



Optimizing Amtrak's Efficiency through Business Intelligence

Teammates

- Manohar Bathina
- Bhavya Polepalli
- Priyadarshini Maddela
- Saranraj Keerthivasan Rani

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

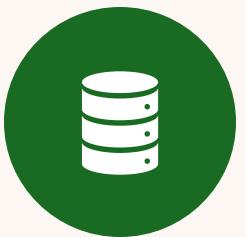
Data Sources & Frequency

- 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 2022)
- Ranked from highest to lowest based on the number of passengers

Top Routes :

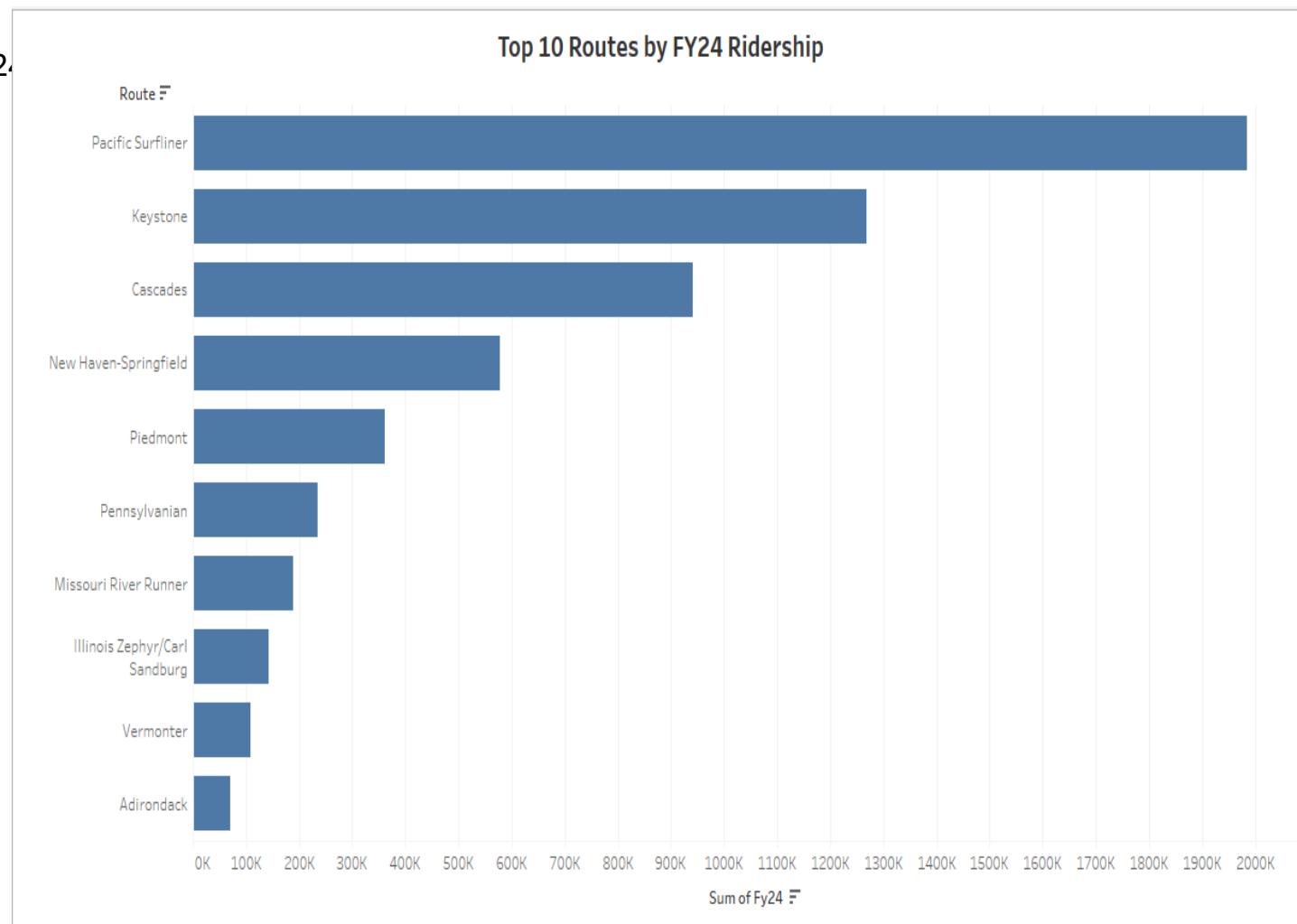
- **Pacific Surfliner:** ~2 million riders (highest)
- **Keystone:** ~1.2 million riders
- **Cascades:** Just under 1 million riders

