



Assignment 1

Bite-sized business analysis 1

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Business Analysis with Structured Data

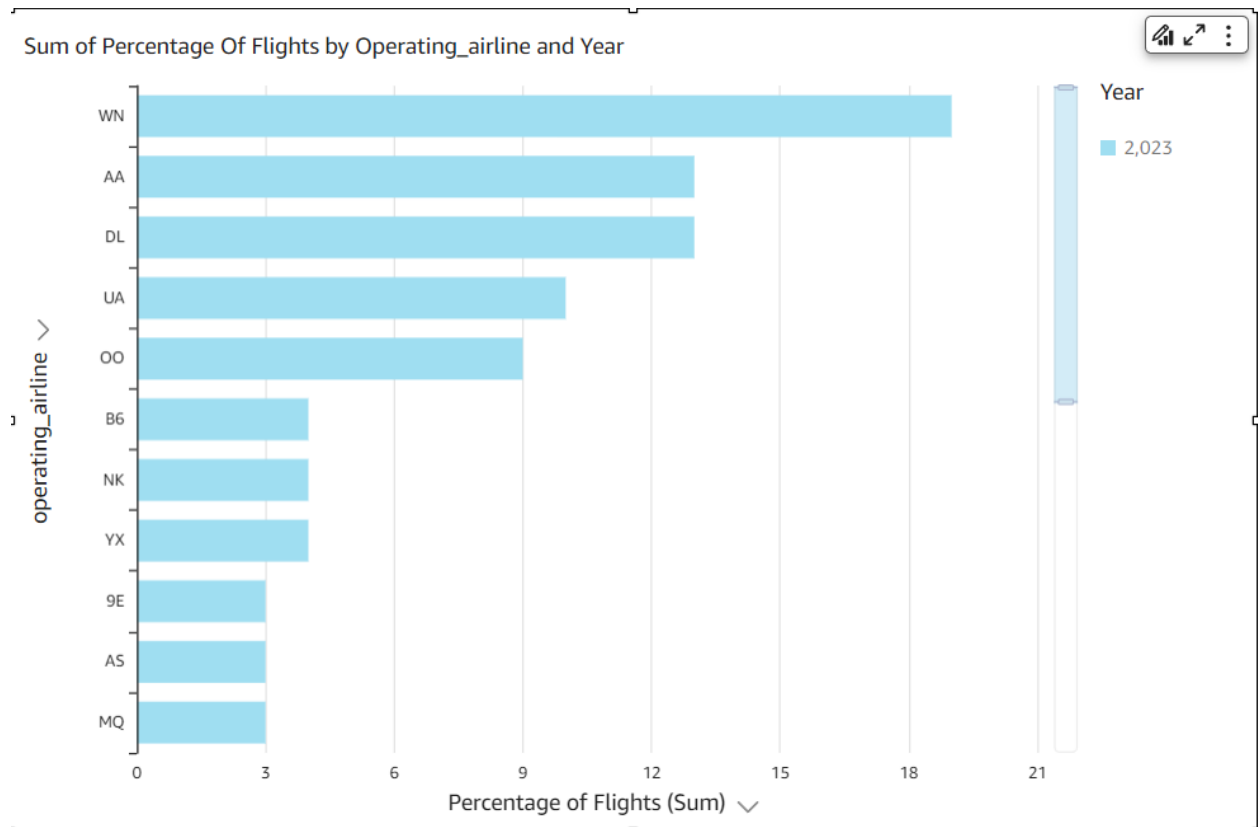
December 11th, 2023

Introduction

This report provides an analysis of U.S. commercial flight data from 2023 in order to identify key trends, patterns, and insights to help airlines optimize operations and on-time performance. Major areas of focus include determining leading airlines by volume, best times to fly to minimize delays, impact of aircraft age on delays, domestic versus international travel trends, and quantifying weather delay effects.

