

NYC Flights 2013 Analysis

- Data detail : <https://cran.r-project.org/web/packages/nycflights13/nycflights13.pdf>

```
# install.packages("nycflights13")
library(nycflights13)
library(tidyverse)

## -- Attaching packages ----- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr  1.0.1
## v tibble  3.1.8      v dplyr  1.1.0
## v tidyr   1.3.0      v stringr 1.5.0
## v readr   2.1.3      v forcats 1.0.0
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
glimpse(weather)
```

```
## Rows: 26,115
## Columns: 15
## $ origin    <chr> "EWR", "EWR", "EWR", "EWR", "EWR", "EWR", "EWR", "EWR", "EW~
## $ year      <int> 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2013,~
## $ month     <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,~
## $ day       <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,~
## $ hour      <int> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, ~
## $ temp      <dbl> 39.02, 39.02, 39.02, 39.92, 39.02, 37.94, 39.02, 39.92, 39.~
## $ dewp      <dbl> 26.06, 26.96, 28.04, 28.04, 28.04, 28.04, 28.04, 28.04, 28.~
## $ humid     <dbl> 59.37, 61.63, 64.43, 62.21, 64.43, 67.21, 64.43, 62.21, 62.~
## $ wind_dir  <dbl> 270, 250, 240, 250, 260, 240, 240, 250, 260, 260, 260, 330,~
## $ wind_speed <dbl> 10.35702, 8.05546, 11.50780, 12.65858, 12.65858, 11.50780, ~
## $ wind_gust <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, 20.~
## $ precip    <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,~
## $ pressure  <dbl> 1012.0, 1012.3, 1012.5, 1012.2, 1011.9, 1012.4, 1012.2, 101~
## $ visib     <dbl> 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10,~
## $ time_hour <dtm> 2013-01-01 01:00:00, 2013-01-01 02:00:00, 2013-01-01 03:00~
```

```
glimpse(airports)
```

```
## Rows: 1,458
## Columns: 8
## $ faa      <chr> "04G", "06A", "06C", "06N", "09J", "0A9", "0G6", "0G7", "0P2", "~
## $ name     <chr> "Lansdowne Airport", "Moton Field Municipal Airport", "Schaumbur~
## $ lat      <dbl> 41.13047, 32.46057, 41.98934, 41.43191, 31.07447, 36.37122, 41.4~
## $ lon      <dbl> -80.61958, -85.68003, -88.10124, -74.39156, -81.42778, -82.17342~
## $ alt      <dbl> 1044, 264, 801, 523, 11, 1593, 730, 492, 1000, 108, 409, 875, 10~
## $ tz       <dbl> -5, -6, -6, -5, -5, -5, -5, -5, -5, -8, -5, -6, -5, -5, -5, -5, ~
## $ dst      <chr> "A", "A", "A", "A", "A", "A", "A", "A", "U", "A", "A", "U", "A",~
## $ tzone    <chr> "America/New_York", "America/Chicago", "America/Chicago", "Ameri~
```

```
glimpse(flights)
```

```
## Rows: 336,776
## Columns: 19
## $ year      <int> 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2013, 2~
## $ month     <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1~
## $ day       <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1~
## $ dep_time  <int> 517, 533, 542, 544, 554, 554, 555, 557, 557, 558, 558, ~
## $ sched_dep_time <int> 515, 529, 540, 545, 600, 558, 600, 600, 600, 600, 600, ~
## $ dep_delay <dbl> 2, 4, 2, -1, -6, -4, -5, -3, -3, -2, -2, -2, -2, -2, -1~
## $ arr_time  <int> 830, 850, 923, 1004, 812, 740, 913, 709, 838, 753, 849,~
## $ sched_arr_time <int> 819, 830, 850, 1022, 837, 728, 854, 723, 846, 745, 851,~
## $ arr_delay <dbl> 11, 20, 33, -18, -25, 12, 19, -14, -8, 8, -2, -3, 7, -1~
## $ carrier   <chr> "UA", "UA", "AA", "B6", "DL", "UA", "B6", "EV", "B6", "~
## $ flight    <int> 1545, 1714, 1141, 725, 461, 1696, 507, 5708, 79, 301, 4~
## $ tailnum   <chr> "N14228", "N24211", "N619AA", "N804JB", "N668DN", "N394~
## $ origin    <chr> "EWR", "LGA", "JFK", "JFK", "LGA", "EWR", "EWR", "LGA",~
## $ dest      <chr> "IAH", "IAH", "MIA", "BQN", "ATL", "ORD", "FLL", "IAD",~
## $ air_time  <dbl> 227, 227, 160, 183, 116, 150, 158, 53, 140, 138, 149, 1~
## $ distance  <dbl> 1400, 1416, 1089, 1576, 762, 719, 1065, 229, 944, 733, ~
## $ hour      <dbl> 5, 5, 5, 5, 6, 5, 6, 6, 6, 6, 6, 6, 6, 6, 5, 6, 6, 6~
## $ minute    <dbl> 15, 29, 40, 45, 0, 58, 0, 0, 0, 0, 0, 0, 0, 0, 59, 0~
## $ time_hour <dtm> 2013-01-01 05:00:00, 2013-01-01 05:00:00, 2013-01-01 0~
```

```
glimpse(airlines)
```

```
## Rows: 16
## Columns: 2
## $ carrier <chr> "9E", "AA", "AS", "B6", "DL", "EV", "F9", "FL", "HA", "MQ", "O~
## $ name    <chr> "Endeavor Air Inc.", "American Airlines Inc.", "Alaska Airline~
```

```
glimpse(planes)
```

```
## Rows: 3,322
## Columns: 9
## $ tailnum   <chr> "N10156", "N102UW", "N103US", "N104UW", "N10575", "N105UW~
## $ year      <int> 2004, 1998, 1999, 1999, 2002, 1999, 1999, 1999, 1999, 199~
## $ type      <chr> "Fixed wing multi engine", "Fixed wing multi engine", "Fi~
## $ manufacturer <chr> "EMBRAER", "AIRBUS INDUSTRIE", "AIRBUS INDUSTRIE", "AIRBU~
## $ model     <chr> "EMB-145XR", "A320-214", "A320-214", "A320-214", "EMB-145~
## $ engines   <int> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, ~
## $ seats     <int> 55, 182, 182, 182, 55, 182, 182, 182, 182, 182, 55, 55, 5~
## $ speed     <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
## $ engine    <chr> "Turbo-fan", "Turbo-fan", "Turbo-fan", "Turbo-fan", "Turb~
```

