

# SOLUTIONS TO AIRLINE DELAYS

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PRESENTED BY

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# MEET THE TEAM



**Alfred Pirovits Jr**



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# AGENDA

- Executive Summary
- Acquired Data
- Exploratory Analysis
- Modeling
- Recommendations
- Conclusion

# EXECUTIVE SUMMARY

**PROBLEM :** Delays cost over \$1 Billion per year in 2022

**GOAL :** Provide proactive solutions to airlines

## PROCESS

- Acquire Data
- Two Datasets

## INSIGHTS

- Seasonal Trends
- General Trends
- Historical Trends

## RESULTS

- Model Performance
- Summary

# WHERE THE DATA CAME FROM



U.S. Department of Transportation

- 11 Years of Flight Data
- 63,000,000 Rows
- 28 Columns

- 114,000 Weekly Flights
- 290 Airports
- 19 Airlines

# HOW WE PREPARED THE DATA

## EXPLORATORY DATA

- 4 Major Airlines
  - UA, DL, AA, SW
- Remove non-delays
- Filter by 15 Airports of Origin
- New Feature (column)
  - Total Delays

# HOW WE PREPARED THE DATA

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- 4 Major Airlines
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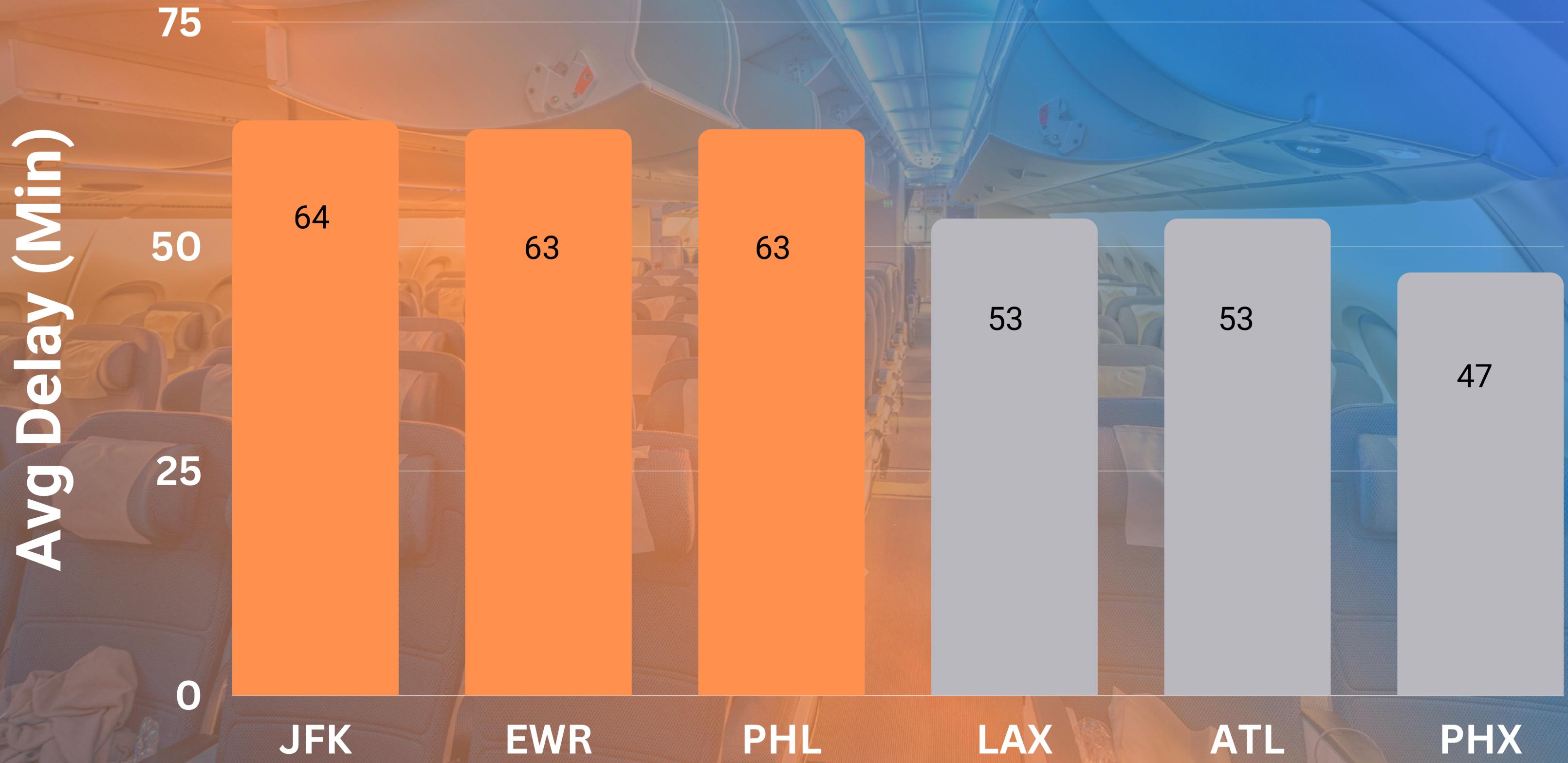
## TIME SERIES DATA