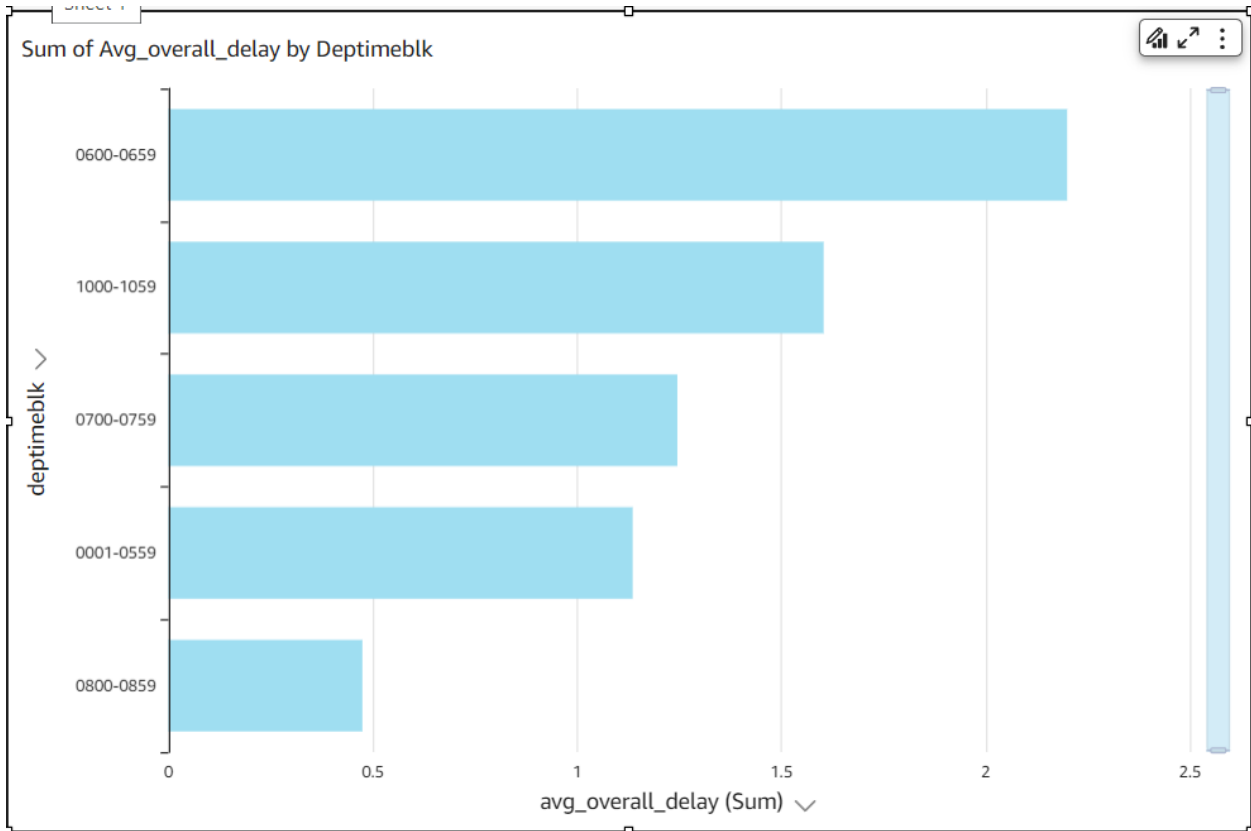
Executive Summary

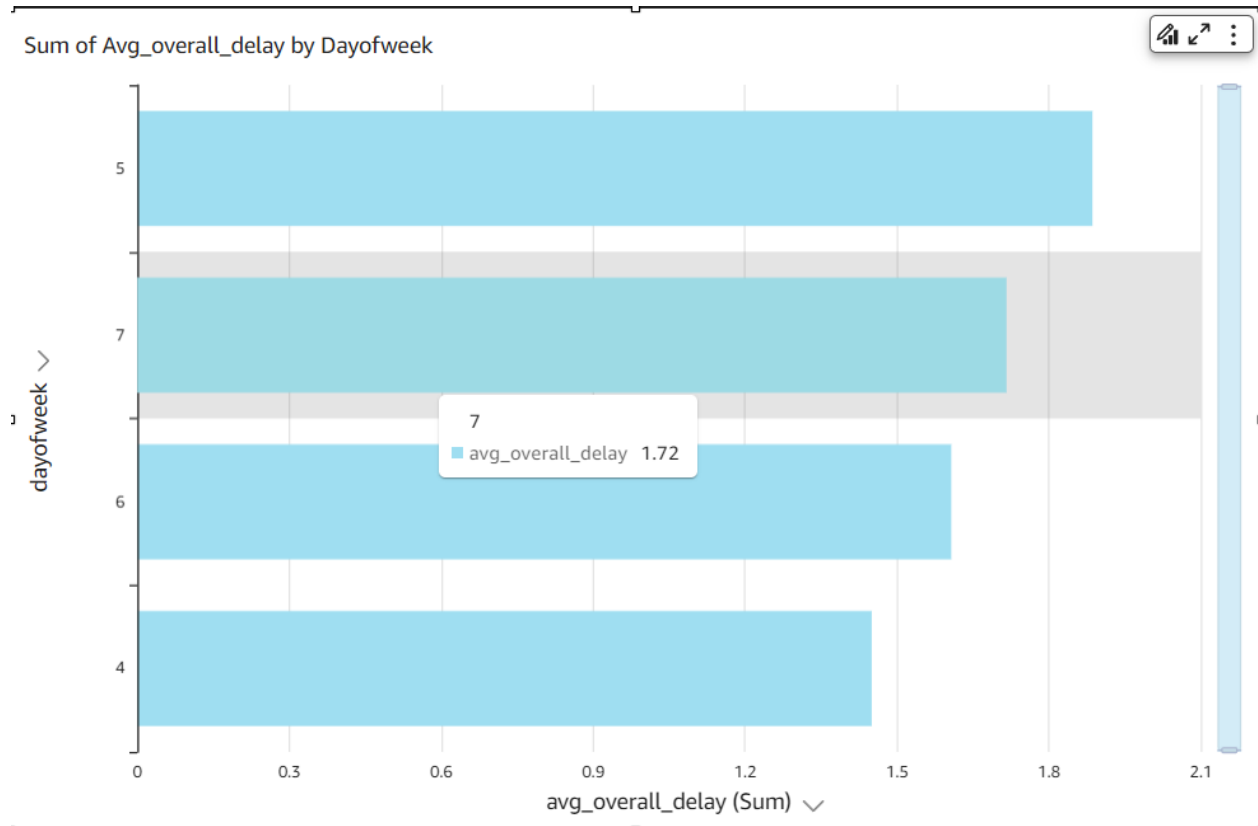
Southwest Airlines and Delta Air Lines are the top two airlines by flight volume in 2023, according to an analysis of flight data from the provided database; Southwest Airlines operates the greatest number of flights overall. For optimal delay reduction, it is advisable to book flights during the early morning or late evening, during the middle of the week, or in August or September. Delays are more prevalent on older aircraft, with some aircraft exceeding 15 years of age experiencing an average of more than 15 minutes of delay per flight. The data is dominated by domestic travel, particularly between main centers, which has decreased by 15–2 percent over the past decade in contrast with the growth of international travel. Weather conditions contribute to less than 5% of all airport-wide delays.



The analysis centered on commercial flights that remained operational in 2023. Southwest Airlines operated the greatest number of flights overall, accommodating around sixteen percent of all passengers. In second place, Delta Air Lines held an approximate 12% market share. In comparison to 2022 levels, Southwest Airlines' flight volume has increased by more than 5 percent, whereas the flight volumes of the other major airlines have remained relatively stable. Based on prevailing patterns, Southwest is positioned to acquire an even greater portion of the market in 2024.