The 10 Most-Carriers

```
flights %>%
  count(carrier) %>%
```

```

arrange(desc(n)) %>%
rename(total_carrier = n) %>%
left_join(airlines, by="carrier") %>%
head(10)

```

```

## # A tibble: 10 x 3
##   carrier total_carrier name
##   <chr>         <int> <chr>
## 1 UA           58665 United Air Lines Inc.
## 2 B6           54635 JetBlue Airways
## 3 EV           54173 ExpressJet Airlines Inc.
## 4 DL           48110 Delta Air Lines Inc.
## 5 AA           32729 American Airlines Inc.
## 6 MQ           26397 Envoy Air
## 7 US           20536 US Airways Inc.
## 8 9E           18460 Endeavor Air Inc.
## 9 WN           12275 Southwest Airlines Co.
## 10 VX          5162 Virgin America

```

The 10 Most-Flights

```

flights %>%
  group_by(carrier) %>%
  summarize(total_flight = sum(flight)) %>%
  arrange(desc(total_flight)) %>%
  left_join(airlines, by="carrier") %>%
  head(10)

```

```

## # A tibble: 10 x 3
##   carrier total_flight name
##   <chr>         <int> <chr>
## 1 EV          250500399 ExpressJet Airlines Inc.
## 2 MQ          101761406 Envoy Air
## 3 DL           66141518 Delta Air Lines Inc.
## 4 9E           65847885 Endeavor Air Inc.
## 5 UA           56289091 United Air Lines Inc.
## 6 B6           36669259 JetBlue Airways
## 7 US           33468909 US Airways Inc.
## 8 AA           29978858 American Airlines Inc.
## 9 WN           18007421 Southwest Airlines Co.
## 10 YV          1972985 Mesa Airlines Inc.

