## Screenshots of dashboard



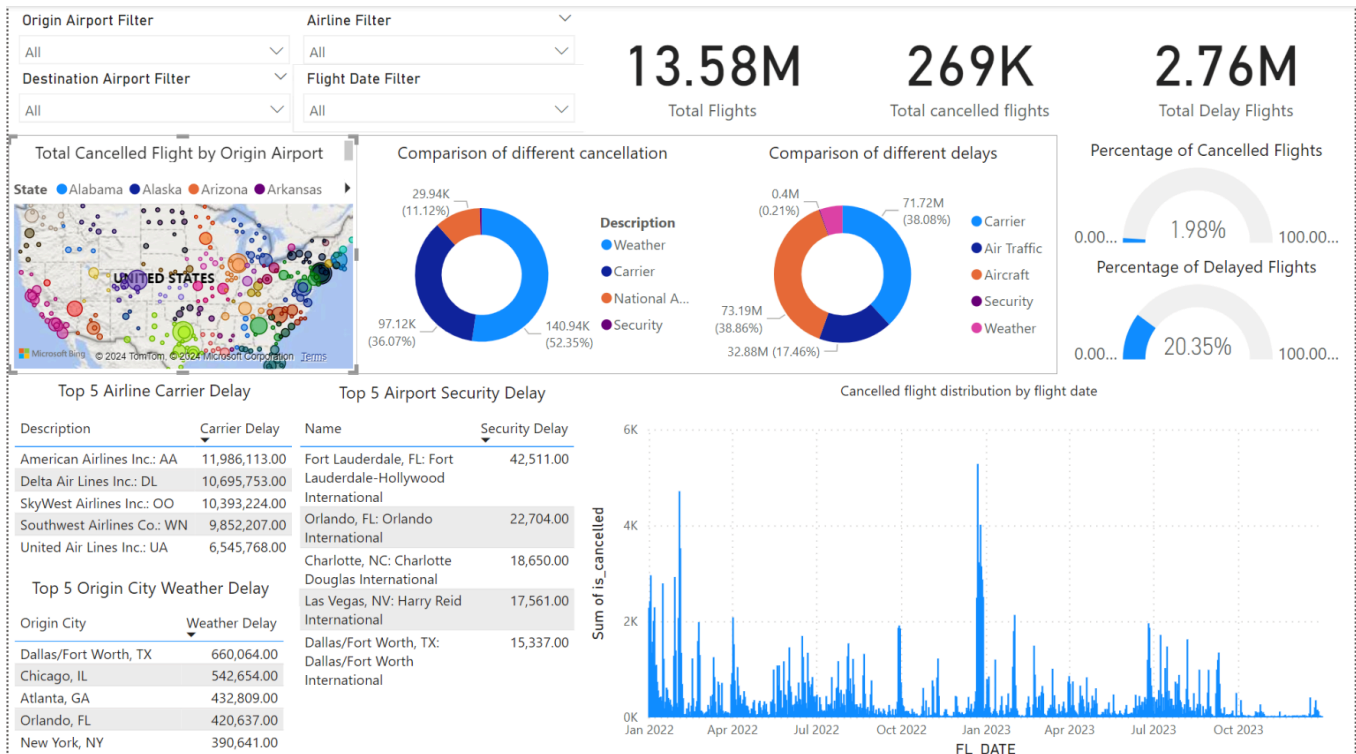Figure 1: Overview dashboard(includes all flight data from 2022 - 2023)
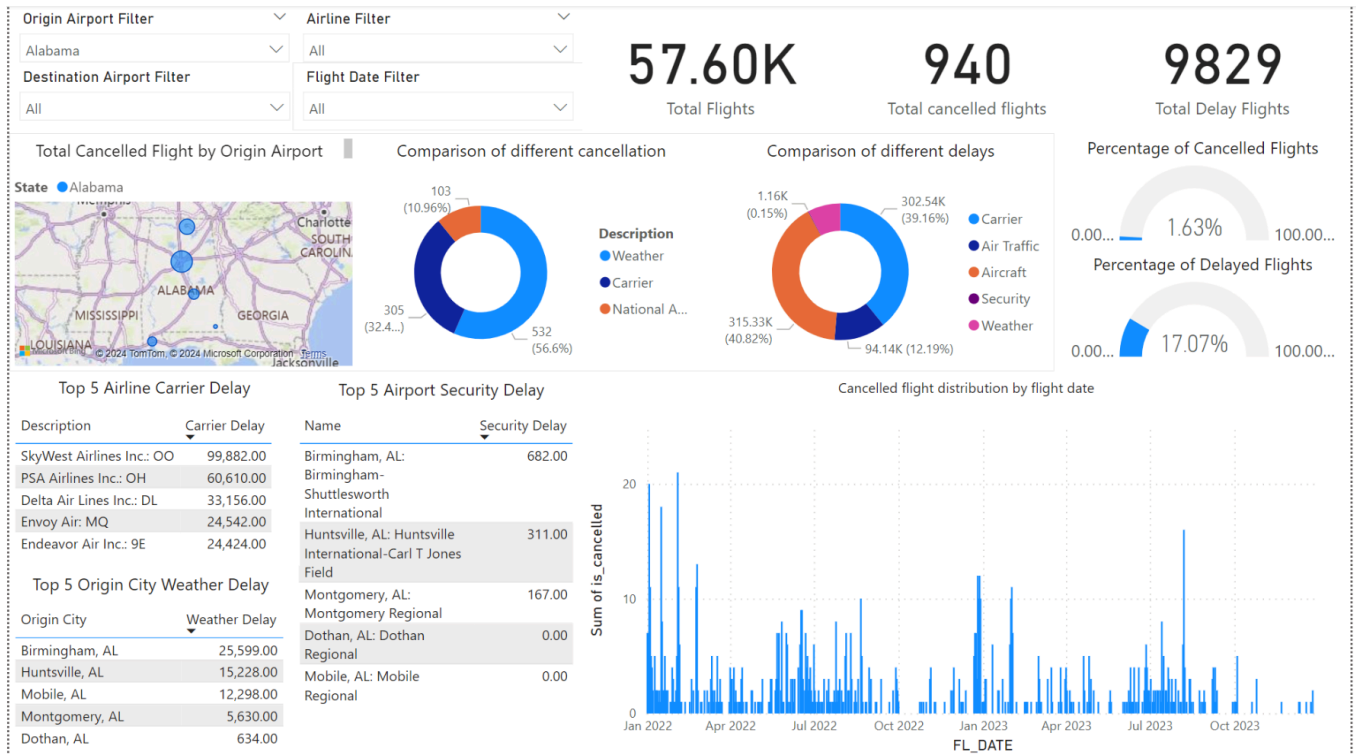