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

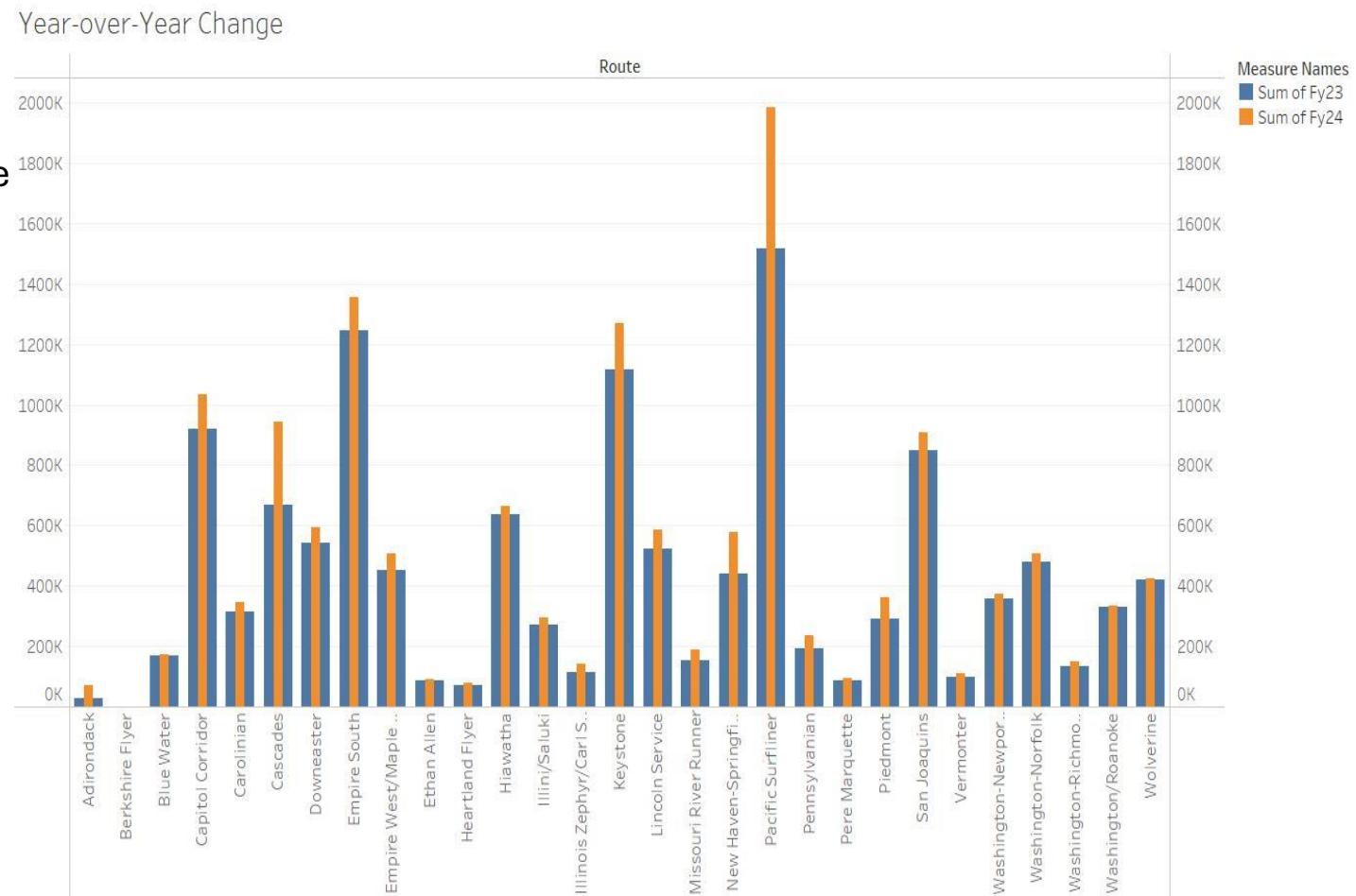
These mid-performing routes showed strong gains and are now among the higher-ridership routes.

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.