- Grouped Data by Day
- Calculated Daily Average
- Reduced to One Feature

# A LOOK AT FLIGHT FREQUENCY BY AIRPORT



# DO MORE FLIGHTS MEAN LONGER DELAYS?



# A LOOK AT FLIGHT FREQUENCY BY AIRLINE

United

DFW

SFO

73,679

Delta

EWR

ATL

259,761

American

EWR

CLT

296,076

Southwest

EWR

PHX

101,461

0

100,000

200,000

300,000

Flight Count

# DO MORE FLIGHTS MEAN LONGER DELAYS?

United

DFW

SFO

Delta

EWR

ATL

American

EWR

CLT

Southwest

EWR

PHX

0

25

50

75

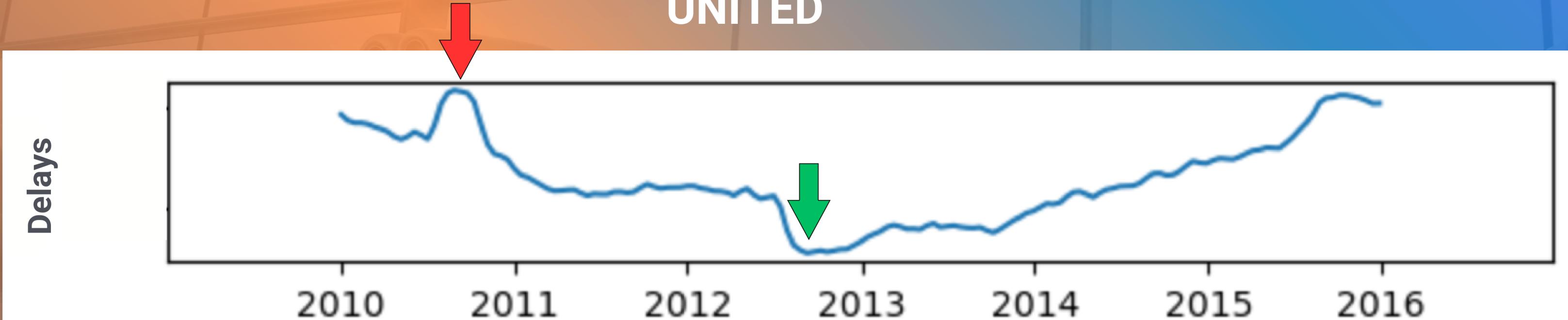
Avg Delay (Min)