Figure 2: Slice operation on dashboard(Origin Airport State = "Alabama')
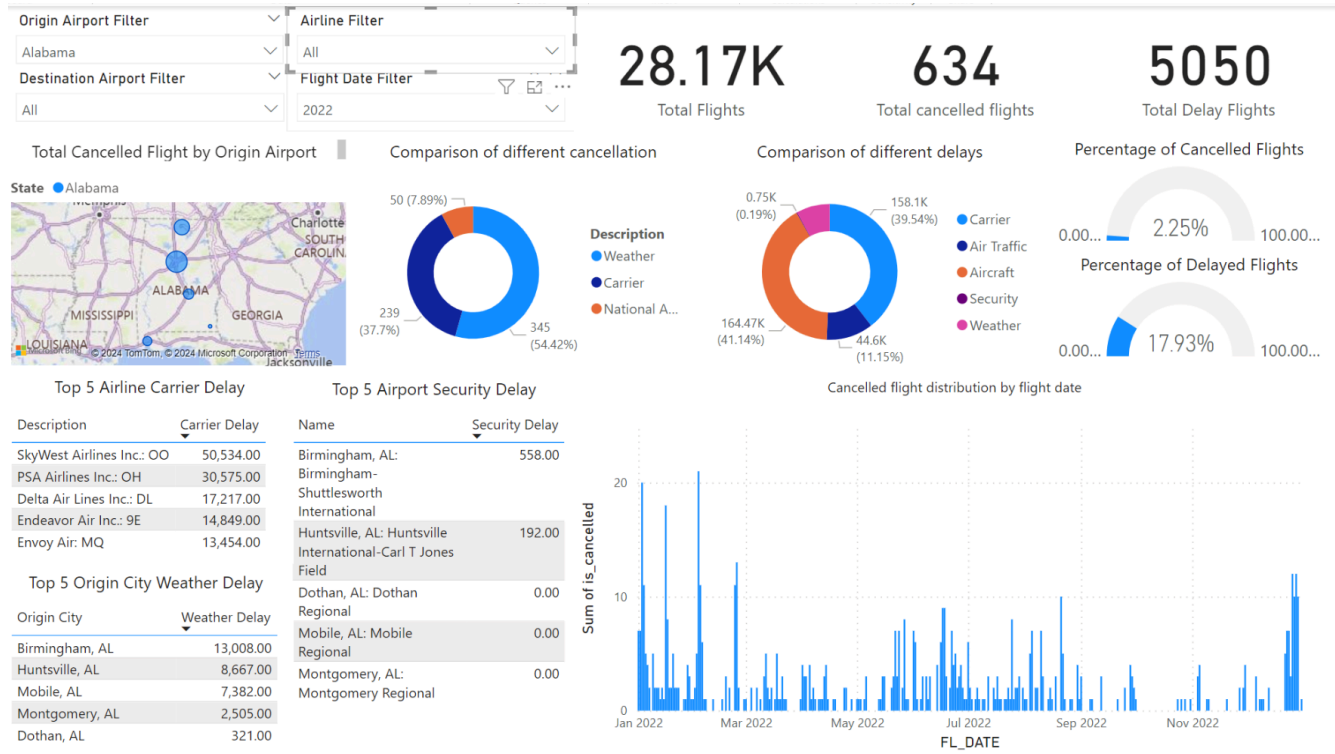
**Origin Airport Filter** ⌄
Alabama ⌄
**Destination Airport Filter** ⌄
All ⌄

