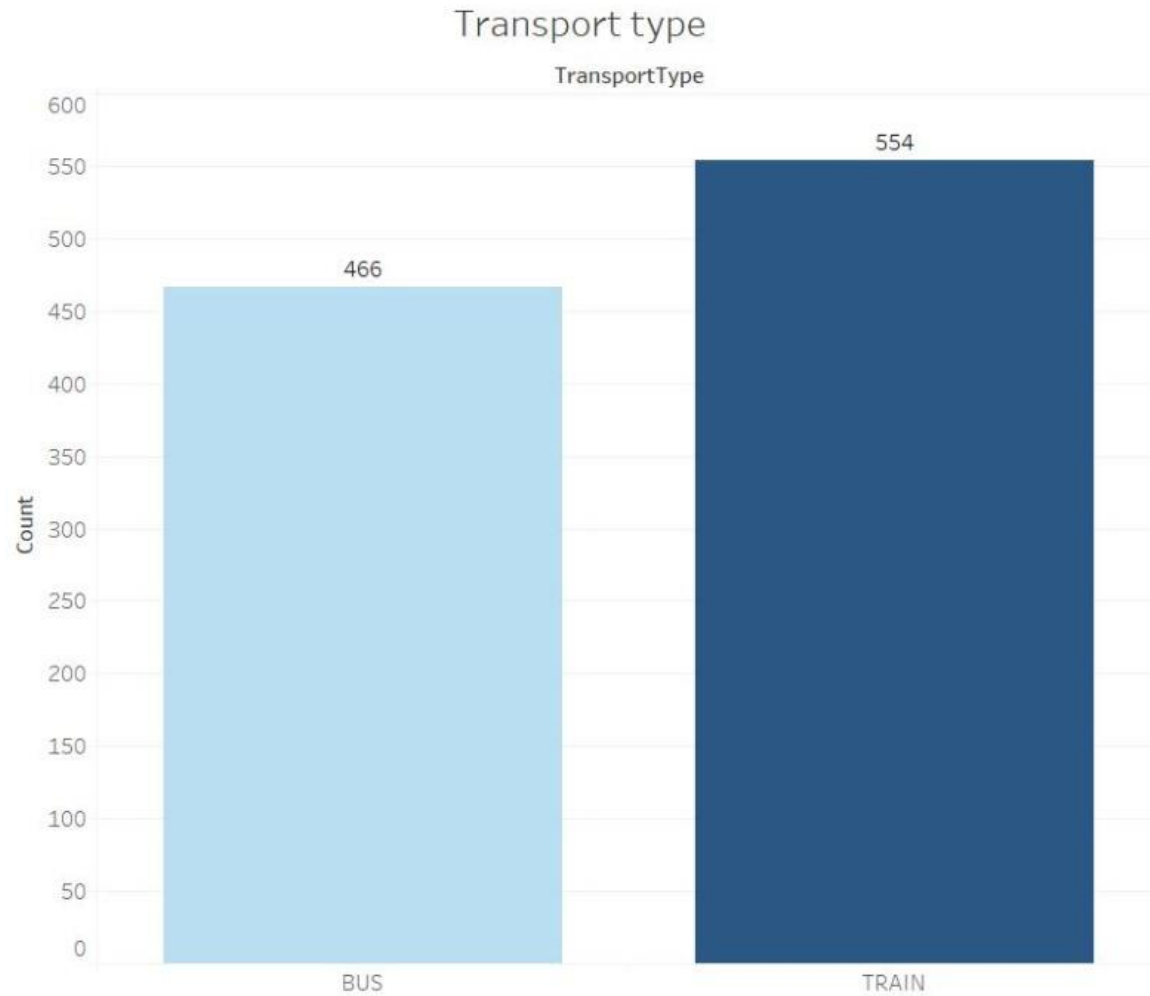


Year-over-Year Change



Station Type and Type of Transport

State
All



RiderShip Details

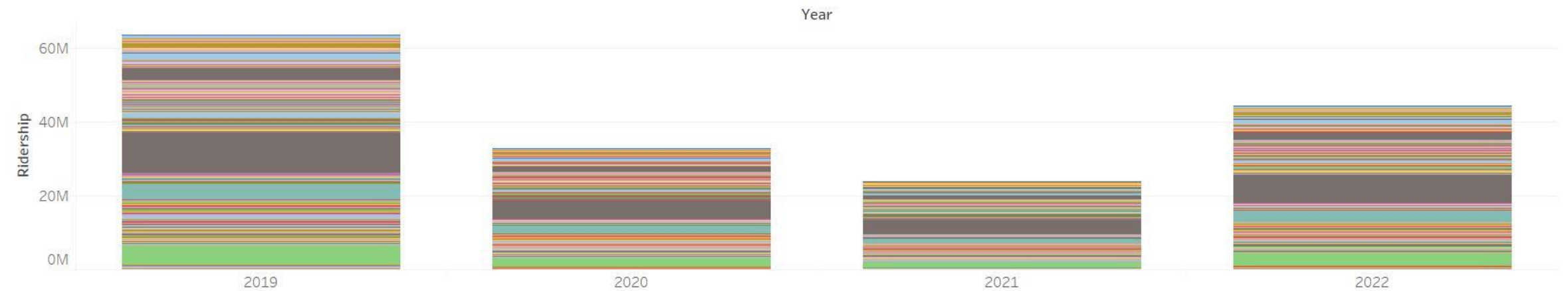
Station
All

Year
2020

Station Ridership in 2022



Station Ridership Over Time



BI Impact – Key Findings

Predictive analytics
helps reduce **train**
delays

Dynamic pricing
strategies **increase**
revenue

Targeted marketing
enhances **customer**
satisfaction

Real-time
dashboards support
better decision-
making

Conclusion & Q&A

Reiterating Project Value

Demonstrated the impact of Business Intelligence on ridership trends, revenue, and customer satisfaction

Key Takeaway

BI is a vital driver of Amtrak's growth, efficiency, and smarter decision-making

 **Questions?**

Happy to answer any questions you may
have

 **Thank You!**