← 18 MINUTE →

# MODEL TRENDS

Airline Safety and Federal Aviation Administration Extension Act of 2010

UNITED

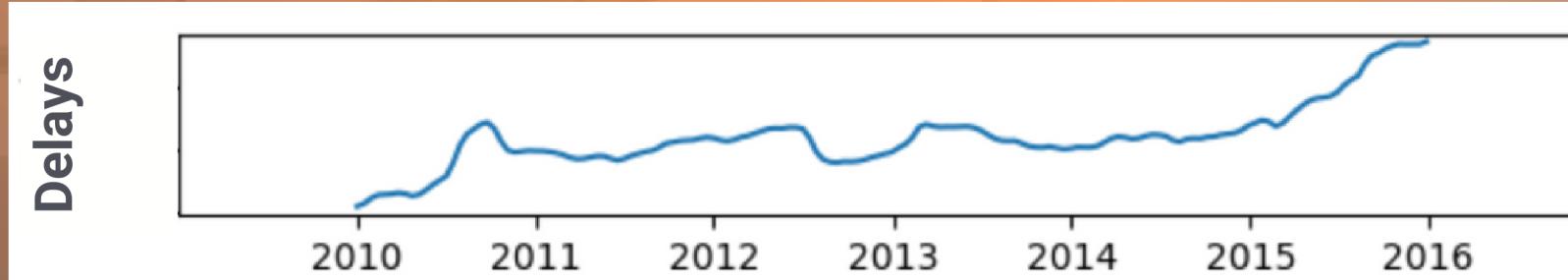


Record Breaking Low Delays

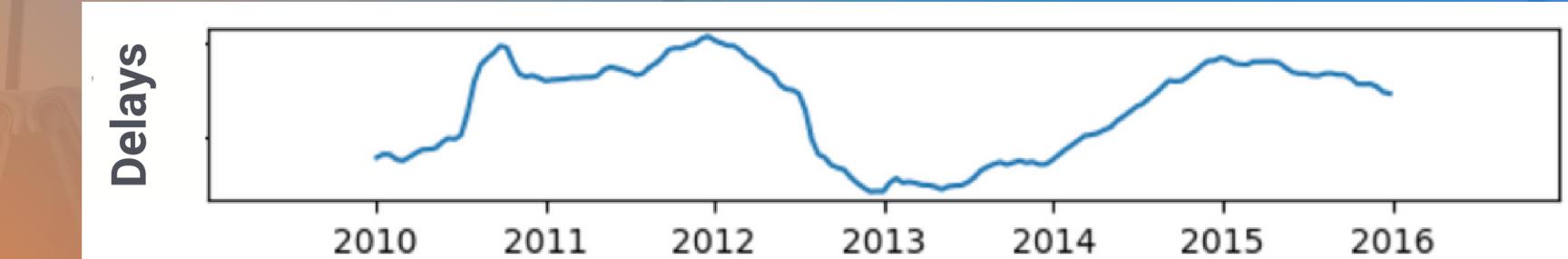
# MODEL TRENDS

Airlines Have the Same Underlying Trends

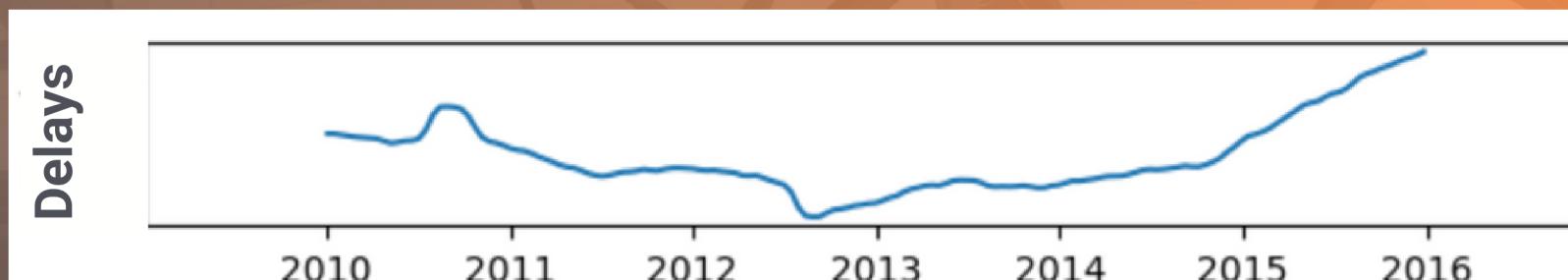
AMERICAN



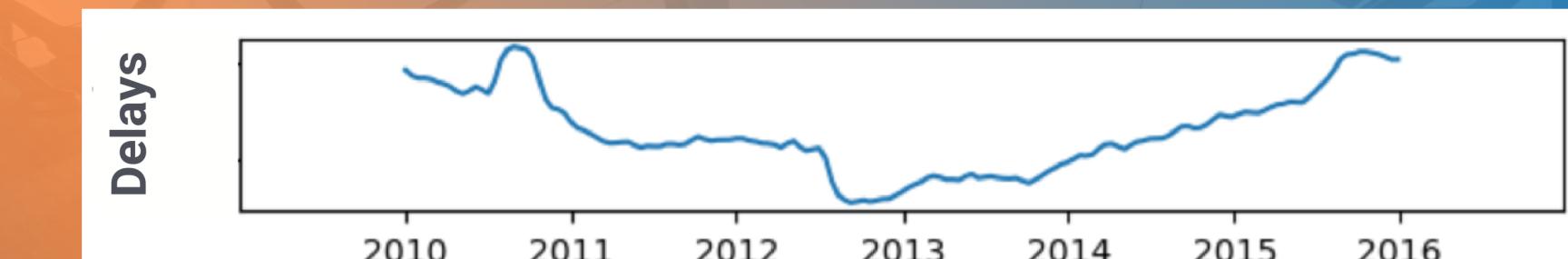
DELTA



SOUTHWEST



UNITED



# SEASONAL TRENDS ARE CONSISTENT

AMERICAN

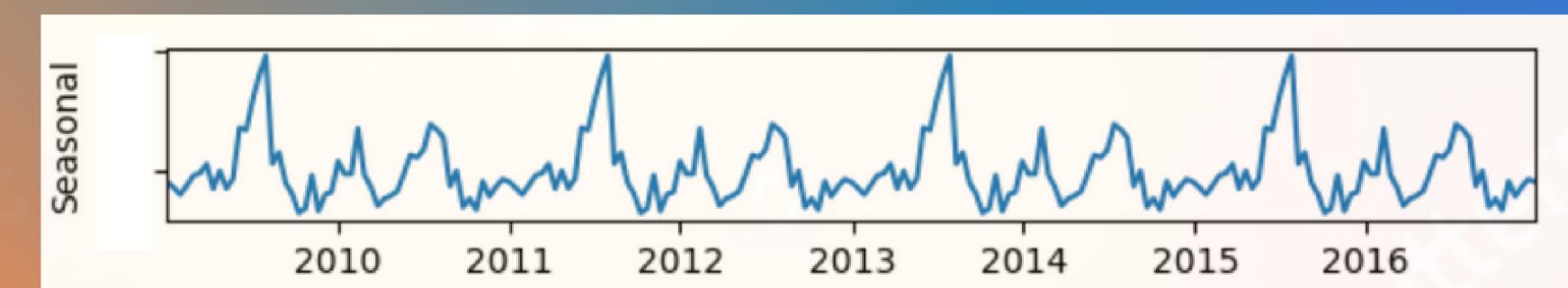