**Airline Filter** ⌄
All ⌄
**Flight Date Filter** 🔽 ⛶ ⋯
2022 ⌄

# 28.17K
Total Flights

# 634
Total cancelled flights

# 5050
Total Delay Flights

**Total Cancelled Flight by Origin Airport**
State ● Alabama

**Comparison of different cancellation**
50 (7.89%)
239 (37.7%)
345 (54.42%)
Description
● Weather
● Carrier
● National A...

**Comparison of different delays**
0.75K (0.19%)
158.1K (39.54%)
164.47K (41.14%)
44.6K (11.15%)
● Carrier
● Air Traffic
● Aircraft
● Security
● Weather

**Percentage of Cancelled Flights**
0.00... 2.25% 100.00...

**Percentage of Delayed Flights**
0.00... 17.93% 100.00...

**Top 5 Airline Carrier Delay**

| Description | Carrier Delay |
|---|---|
| SkyWest Airlines Inc.: OO | 50,534.00 |
| PSA Airlines Inc.: OH | 30,575.00 |
| Delta Air Lines Inc.: DL | 17,217.00 |
| Endeavor Air Inc.: 9E | 14,849.00 |
| Envoy Air: MQ | 13,454.00 |

**Top 5 Airport Security Delay**

| Name | Security Delay |
|---|---|
| Birmingham, AL: Birmingham-Shuttlesworth International | 558.00 |
| Huntsville, AL: Huntsville International-Carl T Jones Field | 192.00 |
| Dothan, AL: Dothan Regional | 0.00 |
| Mobile, AL: Mobile Regional | 0.00 |
| Montgomery, AL: Montgomery Regional | 0.00 |

**Top 5 Origin City Weather Delay**

| Origin City | Weather Delay |
|---|---|
| Birmingham, AL | 13,008.00 |
| Huntsville, AL | 8,667.00 |
| Mobile, AL | 7,382.00 |
| Montgomery, AL | 2,505.00 |
| Dothan, AL | 321.00 |

**Cancelled flight distribution by flight date**
(Sum of is_cancelled vs FL_DATE, Jan 2022 – Nov 2022)

Figure 3: Dice Operation on dashboard(Origin Airport State = "Alabama & Year = 2022 )

**Top 5 Airline Carrier Delay**

| Description | Carrier Delay |
|---|---|
| American Airlines Inc.: AA | 11,986,113.00 |
| Delta Air Lines Inc.: DL | 10,695,753.00 |
| SkyWest Airlines Inc.: OO | 10,393,224.00 |
| Southwest Airlines Co.: WN | 9,852,207.00 |
| United Air Lines Inc.: UA | 6,545,768.00 |

**Top 5 Airport Security Delay**

| Name | Security Delay |
|---|---|
| Fort Lauderdale, FL: Fort Lauderdale-Hollywood International | 42,511.00 |
| Orlando, FL: Orlando International | 22,704.00 |
| Charlotte, NC: Charlotte Douglas International | 18,650.00 |
| Las Vegas, NV: Harry Reid International | 17,561.00 |
| Dallas/Fort Worth, TX: Dallas/Fort Worth International | 15,337.00 |

**Top 5 Origin City Weather Delay**

| Origin City | Weather Delay |
|---|---|
| Dallas/Fort Worth, TX | 660,064.00 |
| Chicago, IL | 542,654.00 |
| Atlanta, GA | 432,809.00 |
| Orlando, FL | 420,637.00 |
| New York, NY | 390,641.00 |

Figure 4: Iceberg queries(Top 5)

**OLAP Queries**

**Part 1:**

    a. **Drill down (State, City, Airport):**

```
(
CREATE OR REPLACE VIEW
"Staging".cancellation_flight_counts_by_state_city_airport_view
 AS
 SELECT o."State",
    o."City",
    o."Name" AS airport_name,
    count(*) AS cancellation_count
   FROM "Staging".fact_table f
     JOIN "Staging".dim_origin_airport o ON f."Origin Airport Surrogate Key" = o."Origin Airport Surrogate Key"
  WHERE f.is_cancelled = 1
  GROUP BY o."State", o."City", o."Name"
  ORDER BY o."State", o."City", o."Name";
)
```