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

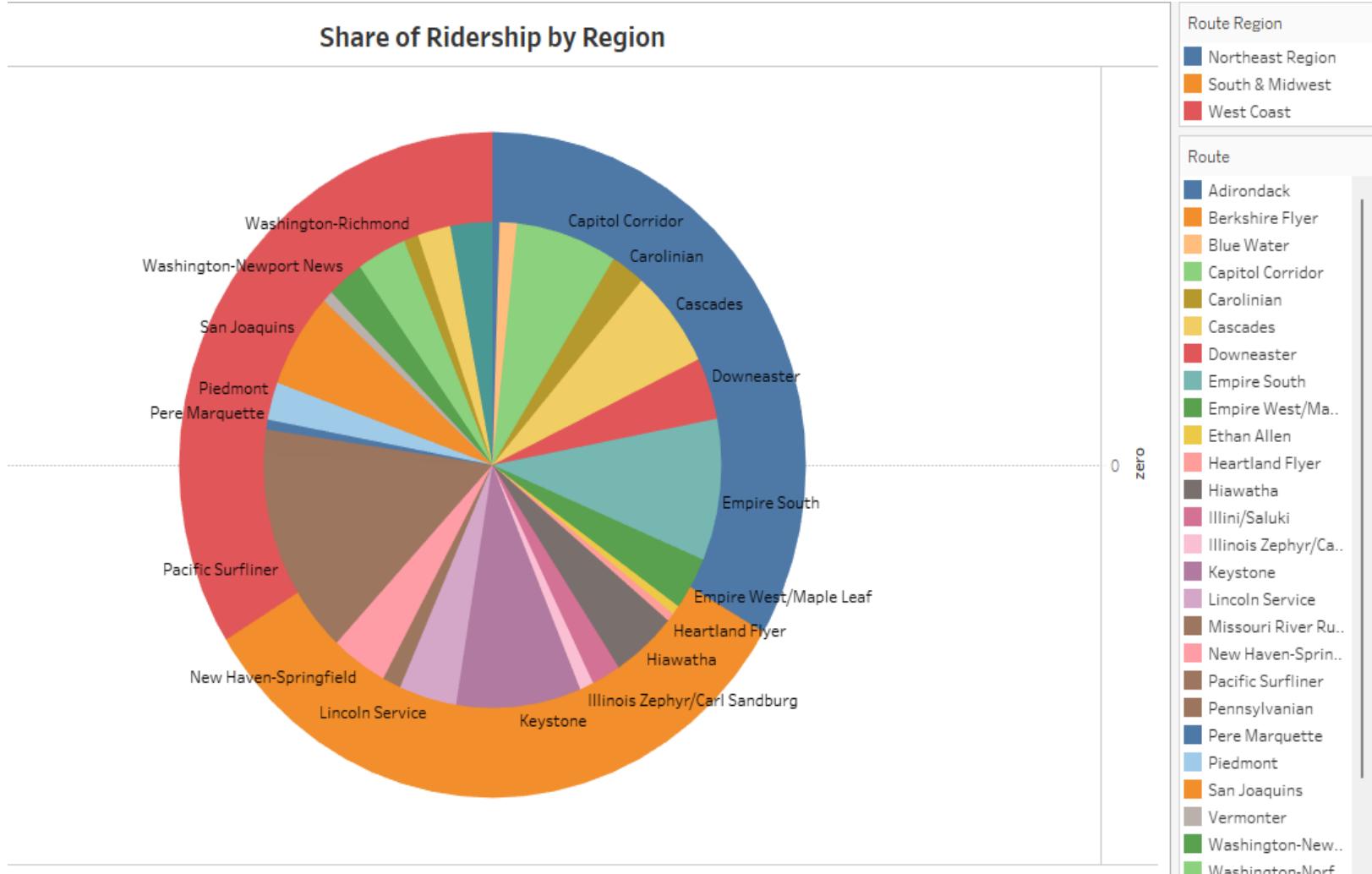
- Largest segments:
- Pacific Surfliner
- Lincoln Service
- Keystone