# PERIODS CONSISTENT ACROSS THE INDUSTRY

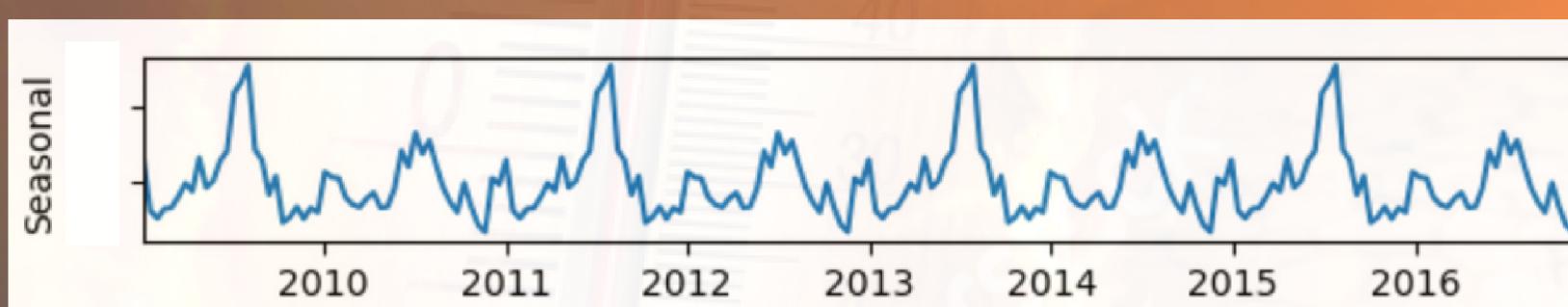
AMERICAN



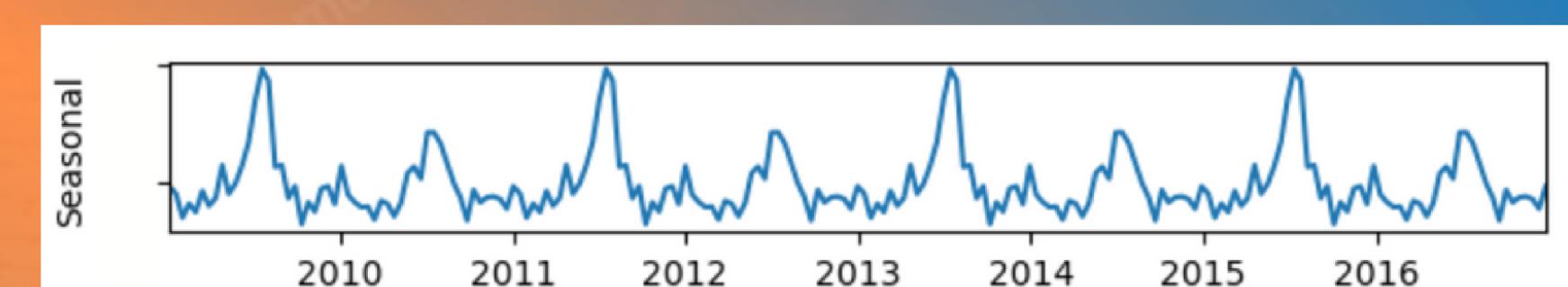
DELTA



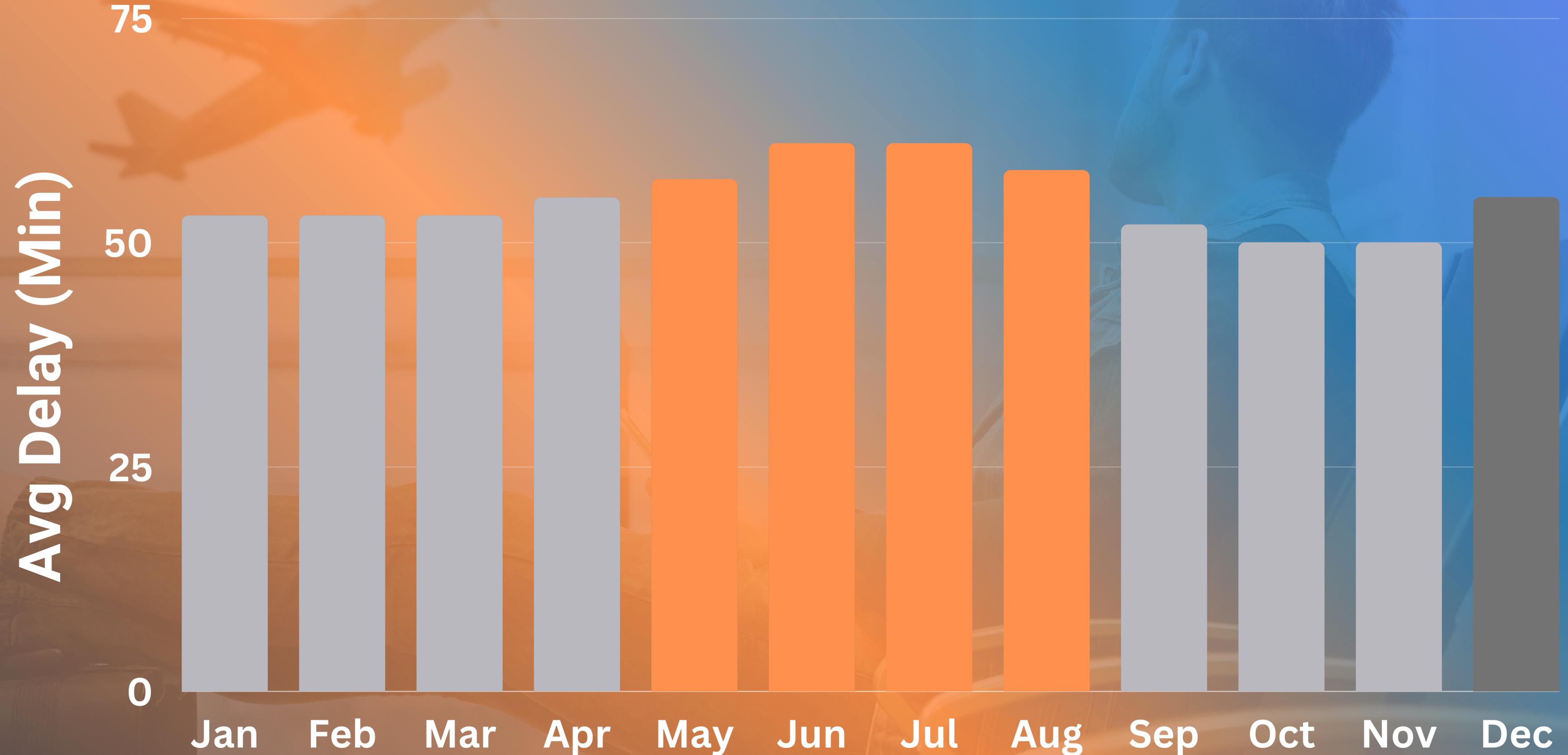
SOUTHWEST



UNITED



# SEASONAL DELAY



# WHAT CAUSES SUMMER DELAYS?

HOT AIR  
PERFORMANCE



# WHAT CAUSES SUMMER DELAYS?

HOT AIR  
PERFORMANCE



PEAK TRAVEL  
SEASON



# WHAT CAUSES SUMMER DELAYS?

HOT AIR  
PERFORMANCE



PEAK TRAVEL  
SEASON



FLIGHTLINE  
CONDITIONS