| | State character varying | City character varying | airport_name character varying | cancellation_count bigint |
|---|---|---|---|---|
| 9 | Alaska | Bethel, AK | Bethel, AK: Bethel Airport | 38 |
| 10 | Alaska | Cordova, AK | Cordova, AK: Merle K Mudhole Smith | 41 |
| 11 | Alaska | Deadhorse, AK | Deadhorse, AK: Deadhorse Airport | 18 |
| 12 | Alaska | Dillingham, AK | Dillingham, AK: Dillingham Airport | 40 |
| 13 | Alaska | Fairbanks, AK | Fairbanks, AK: Fairbanks International | 147 |
| 14 | Alaska | Gustavus, AK | Gustavus, AK: Gustavus Airport | 4 |
| 15 | Alaska | Juneau, AK | Juneau, AK: Juneau International | 219 |
| 16 | Alaska | Ketchikan, AK | Ketchikan, AK: Ketchikan International | 107 |
| 17 | Alaska | King Salmon, AK | King Salmon, AK: King Salmon Airport | 34 |
| 18 | Alaska | Kodiak, AK | Kodiak, AK: Kodiak Airport | 68 |
| 19 | Alaska | Kotzebue, AK | Kotzebue, AK: Ralph Wien Memorial | 75 |
| 20 | Alaska | Nome, AK | Nome, AK: Nome Airport | 64 |
| 21 | Alaska | Petersburg, AK | Petersburg, AK: Petersburg James A Johnson | 42 |
| 22 | Alaska | Sitka, AK | Sitka, AK: Sitka Rocky Gutierrez | 74 |
| 23 | Alaska | Wrangell, AK | Wrangell, AK: Wrangell Airport | 30 |

Total rows: 369 of 369    Query complete 00:00:01.985

    **Roll up (Month, Quarter, Year):**

```
(
CREATE OR REPLACE VIEW
"Staging".cancellation_flight_counts_by_month_quarter_year_rollup_view
 AS
 SELECT fd."YEAR",
```

```
   fd."Quarter",
   fd."MONTH",
   GROUPING(fd."YEAR", fd."Quarter", fd."MONTH") AS "grouping",
   count(*) AS cancellation_count
  FROM "Staging".fact_table f
    JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date
ID"
  WHERE f.is_cancelled = 1
  GROUP BY ROLLUP(fd."YEAR", fd."Quarter", fd."MONTH")
  ORDER BY fd."YEAR", fd."Quarter", fd."MONTH";
)
```

Data Output    Messages    Notifications

| | YEAR integer | Quarter integer | MONTH integer | grouping integer | cancellation_count bigint |
|---|---|---|---|---|---|
| 1 | 2022 | 1 | 1 | 0 | 33256 |
| 2 | 2022 | 1 | 2 | 0 | 21736 |
| 3 | 2022 | 1 | 3 | 0 | 8742 |
| 4 | 2022 | 1 | [null] | 1 | 63734 |
| 5 | 2022 | 2 | 4 | 0 | 13042 |
| 6 | 2022 | 2 | 5 | 0 | 11385 |
| 7 | 2022 | 2 | 6 | 0 | 17876 |
| 8 | 2022 | 2 | [null] | 1 | 42303 |
| 9 | 2022 | 3 | 7 | 0 | 10546 |
| 10 | 2022 | 3 | 8 | 0 | 14401 |
| 11 | 2022 | 3 | 9 | 0 | 8699 |
| 12 | 2022 | 3 | [null] | 1 | 33646 |
| 13 | 2022 | 4 | 10 | 0 | 4832 |
| 14 | 2022 | 4 | 11 | 0 | 6189 |
| 15 | 2022 | 4 | 12 | 0 | 30582 |

b.  **Slice (Airline = 'Hawaiian Airlines Inc.: HA'):**

```
(
CREATE OR REPLACE VIEW "Staging".slice_table_hawaiian_airline_view
AS
 SELECT f."Fact Table ID",
```

```
      f."Cancellation Surrogate Key",
      f."Flight Date Surrogate Key",
      f."Airline Surrogate Key",
      f."Aircraft Surrogate Key",
      f."Origin Airport Surrogate Key",
      f."Destination Airport Surrogate Key",
      f."DISTANCE",
      f."CRS_ELAPSED_TIME",
      f."ACTUAL_ELAPSED_TIME",
      f."AIR_TIME",
      f."CARRIER_DELA Y",
      f."WEATHER_DELAY",
      f."NAS_DELAY",
      f."SECURITY_DELAY",
      f."LATE_AIRCRAFT_DELAY",
      f.is_cancelled,
      f.total_delay,
      da."Description" AS airline
    FROM "Staging".fact_table f
      JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
    WHERE da."Description"::text = 'Hawaiian Airlines Inc.: HA'::text;
)
```