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

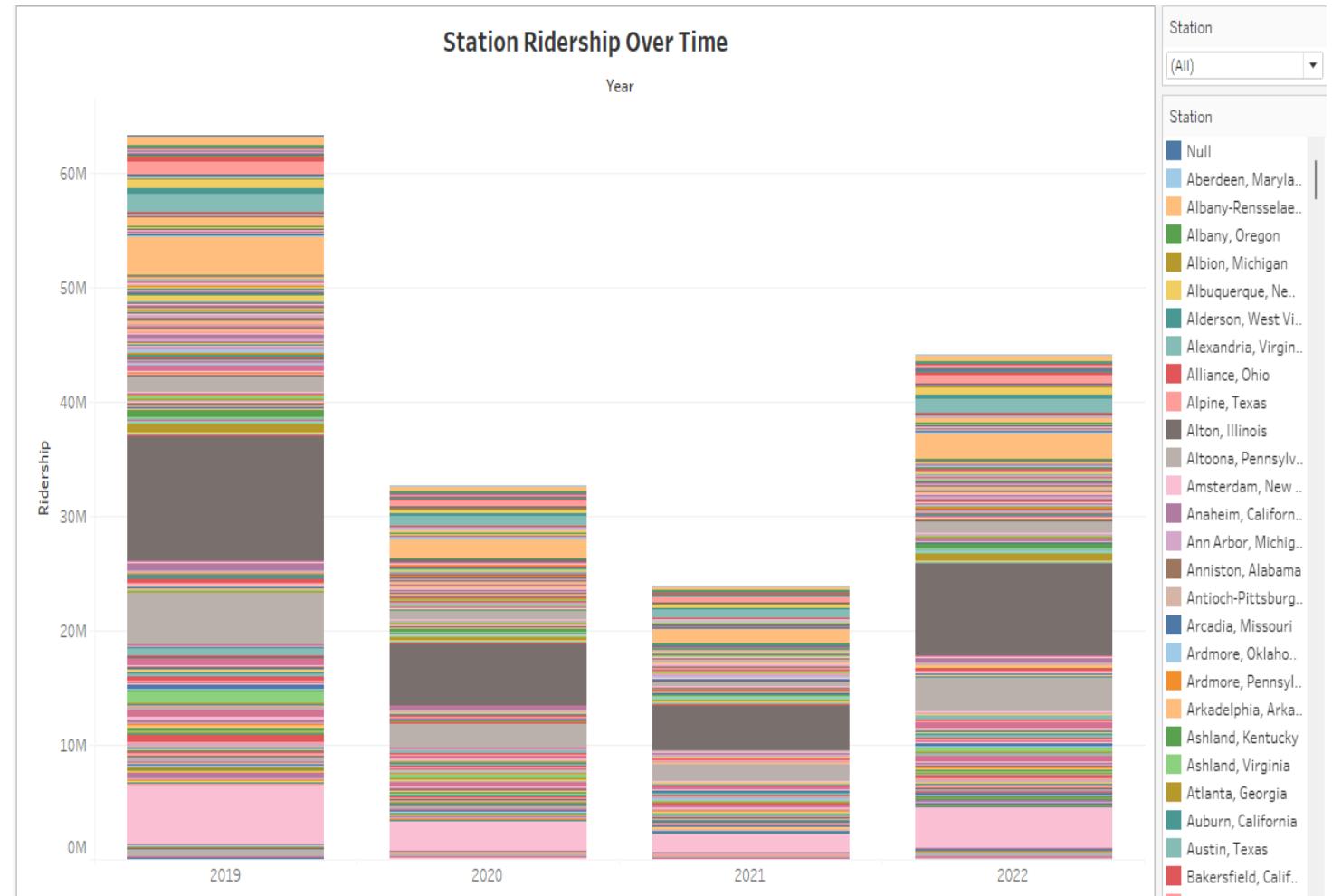
- Total bar height = overall annual ridership
 - Noticeable drop in 2020 and 2021, followed by partial recovery in 2022

