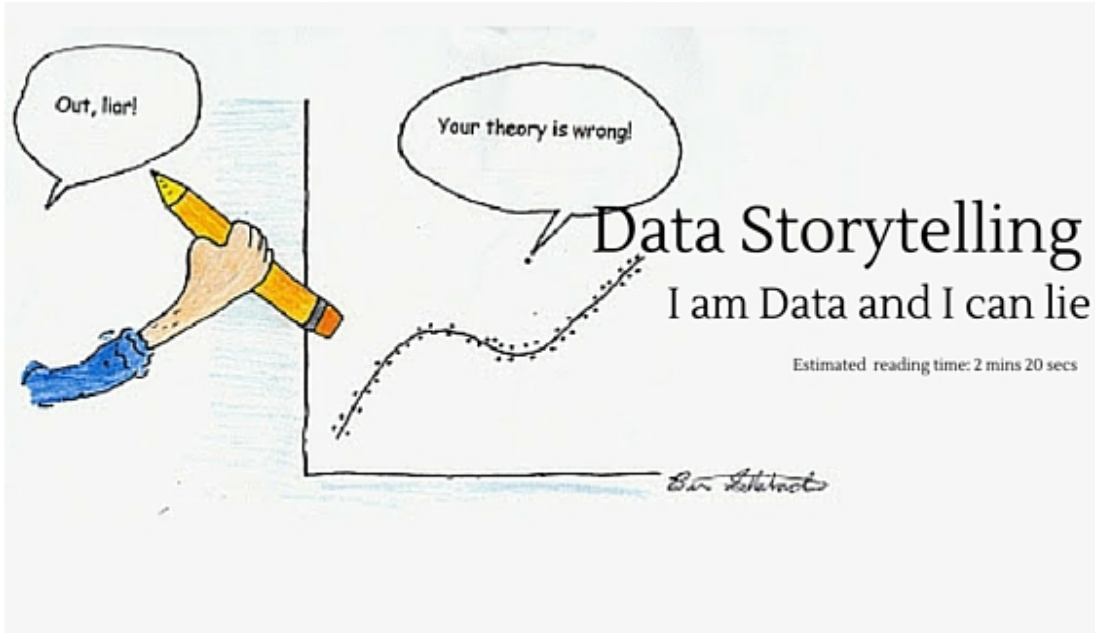

Data Storytelling – Tableau Workshop II DAY 3 pm

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Learning Objectives

- Data story-telling
  - Creating a dashboard to inform
  - Using a story board to communicate your views
- Workshop activities

Recap:

- Recall we have looked at the steps to ‘weaving a story’.
- Best charting practices in Tableau (yesterday pm)
- Principles of dashboarding (by Brandon)
- We have looked at some things to avoid in charting.
- Today, we do the actually ‘story-telling’, or be a visual journalist (to cap it all with an example)

Data Story Telling

- Charting gives you a snapshot of the data. When you tell a story, you need to 'connect the dots' (snapshots) to communicate the story.
- At the end of it, you want to achieve some objectives amongst your listeners
  - Inform and convince
  - Actionable insights