| | CRS_ELAPSED_TIME numeric | ACTUAL_ELAPSED_TIME numeric | AIR_TIME numeric | CARRIER_DELAY numeric | WEATHER_DELAY numeric | NAS_DELAY numeric | SECURITY_DELAY numeric | LATE_AIRCRAFT_DELAY numeric | is_cancelled integer | total_delay integer | airline character varying |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 216 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 2 | 102 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 3 | 163 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 4 | 100 | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 5 | 100 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 6 | 163 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 7 | 163 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 8 | 216 | 54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 9 | 216 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 10 | 216 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 11 | 102 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 12 | 216 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 13 | 163 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |
| 14 | 163 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Hawaiian Airlines Inc.: HA |

c.  **Dice (Airline = 'United Air Lines Inc.: UA', airport = 'Phoenix, AZ: Phoenix Sky Harbor International'):**

```
(
 CREATE OR REPLACE VIEW "Staging".dice_table_airline_airport_view
 AS
 SELECT f."Fact Table ID",
      f."Cancellation Surrogate Key",
      f."Flight Date Surrogate Key",
      f."Airline Surrogate Key",
```

```sql
        f."Aircraft Surrogate Key",
        f."Origin Airport Surrogate Key",
        f."Destination Airport Surrogate Key",
        f."DISTANCE",
        f."CRS_ELAPSED_TIME",
        f."ACTUAL_ELAPSED_TIME",
        f."AIR_TIME",
        f."CARRIER_DELAY",
        f."WEATHER_DELAY",
        f."NAS_DELAY",
        f."SECURITY_DELAY",
        f."LATE_AIRCRAFT_DELAY",
        f.is_cancelled,
        f.total_delay,
        da."Description" AS airline,
        doa."Name" AS airport
   FROM "Staging".fact_table f
     JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
     JOIN "Staging".dim_origin_airport doa ON f."Origin Airport Surrogate Key" =
doa."Origin Airport Surrogate Key"
  WHERE da."Description"::text = 'United Air Lines Inc.: UA'::text AND doa."Name"::text
= 'Phoenix, AZ: Phoenix Sky Harbor International'::text;
)
```

| | APSED_TIME numeric | AIR_TIME numeric | CARRIER_DELAY numeric | WEATHER_DELAY numeric | NAS_DELAY numeric | SECURITY_DELAY numeric | LATE_AIRCRAFT_DELAY numeric | is_cancelled integer | total_delay integer | airline character varying | airport character varying |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 7 | 251 | 228 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 8 | 153 | 129 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 9 | 125 | 88 | 0 | 0 | 14 | 0 | 77 | 0 | 91 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 10 | 97 | 77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 11 | 262 | 229 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 12 | 139 | 118 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 13 | 237 | 93 | 0 | 0 | 128 | 0 | 20 | 0 | 148 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |
| 14 | 150 | 85 | 0 | 0 | 34 | 0 | 0 | 0 | 34 | United Air Lines Inc.: UA | Phoenix, AZ: Phoenix Sky Harbor International |

**Dice (Airline = 'United Air Lines Inc.: UA', YEAR = 2023 AND Quarter = 1):**

```sql
(
 CREATE OR REPLACE VIEW "Staging".dice_table_date_airline_view
 AS
 SELECT f."Fact Table ID",
    f."Cancellation Surrogate Key",
    f."Flight Date Surrogate Key",
    f."Airline Surrogate Key",
```

```
        f."Aircraft Surrogate Key",
        f."Origin Airport Surrogate Key",
        f."Destination Airport Surrogate Key",
        f."DISTANCE",
        f."CRS_ELAPSED_TIME",
        f."ACTUAL_ELAPSED_TIME",
        f."AIR_TIME",
        f."CARRIER_DELAY",
        f."WEATHER_DELAY",
        f."NAS_DELAY",
        f."SECURITY_DELAY",
        f."LATE_AIRCRAFT_DELAY",
        f.is_cancelled,
        f.total_delay,
        da."Description" AS airline,
        fd."YEAR",
        fd."Quarter"
     FROM "Staging".fact_table f
        JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
        JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date
ID"
     WHERE da."Description"::text = 'United Air Lines Inc.: UA'::text AND fd."YEAR" = 2023
AND fd."Quarter" = 1;
     )
```

| | ACTUAL_ELAPSED_TIME numeric | AIR_TIME numeric | CARRIER_DELAY numeric | WEATHER_DELAY numeric | NAS_DELAY numeric | SECURITY_DELAY numeric | LATE_AIRCRAFT_DELAY numeric | is_cancelled integer | total_delay integer | airline character varying | YEAR integer | Quarter integer |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 168 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 2 | 174 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 3 | 91 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 4 | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 5 | 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 6 | 101 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 7 | 149 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 8 | 207 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 9 | 193 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 10 | 174 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 11 | 134 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 12 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 13 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |
| 14 | 113 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | United Air Lines Inc.: UA | 2023 | 1 |