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

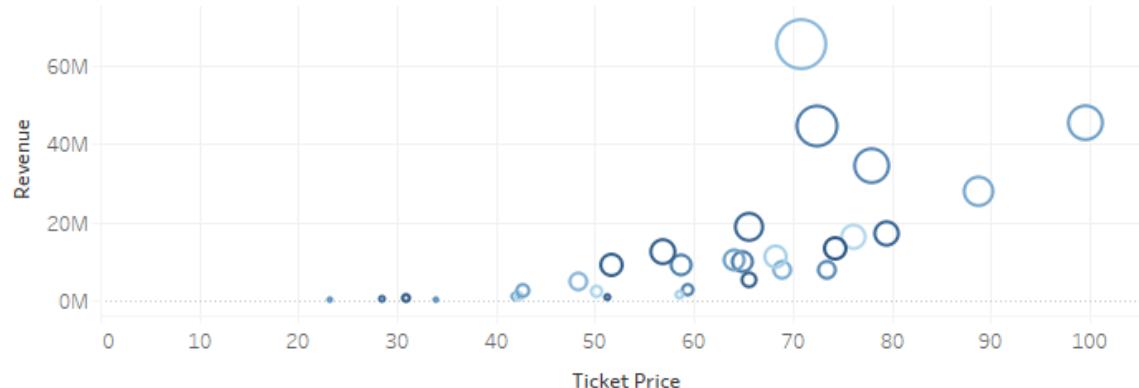


Dashboards

Amtrack Tracking Trends

Average Delay
72.77

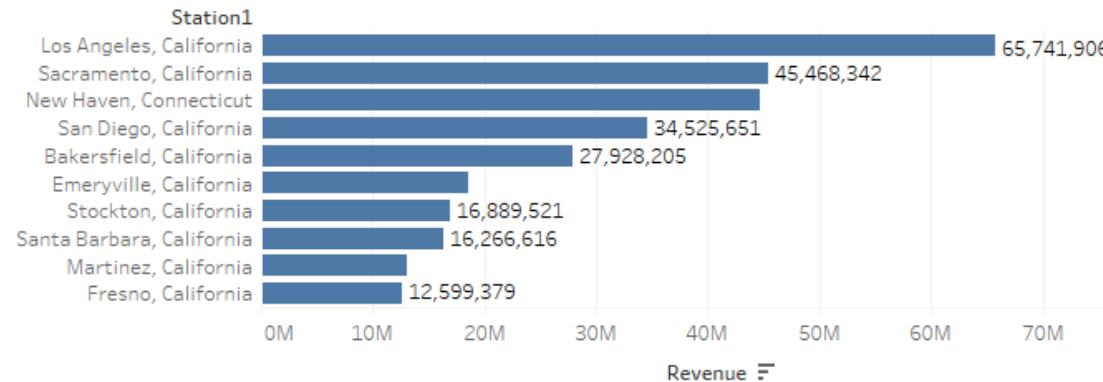