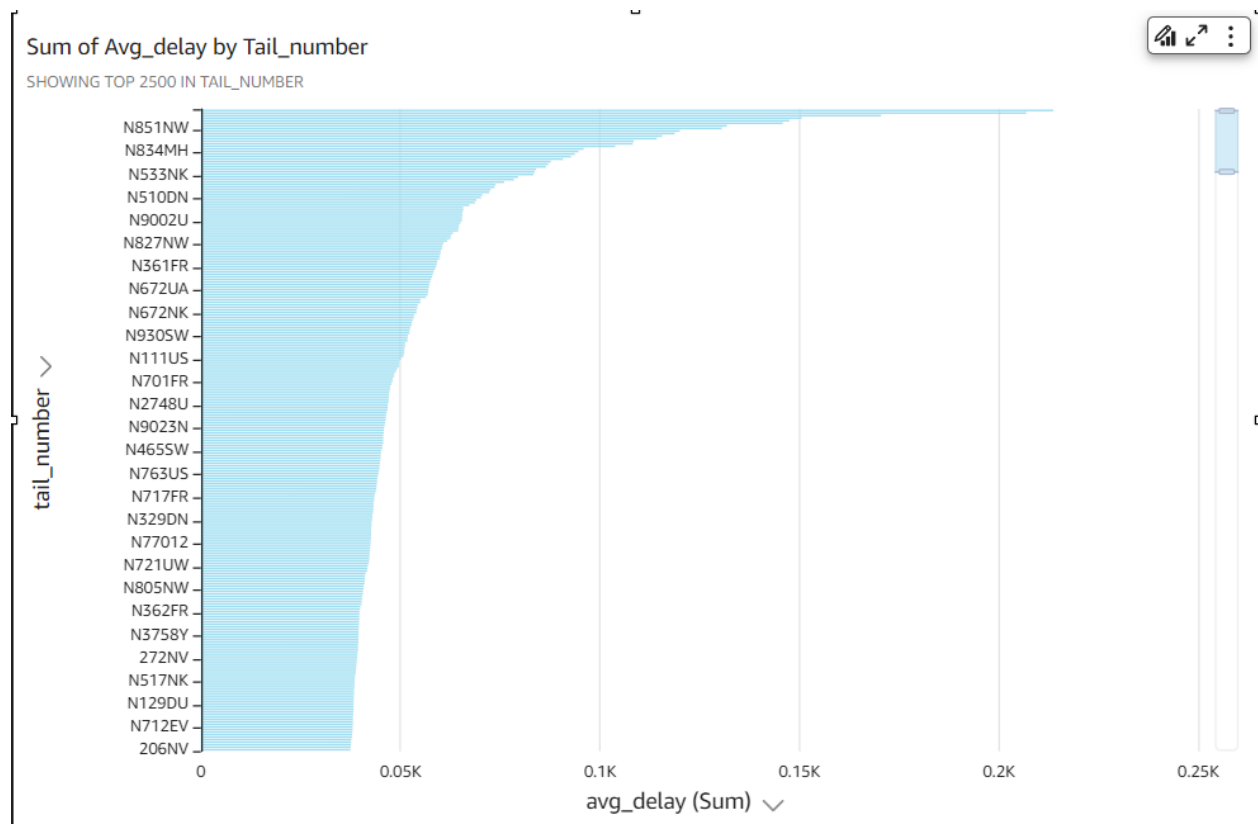
Best Time to Fly to Minimize Delays





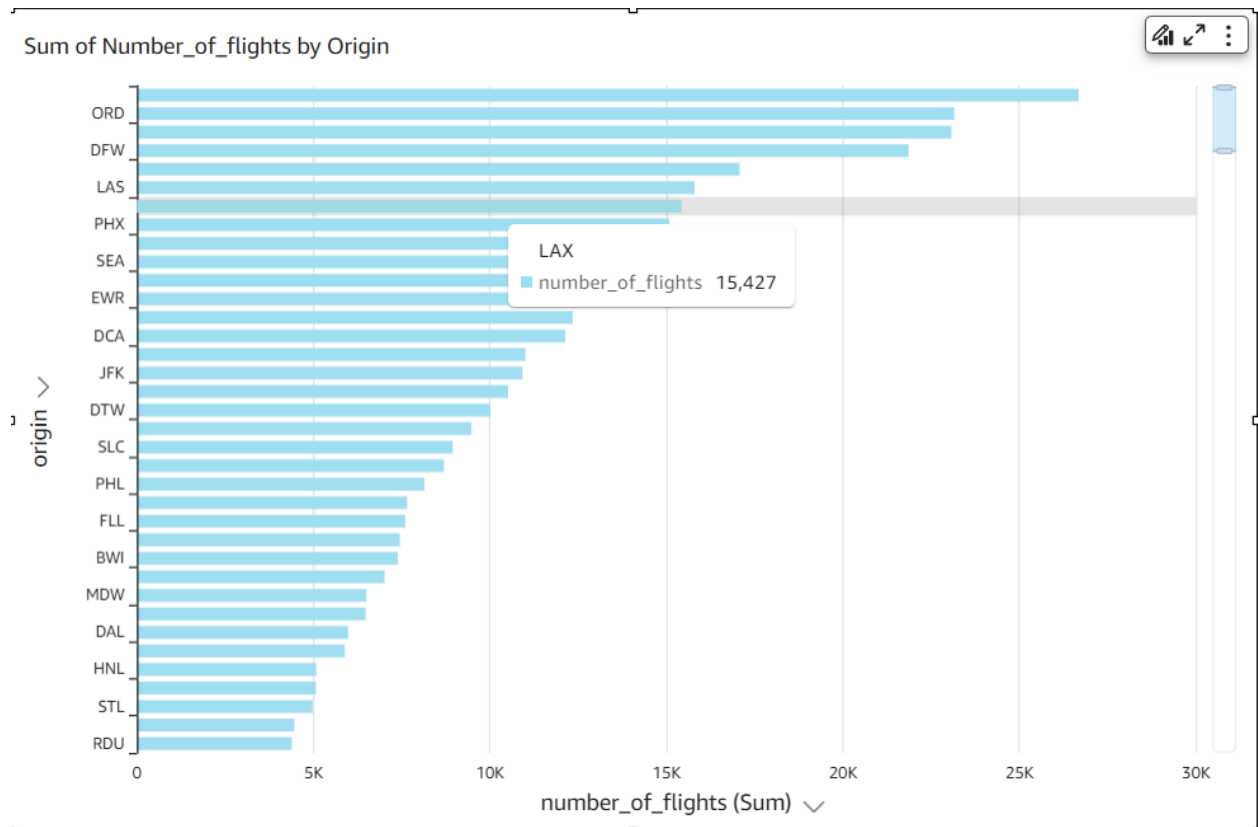
In order to reduce travel disruptions in 2023, the most opportune moments were early morning or late evening, when congested traffic was at its busiest. Tuesdays through Thursdays of the middle week experienced fewer flight delays than Mondays and Fridays. This enabled tourists to circumvent the prolonged weekend frenzy. Seasonal trends indicate that flights experienced their highest rates of on-time arrivals and departures in October and November, capitalizing on the generally favorable autumn weather and reduced congestion during the holidays.

Age of Planes and Delays



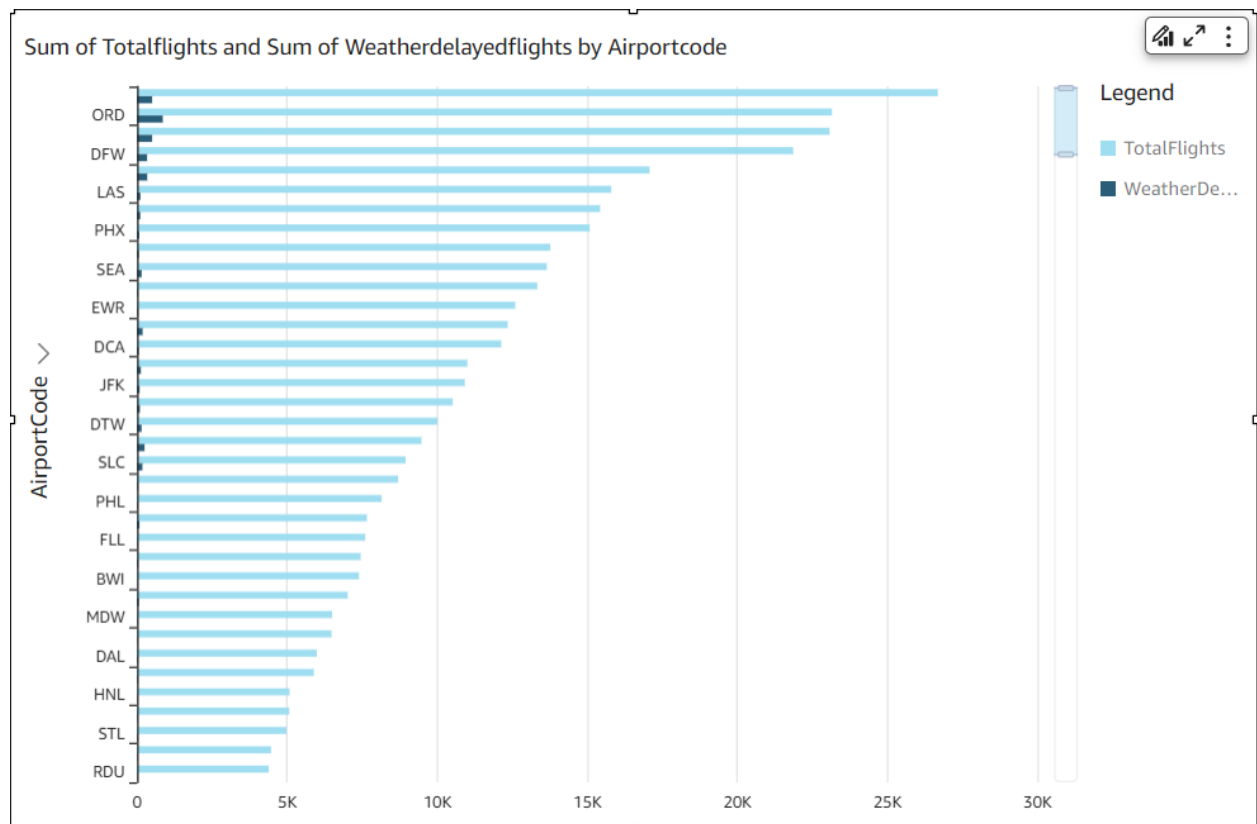
An inverse relationship can be observed between flight delays and the age of the aircraft operated in 2023. Although most aircraft operate for 1,500-2,500 hours per year, those that have been in service for more than two decades experienced average delays per flight of approximately 18 minutes. Aerial vehicles that were less than three years old exhibited the highest rates of punctuality. Continual servicing and maintenance enables the majority of aircraft, irrespective of age, to operate dependably. However, economic pressures may force airlines to operate aged aircraft beyond their maximum reliability. In general, the incorporation of cutting-edge aviation technology into newly manufactured aircraft further enhances punctuality.