d.  **Combining OLAP operations:**

**Compare cancellation counts of different origin airports by quarter, year:**
```
(
CREATE OR REPLACE VIEW
"Staging".cancellation_flight_count_by_airport_quarter_year_view
 AS
 SELECT fd."YEAR",
    fd."Quarter",
```

```
    doa."Name",
    count(*) AS cancellation_count
  FROM "Staging".fact_table f
    JOIN "Staging".dim_origin_airport doa ON f."Origin Airport Surrogate Key" =
doa."Origin Airport Surrogate Key"
    JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date
ID"
  WHERE f.is_cancelled = 1
  GROUP BY fd."YEAR", fd."Quarter", doa."Name"
  ORDER BY fd."YEAR", fd."Quarter", doa."Name";
)
```

| | YEAR integer | Quarter integer | Name character varying | cancellation_count bigint |
|---|---|---|---|---|
| 1 | 2022 | 1 | Aberdeen, SD: Aberdeen Regional | 4 |
| 2 | 2022 | 1 | Abilene, TX: Abilene Regional | 26 |
| 3 | 2022 | 1 | Adak Island, AK: Adak | 3 |
| 4 | 2022 | 1 | Aguadilla, PR: Rafael Hernandez | 22 |
| 5 | 2022 | 1 | Akron, OH: Akron-Canton Regional | 28 |
| 6 | 2022 | 1 | Alamosa, CO: San Luis Valley Regional/Bergman Field | 20 |
| 7 | 2022 | 1 | Albany, GA: Southwest Georgia Regional | 2 |
| 8 | 2022 | 1 | Albany, NY: Albany International | 176 |
| 9 | 2022 | 1 | Albuquerque, NM: Albuquerque International Sunport | 147 |
| 10 | 2022 | 1 | Alexandria, LA: Alexandria International | 22 |
| 11 | 2022 | 1 | Allentown/Bethlehem/Easton, PA: Lehigh Valley International | 46 |
| 12 | 2022 | 1 | Alpena, MI: Alpena County Regional | 13 |
| 13 | 2022 | 1 | Amarillo, TX: Rick Husband Amarillo International | 58 |
| 14 | 2022 | 1 | Anchorage, AK: Ted Stevens Anchorage International | 176 |
| 15 | 2022 | 1 | Appleton, WI: Appleton International | 31 |

**Compare cancellation counts of different airlines by quarter, year:**

```
(
CREATE OR REPLACE VIEW
"Staging".cancellation_flight_counts_by_airline_month_year_view
 AS
 SELECT fd."YEAR",
    fd."Quarter",
    da."Description",
    count(*) AS cancellation_count
  FROM "Staging".fact_table f
    JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
    JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date
ID"
  WHERE f.is_cancelled = 1
  GROUP BY fd."YEAR", fd."Quarter", da."Description"
```

```
  ORDER BY fd."YEAR", fd."Quarter", da."Description";
)
```

| | YEAR integer | Quarter integer | Description character varying | cancellation_count bigint |
|---|---|---|---|---|
| 1 | 2022 | 1 | Alaska Airlines Inc.: AS | 1759 |
| 2 | 2022 | 1 | Allegiant Air: G4 | 1850 |
| 3 | 2022 | 1 | American Airlines Inc.: AA | 9071 |
| 4 | 2022 | 1 | Delta Air Lines Inc.: DL | 3565 |
| 5 | 2022 | 1 | Endeavor Air Inc.: 9E | 2458 |
| 6 | 2022 | 1 | Envoy Air: MQ | 3092 |
| 7 | 2022 | 1 | Frontier Airlines Inc.: F9 | 1603 |
| 8 | 2022 | 1 | Hawaiian Airlines Inc.: HA | 252 |
| 9 | 2022 | 1 | Horizon Air: QX | 667 |
| 10 | 2022 | 1 | JetBlue Airways: B6 | 3771 |
| 11 | 2022 | 1 | Mesa Airlines Inc.: YV | 2234 |
| 12 | 2022 | 1 | PSA Airlines Inc.: OH | 3267 |
| 13 | 2022 | 1 | Republic Airline: YX | 5194 |
| 14 | 2022 | 1 | SkyWest Airlines Inc.: OO | 7095 |
| 15 | 2022 | 1 | Southwest Airlines Co.: WN | 12275 |

**Compare total delay of different origin airports by quarter, year:**

```
(
CREATE OR REPLACE VIEW "Staging".total_delay_by_airport_quarter_year_view
 AS
 SELECT fd."YEAR",
   fd."Quarter",
   doa."Name",
   sum(f.total_delay) AS total_delay
  FROM "Staging".fact_table f
    JOIN "Staging".dim_origin_airport doa ON f."Origin Airport Surrogate Key" =
doa."Origin Airport Surrogate Key"
    JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date
ID"
 GROUP BY fd."YEAR", fd."Quarter", doa."Name"
 ORDER BY fd."YEAR", fd."Quarter", doa."Name";
```