# WHAT CAUSES SUMMER DELAYS?

HOT AIR  
PERFORMANCE



PEAK TRAVEL  
SEASON



FLIGHTLINE  
CONDITIONS



CARGO CONTRACTS



# WHAT CAUSES SUMMER DELAYS?

HOT AIR  
PERFORMANCE



PEAK TRAVEL  
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FLIGHTLINE  
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OVERBOOKING



# RECOMMENDATIONS

## SUMMER ROUTES



- Takeoff times
- Summer Peak
- Cargo Contracts

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## PERSONNEL



- Breakrooms
- Air Conditioning
- Hydration

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## PERSONNEL



- Breakrooms
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## PASSENGERS



- Overbooking
- Delay Compensation
- Flight Incentives

# TO CONCLUDE

SEASONAL TRENDS



HISTORICAL EVENTS



SEASONAL DELAYS



# THANK YOU



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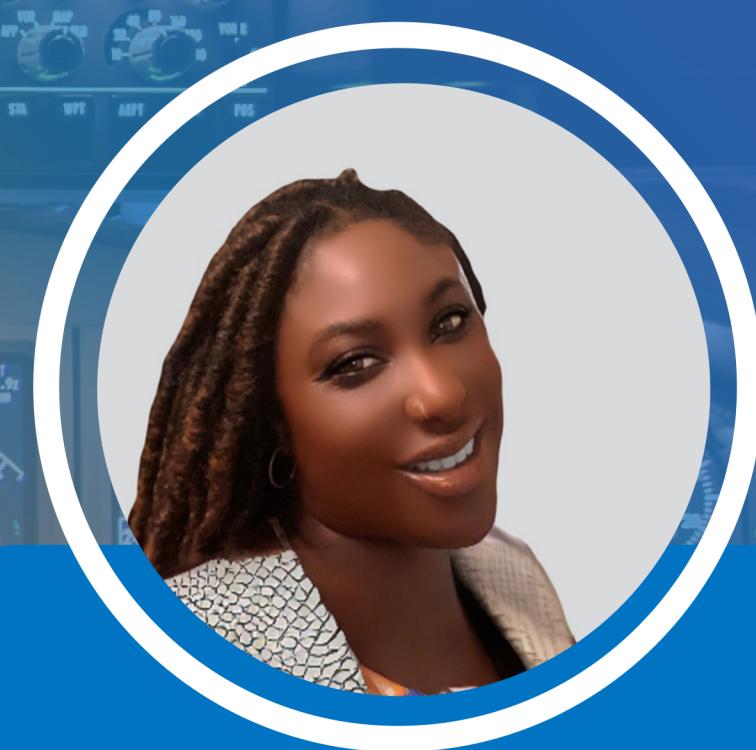
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