Domestic vs. International Travel Trends



According to data from 2023, 94% of all flights are directed domestically within the United States, with a concentration in main airline centers. Domestic passenger volumes decreased by 2% in comparison to 2022 levels. The previous year, however, saw an 11% increase in international travel, extending significant gains made in recent times. International low-cost carrier expansion and rising demand for flights to Asia and the Middle East appear to be the primary factors propelling the expansion of international passenger traffic. Should these patterns persist at their present rate, the percentage of flights that are international may increase to 15% by 2025, thereby undermining the dominance of domestic airlines.

Airport Weather Delays



In 2023, meteorological conditions will contribute to less than 4% of all flight delays at major airports. Denver, Chicago, Boston, and Cleveland are the terminals located in regions prone to winter storms and have the greatest weather delay rates (approximately 6% of delays each). Weather-related delays at airports on the west coast, including those in Los Angeles, San Diego, and Phoenix, are less than 0.5 percent, owing to their more favorable aviation conditions. However, when climate is accounted for, the overwhelming majority of delays are caused by factors such as baggage handling, mechanical issues, airport congestion, or delayed incoming aircraft.

Airlines ought to contemplate the utilization of more recent aircraft on routes susceptible to winter weather-induced delays, while assigning aging aircraft to domestic routes characterized by temperate climates. The implementation of flight schedule adjustments in anticipation of

cyclones has the potential to alleviate the adverse effects of weather conditions. During the winter peak season, airlines could potentially gain advantages by allocating additional ground time between flights in order to tolerate minor delays without significant domino effects. Moreover, additional financial commitments towards enhanced aviation weather notification systems may provide air traffic control and pilots with additional alternatives for optimizing the runway.

conclusion

In order to improve operational efficiency, airlines can gain substantial insights by initiating the examination of flight data in 2023. Presently, Southwest Airlines is in an advantageous position to both sustain and expand its market share on account of the volume trends that are prevalent. However, despite this, it is critical that airlines maintain their proactive approach in reducing the occurrence of flight delays. It is crucial to allocate specific focus towards periods of increased travel demand, including Mondays, Fridays, and weekends, in addition to the winter season, which is susceptible to disruptions resulting from adverse weather conditions. Additionally, it is recommended to ensure proper maintenance and modify aging aircraft in order to reduce the number of mechanically-related delays. In light of the escalating global travel demand, airlines are required to maintain a strategic equilibrium between fleet management and the relative significance attributed to domestic and international routes. By strategically managing these critical factors that contribute to delays, airlines have the ability to improve their overall punctuality and customer satisfaction.