)

| | YEAR integer | Quarter integer | Name character varying | total_delay bigint |
|---|---|---|---|---|
| 1 | 2022 | 1 | Aberdeen, SD: Aberdeen Regional | 3818 |
| 2 | 2022 | 1 | Abilene, TX: Abilene Regional | 2802 |
| 3 | 2022 | 1 | Adak Island, AK: Adak | 300 |
| 4 | 2022 | 1 | Aguadilla, PR: Rafael Hernandez | 15312 |
| 5 | 2022 | 1 | Akron, OH: Akron-Canton Regional | 9956 |
| 6 | 2022 | 1 | Alamosa, CO: San Luis Valley Regional/Bergman Field | 1660 |
| 7 | 2022 | 1 | Albany, GA: Southwest Georgia Regional | 2460 |
| 8 | 2022 | 1 | Albany, NY: Albany International | 50991 |
| 9 | 2022 | 1 | Albuquerque, NM: Albuquerque International Sunport | 49730 |
| 10 | 2022 | 1 | Alexandria, LA: Alexandria International | 5683 |
| 11 | 2022 | 1 | Allentown/Bethlehem/Easton, PA: Lehigh Valley International | 12592 |
| 12 | 2022 | 1 | Alpena, MI: Alpena County Regional | 3819 |
| 13 | 2022 | 1 | Amarillo, TX: Rick Husband Amarillo International | 9533 |
| 14 | 2022 | 1 | Anchorage, AK: Ted Stevens Anchorage International | 44397 |
| 15 | 2022 | 1 | Appleton, WI: Appleton International | 19269 |

Total rows: 1000 of 2819    Query complete 00:00:02.960

**Compare total delay of different airlines by quarter, year:**
(
CREATE OR REPLACE VIEW "Staging".total_delay_by_airline_quarter_year_view
 AS
 SELECT fd."YEAR",
    fd."Quarter",
    da."Description" AS airline,
    sum(f.total_delay) AS total_delay
   FROM "Staging".fact_table f
     JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
     JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date ID"
  GROUP BY fd."YEAR", fd."Quarter", da."Description"
  ORDER BY fd."YEAR", fd."Quarter", da."Description";
)

| | YEAR integer | Quarter integer | airline character varying | total_delay bigint |
|---|---|---|---|---|
| 1 | 2022 | 1 | Alaska Airlines Inc.: AS | 471695 |
| 2 | 2022 | 1 | Allegiant Air: G4 | 581080 |
| 3 | 2022 | 1 | American Airlines Inc.: AA | 2510802 |
| 4 | 2022 | 1 | Delta Air Lines Inc.: DL | 2165345 |
| 5 | 2022 | 1 | Endeavor Air Inc.: 9E | 747330 |
| 6 | 2022 | 1 | Envoy Air: MQ | 580412 |
| 7 | 2022 | 1 | Frontier Airlines Inc.: F9 | 791947 |
| 8 | 2022 | 1 | Hawaiian Airlines Inc.: HA | 126655 |
| 9 | 2022 | 1 | Horizon Air: QX | 204786 |
| 10 | 2022 | 1 | JetBlue Airways: B6 | 1641959 |
| 11 | 2022 | 1 | Mesa Airlines Inc.: YV | 496684 |
| 12 | 2022 | 1 | PSA Airlines Inc.: OH | 945246 |
| 13 | 2022 | 1 | Republic Airline: YX | 1082704 |
| 14 | 2022 | 1 | SkyWest Airlines Inc.: OO | 2640657 |
| 15 | 2022 | 1 | Southwest Airlines Co.: WN | 3068740 |

Total rows: 128 of 128    Query complete 00:00:02.840

**Part 2:**
   a. **Iceberg queries (Top 5 weather delay airports):**

```
(
CREATE OR REPLACE VIEW "Staging".total_weather_delay_by_airport_view
 AS
 SELECT doa."Name",
    sum(f."WEATHER_DELAY") AS total_weather_delay
   FROM "Staging".fact_table f
     JOIN "Staging".dim_origin_airport doa ON f."Origin Airport Surrogate Key" =
doa."Origin Airport Surrogate Key"
  GROUP BY doa."Name"
  ORDER BY (sum(f."WEATHER_DELAY")) DESC
 LIMIT 5;
)
```

| | Name<br>character varying 🔒 | total_weather_delay 🔒<br>numeric |
|---|---|---|
| 1 | Dallas/Fort Worth, TX: Dallas/Fort Worth International | 652506 |
| 2 | Chicago, IL: Chicago O'Hare International | 458647 |
| 3 | Atlanta, GA: Hartsfield-Jackson Atlanta International | 425359 |
| 4 | Orlando, FL: Orlando International | 419076 |
| 5 | Charlotte, NC: Charlotte Douglas International | 355239 |