Ticket Price Vs Revenue



Delay Minutes

15 118

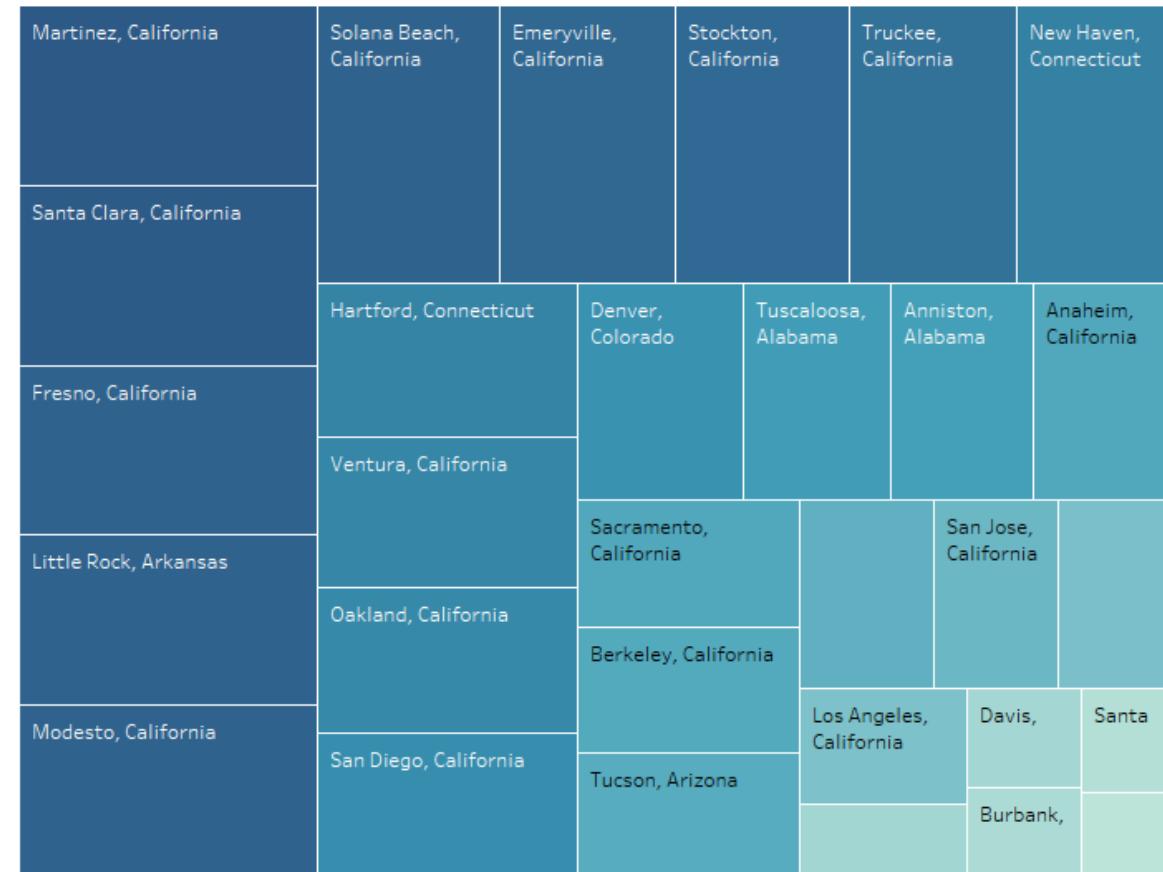
Top 10 Generating Revenue Stations



Total Revenue

\$382.38M

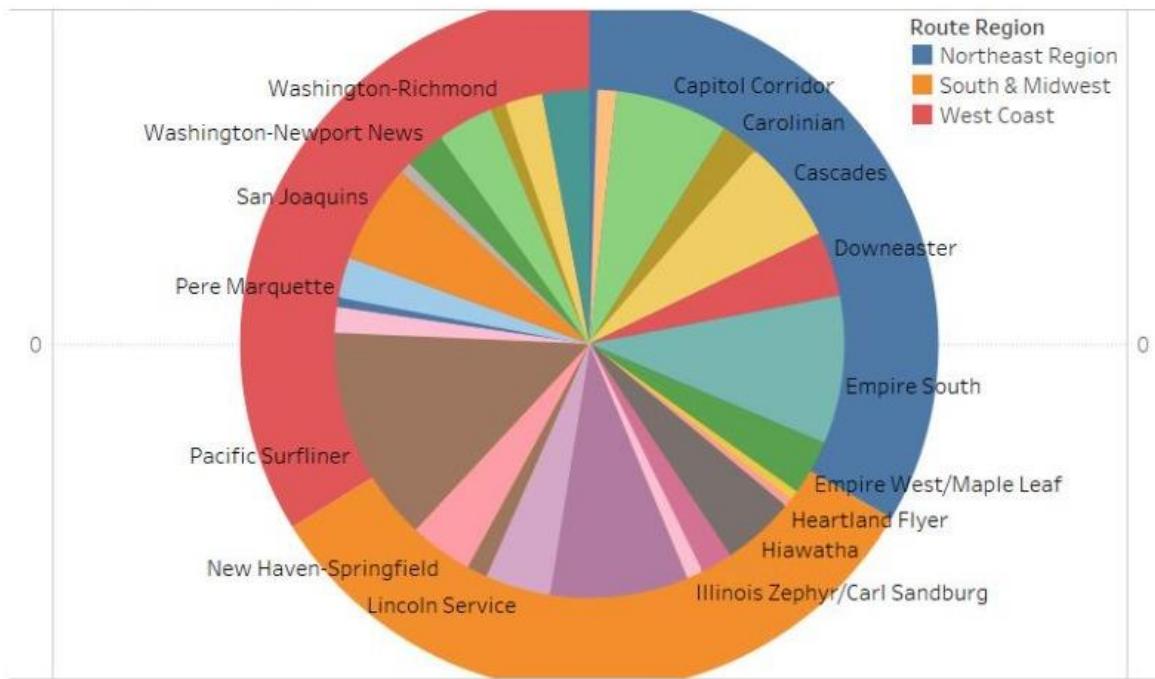