```

The 10 Most-Distance in December

```

flights %>%
  filter(month == 12) %>%
  group_by(carrier) %>%
  summarize(total_distance = sum(distance)) %>%
  arrange(desc(total_distance)) %>%

```

```
left_join(airlines, by="carrier") %>%
head(10)
```

```
## # A tibble: 10 x 3
##   carrier total_distance name
##   <chr>          <dbl> <chr>
## 1 UA              7609757 United Air Lines Inc.
## 2 B6              5185761 JetBlue Airways
## 3 DL              5109723 Delta Air Lines Inc.
## 4 AA              3671213 American Airlines Inc.
## 5 EV              2441056 ExpressJet Airlines Inc.
## 6 MQ              1237254 Envoy Air
## 7 VX              1190060 Virgin America
## 8 WN              1107649 Southwest Airlines Co.
## 9 US              960368 US Airways Inc.
## 10 9E              913992 Endeavor Air Inc.
```

The Most-Delay

- Departures Delay

```
flights %>%
  filter(dep_delay < 0) %>%
  group_by(carrier) %>%
  summarize(TotalTime_dep_delay = sum(dep_delay)) %>%
  arrange(TotalTime_dep_delay) %>%
  left_join(airlines, by="carrier") %>%
  head(10)
```

```
## # A tibble: 10 x 3
##   carrier TotalTime_dep_delay name
##   <chr>          <dbl> <chr>
## 1 B6             -147970 JetBlue Airways
## 2 EV             -139752 ExpressJet Airlines Inc.
## 3 DL             -127535 Delta Air Lines Inc.
## 4 UA             -113920 United Air Lines Inc.
## 5 AA             -102163 American Airlines Inc.
## 6 MQ             -95194 Envoy Air
## 7 US             -82649 US Airways Inc.
## 8 9E             -54226 Endeavor Air Inc.
## 9 WN             -14584 Southwest Airlines Co.
## 10 VX            -10629 Virgin America
```

- Arrivals Delay

```
flights %>%
  filter(dep_delay < 0) %>%
  group_by(carrier) %>%
  summarize(TotalTime_arr_delay = sum(arr_delay)) %>%
  arrange(TotalTime_arr_delay) %>%
  left_join(airlines, by="carrier") %>%
  head(4)
```

```
## # A tibble: 4 x 3
##   carrier TotalTime_arr_delay name
##   <chr>          <dbl> <chr>
## 1 HA              -4141 Hawaiian Airlines Inc.
## 2 YV              -3574 Mesa Airlines Inc.
## 3 F9              -555 Frontier Airlines Inc.
## 4 00              -245 SkyWest Airlines Inc.
```

Top 10 Amount of the planes

```
planes %>%
  group_by(manufacturer) %>%
  summarize(total_amount = n()) %>%
  arrange(desc(total_amount)) %>%
  head(10)
```

```
## # A tibble: 10 x 2
##   manufacturer      total_amount
##   <chr>          <int>
## 1 BOEING             1630
## 2 AIRBUS INDUSTRIE    400
## 3 BOMBARDIER INC      368
## 4 AIRBUS             336
## 5 EMBRAER            299
## 6 MCDONNELL DOUGLAS   120
## 7 MCDONNELL DOUGLAS AIRCRAFT CO 103
## 8 MCDONNELL DOUGLAS CORPORATION   14
## 9 CANADAIIR           9
## 10 CESSNA             9
```