**b. Windowing queries (Ranking airlines by security delay):**

(
CREATE OR REPLACE VIEW "Staging".total_security_delay_by_airline_rank_view
AS
SELECT da."Description",
  sum(f."SECURITY_DELAY") AS total_security_delay,
  rank() OVER (ORDER BY (sum(f."SECURITY_DELAY")) DESC) AS rank
  FROM "Staging".fact_table f
    JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
  GROUP BY da."Description";

| | Description<br>character varying 🔒 | total_security_delay 🔒<br>numeric | rank<br>bigint 🔒 |
|---|---|---|---|
| 1 | Southwest Airlines Co.... | 85935 | 1 |
| 2 | Spirit Air Lines: NK | 66574 | 2 |
| 3 | American Airlines Inc.:... | 59553 | 3 |
| 4 | SkyWest Airlines Inc.: ... | 38662 | 4 |
| 5 | Alaska Airlines Inc.: AS | 29152 | 5 |
| 6 | JetBlue Airways: B6 | 26394 | 6 |
| 7 | Delta Air Lines Inc.: DL | 18122 | 7 |
| 8 | Allegiant Air: G4 | 16746 | 8 |
| 9 | PSA Airlines Inc.: OH | 12341 | 9 |
| 10 | Envoy Air: MQ | 9199 | 10 |
| 11 | Hawaiian Airlines Inc.: ... | 6512 | 11 |
| 12 | Republic Airline: YX | 5295 | 12 |
| 13 | United Air Lines Inc.: UA | 2995 | 13 |
| 14 | Horizon Air: QX | 2800 | 14 |
| 15 | Endeavor Air Inc.: 9E | 1936 | 15 |

Total rows: 17 of 17    Query complete 00:00:02.481
)

## c. Using the Windowing clause(moving average total delay):

(

CREATE OR REPLACE VIEW "Staging".moving_ave_total_delay_by_airline_year_month_view
 AS
 SELECT da."Description",
   fd."YEAR",
   fd."MONTH",
   sum(f.total_delay) AS total_delay,
   avg(sum(f.total_delay)) OVER w AS movavg
  FROM "Staging".fact_table f
    JOIN "Staging".dim_airline da ON f."Airline Surrogate Key" = da."Airline ID"
    JOIN "Staging".dim_flight_date fd ON f."Flight Date Surrogate Key" = fd."Flight Date ID"
  GROUP BY da."Description", fd."YEAR", fd."MONTH"
  WINDOW w AS (PARTITION BY da."Description", fd."YEAR" ORDER BY (to_date(((fd."YEAR"
 || '-'::text) || fd."MONTH") || '-01'::text, 'YYYY-MM-DD'::text)) RANGE BETWEEN '1 mon'::interval
 PRECEDING AND '1 mon'::interval FOLLOWING);

)

| | Description<br>character varying | YEAR<br>integer | MONTH<br>integer | total_delay<br>bigint | movavg<br>numeric |
|---|---|---|---|---|---|
| 1 | Alaska Airlines Inc.: AS | 2022 | 1 | 190289 | 157036.500000000000 |
| 2 | Alaska Airlines Inc.: AS | 2022 | 2 | 123784 | 157231.666666666667 |
| 3 | Alaska Airlines Inc.: AS | 2022 | 3 | 157622 | 166581.666666666667 |
| 4 | Alaska Airlines Inc.: AS | 2022 | 4 | 218339 | 181247.000000000000 |
| 5 | Alaska Airlines Inc.: AS | 2022 | 5 | 167780 | 190828.333333333333 |
| 6 | Alaska Airlines Inc.: AS | 2022 | 6 | 186366 | 177216.000000000000 |
| 7 | Alaska Airlines Inc.: AS | 2022 | 7 | 177502 | 182151.333333333333 |
| 8 | Alaska Airlines Inc.: AS | 2022 | 8 | 182586 | 170625.666666666667 |
| 9 | Alaska Airlines Inc.: AS | 2022 | 9 | 151789 | 154843.666666666667 |
| 10 | Alaska Airlines Inc.: AS | 2022 | 10 | 130156 | 165085.333333333333 |
| 11 | Alaska Airlines Inc.: AS | 2022 | 11 | 213311 | 250433.000000000000 |
| 12 | Alaska Airlines Inc.: AS | 2022 | 12 | 407832 | 310571.500000000000 |
| 13 | Alaska Airlines Inc.: AS | 2023 | 1 | 211052 | 211903.500000000000 |
| 14 | Alaska Airlines Inc.: AS | 2023 | 2 | 212755 | 213313.000000000000 |
| 15 | Alaska Airlines Inc.: AS | 2023 | 3 | 216132 | 209194.666666666667 |

Total rows: 369 of 369     Query complete 00:00:02.856