Delays By Station



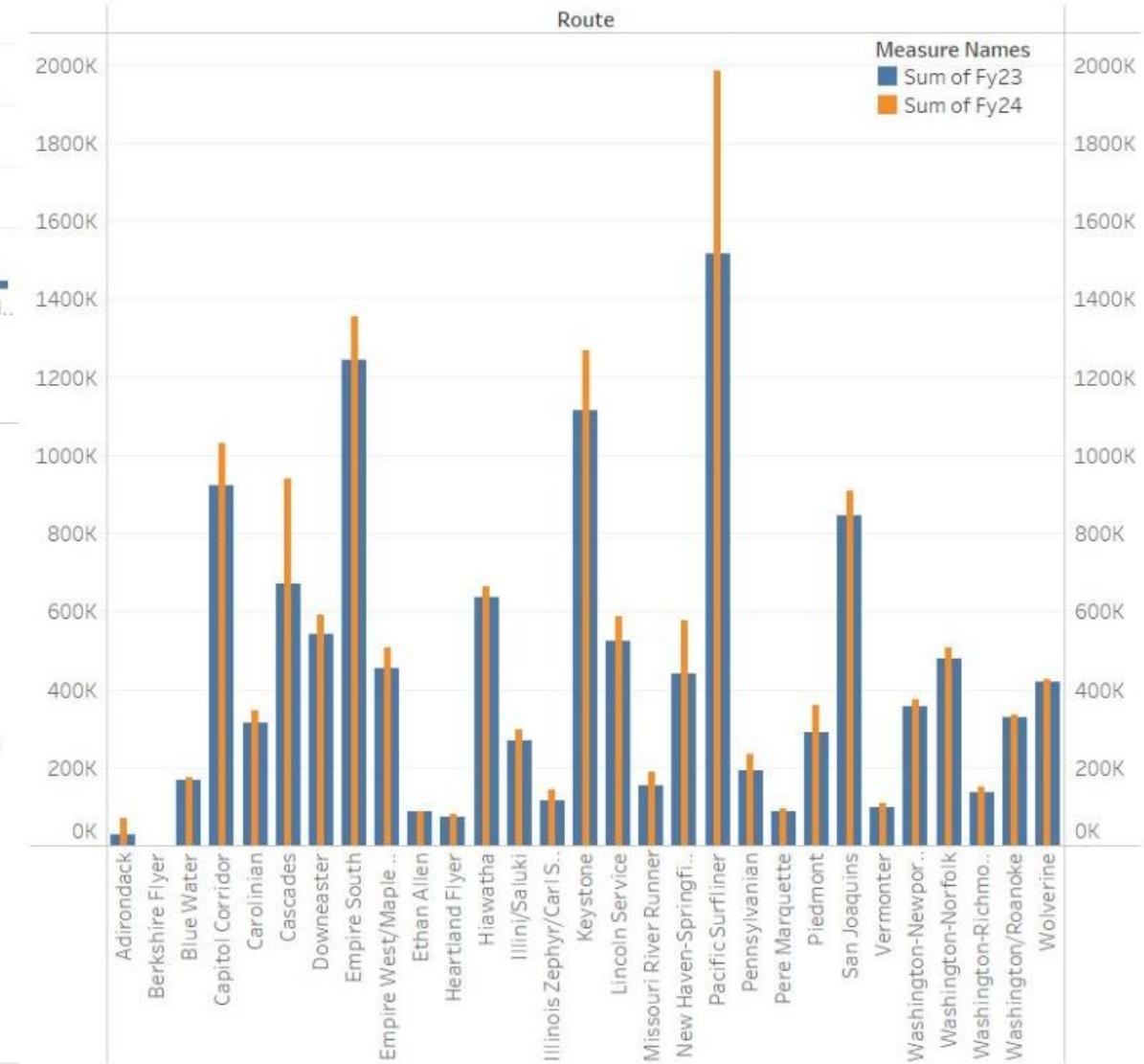
Top 10 Routes by FY24 Ridership



Share of Ridership by Region

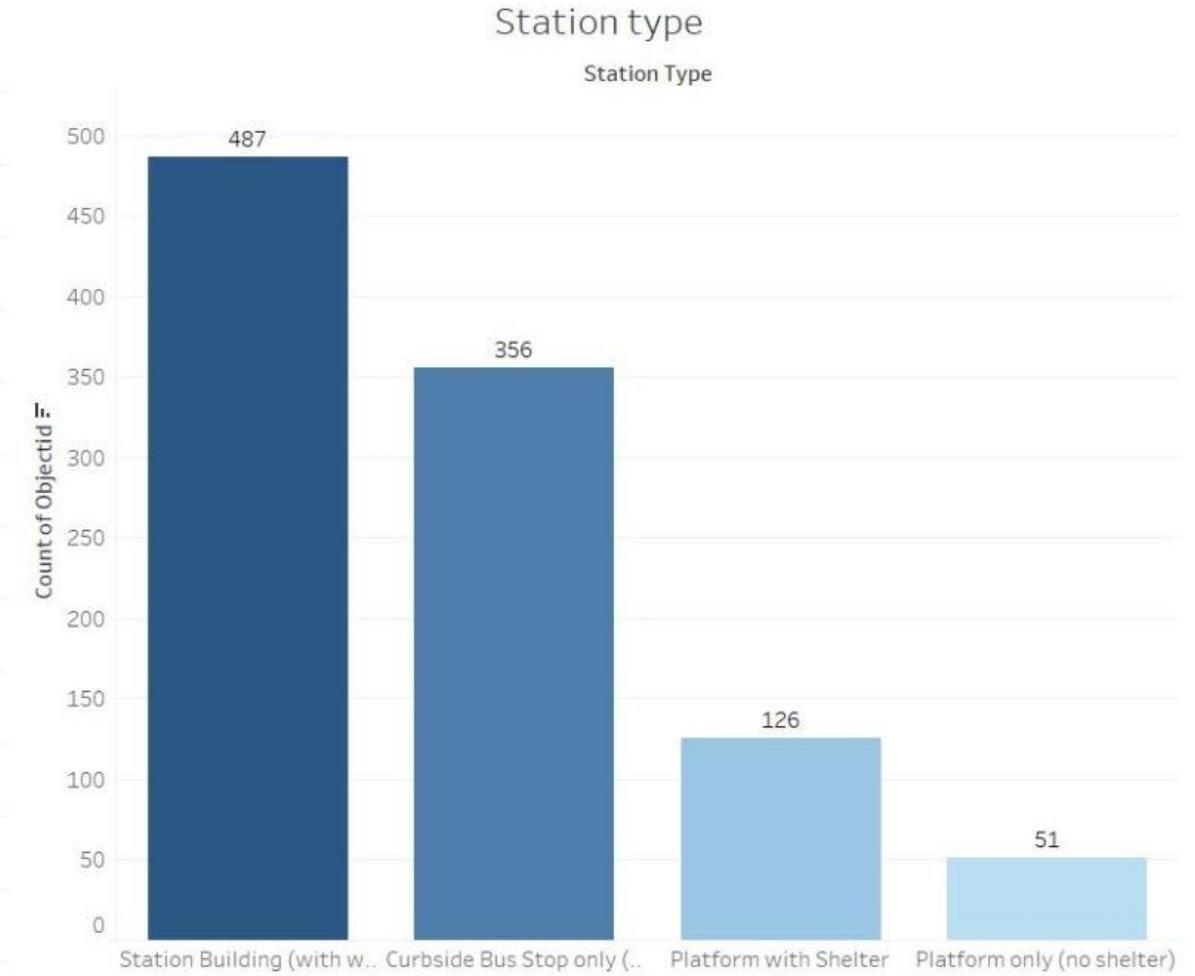
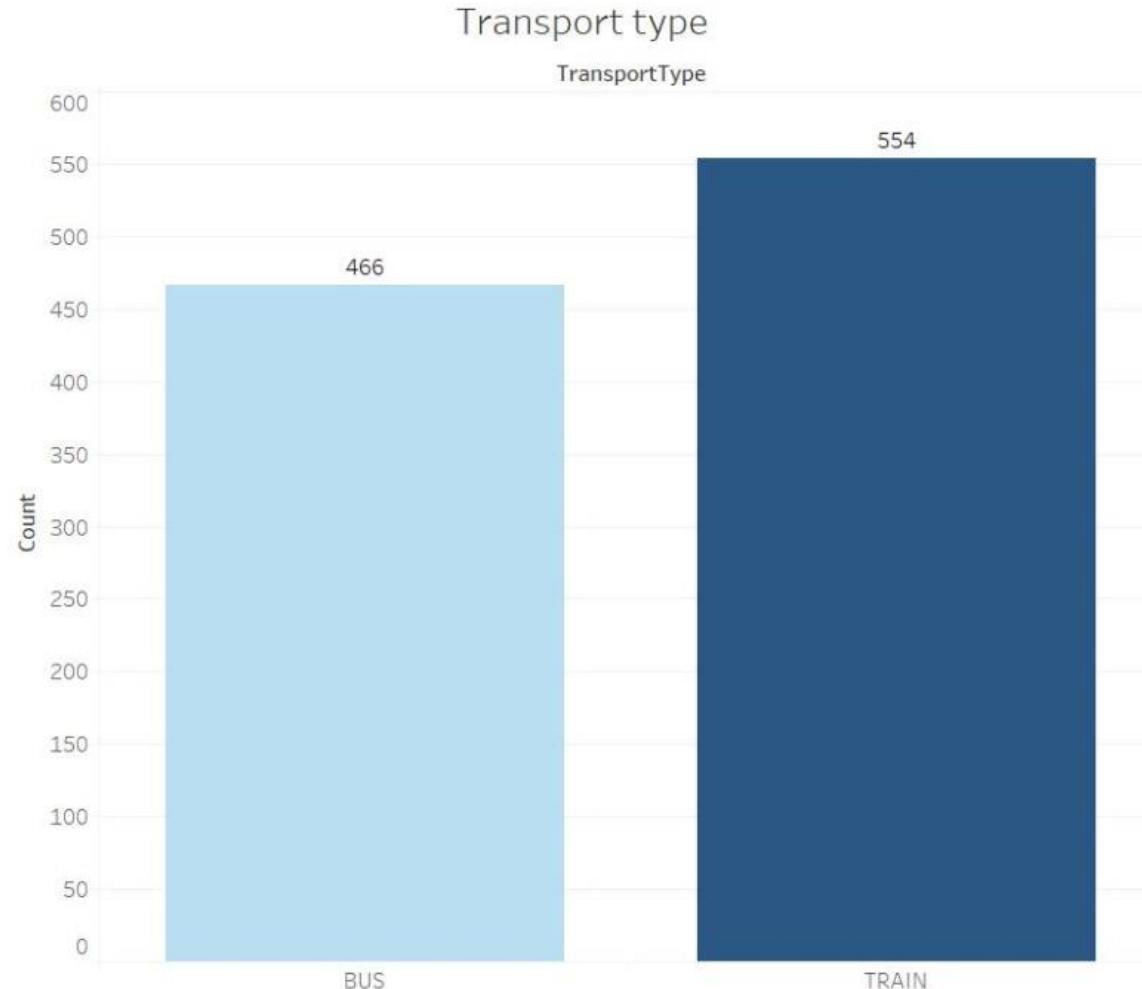


Year-over-Year Change



Station Type and Type of Transport

State
All



RiderShip Details

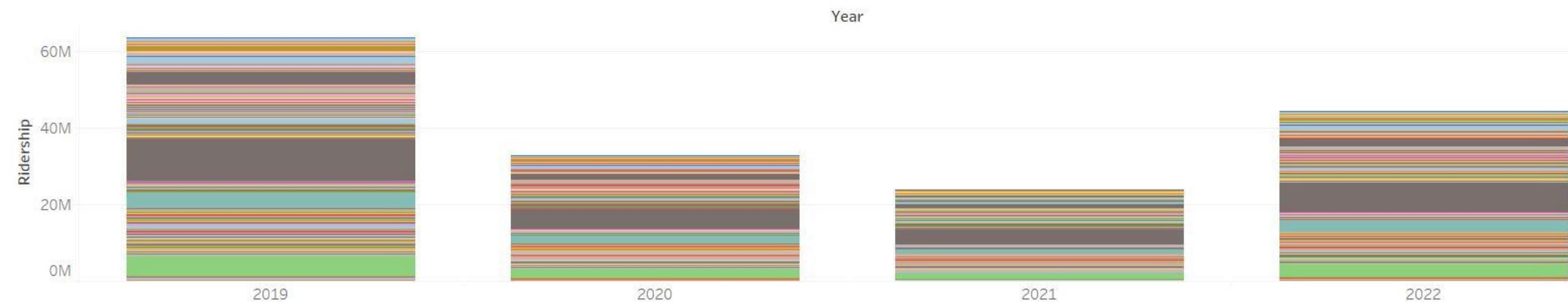
Station
All

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!