Dashboards

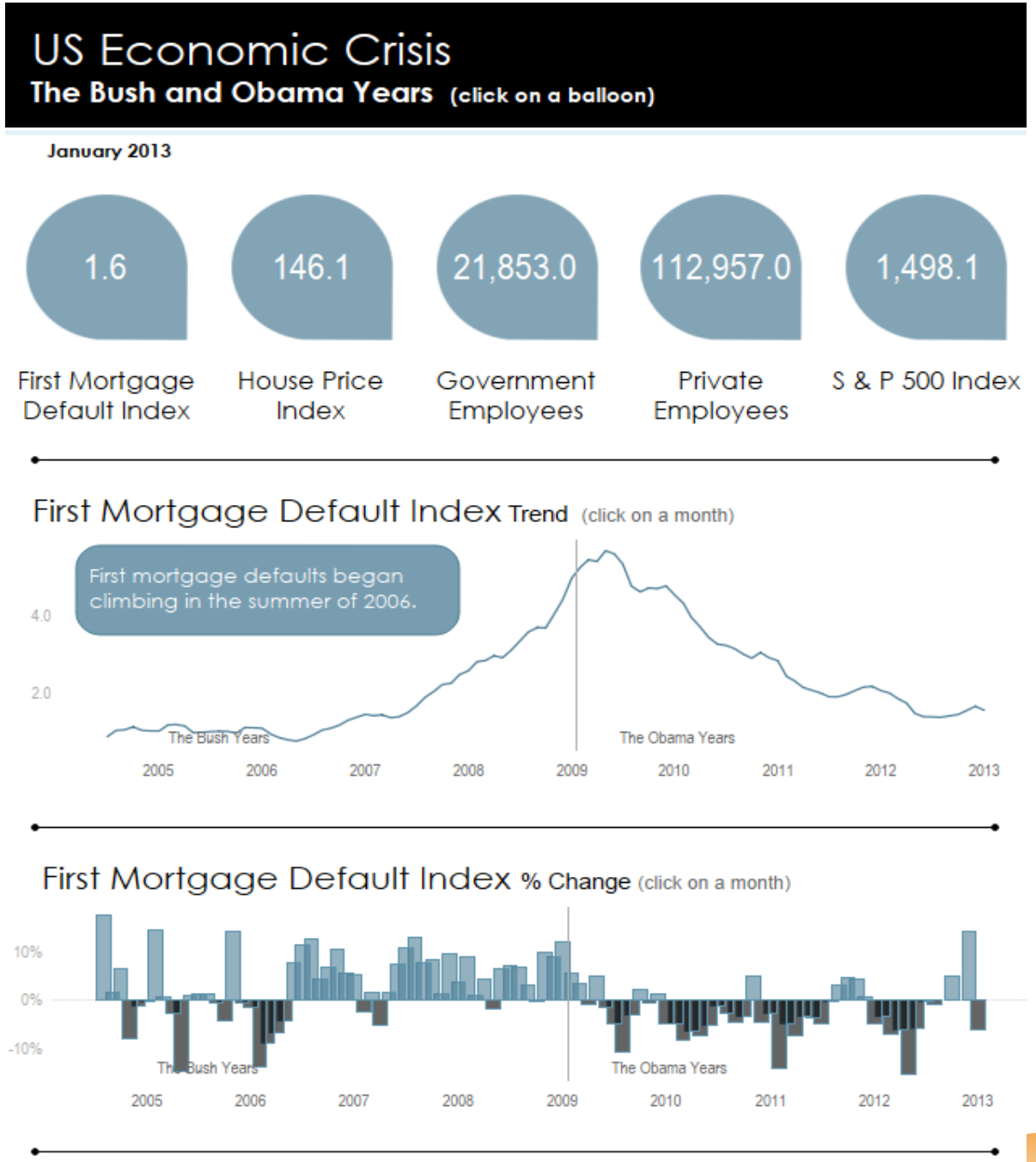
From the earlier lecture on principles of dashboarding:

- Provides a holistic view of the data
- The objectives of the dashboard are firstly to:
  - To inform, update and highlight *(quickly)*
  - A secondary objective is for exploratory analysis (not always done though)

Observe the dashboard 'US Economic Crisis' overleaf. What are the key points can you find out?

Dashboards

List down some things you are ‘informed’ from this static dashboard



Dashboard 'Insights'

- Now go to Tableau Public where there is a dynamic copy of the dashboard. https://public.tableau.com/en-us/s/gallery/comparing-us-economic-crisis
- Explore the dashboard. From this exploratory analysis, list down some insights that you learn.

- What *underlying communication* (that 1 or 2 key points) is the author of the dashboard trying to say?

Workshop activity II

Learning objectives

- Visual Journalism
- Design a Dash Board with Tableau

Data File: 347144772_42017_5440_airline_delay_causes.csv

Assume you work in an aviation authority in USA as a data evangelist. You have the data for flights delay for the whole of country in the file above for year 2012-2017. You are tasked to use the data to provide some analysis to the management. In this workshop we go through together how we produce the dashboarding to extract insights.

- First, upload and explore the data (as per yesterday).

Exploring Data

- The data is obtained from the website

https://www.bts.gov/topics/airlines-and-airports/understanding-reporting-causes-flight-delays-and-cancellations
https://www.transtats.bts.gov/OT_Delay/OT_DelayCause1.asp

- First, upload and explore the data (as per yesterday). See overleaf.

- The dataset shows by airline, airport the causes of flight delays in seconds. Unfortunately no such data for Changi Airport!

On-Time Arrival Performance
National (February, 2019)

Most Recent Month Year to Date View Pie Chart Print Table Download Raw Data

	Number of Operations	% of Total Operations	Delayed Minutes	% of Total Delayed Minutes
On Time	396,837	74.43%	N/A	N/A
Air Carrier Delay	31,505	5.91%	2,451,971	29.71%
Weather Delay	4,356	0.82%	562,827	6.82%
National Aviation System Delay	40,374	7.57%	2,022,692	24.51%
Security Delay	220	0.04%	18,089	0.22%
Aircraft Arriving Late	43,022	8.07%	3,196,180	38.73%
Cancelled	15,255	2.86%	N/A	N/A
Diverted	1,606	0.30%	N/A	N/A
Total Operations	533,175	100.00%	8,251,759	100.00%

A flight is considered delayed when it arrived 15 or more minutes than the schedule (see definitions in Frequently Asked Questions). Delayed minutes are calculated for delayed flights only.
When multiple causes are assigned to one delayed flight, each cause is prorated based on delayed minutes it is responsible for. The displayed numbers are rounded and may not add up to the total.

SOURCE: Bureau of Transportation Statistics, Airline Service Quality Performance 234

Observing the story

- Now that we have set up some chart practices (recall building blocks), let's take the next step – to inform and communicate via dashboarding. To do so, we need to do some 'pre-processing'.

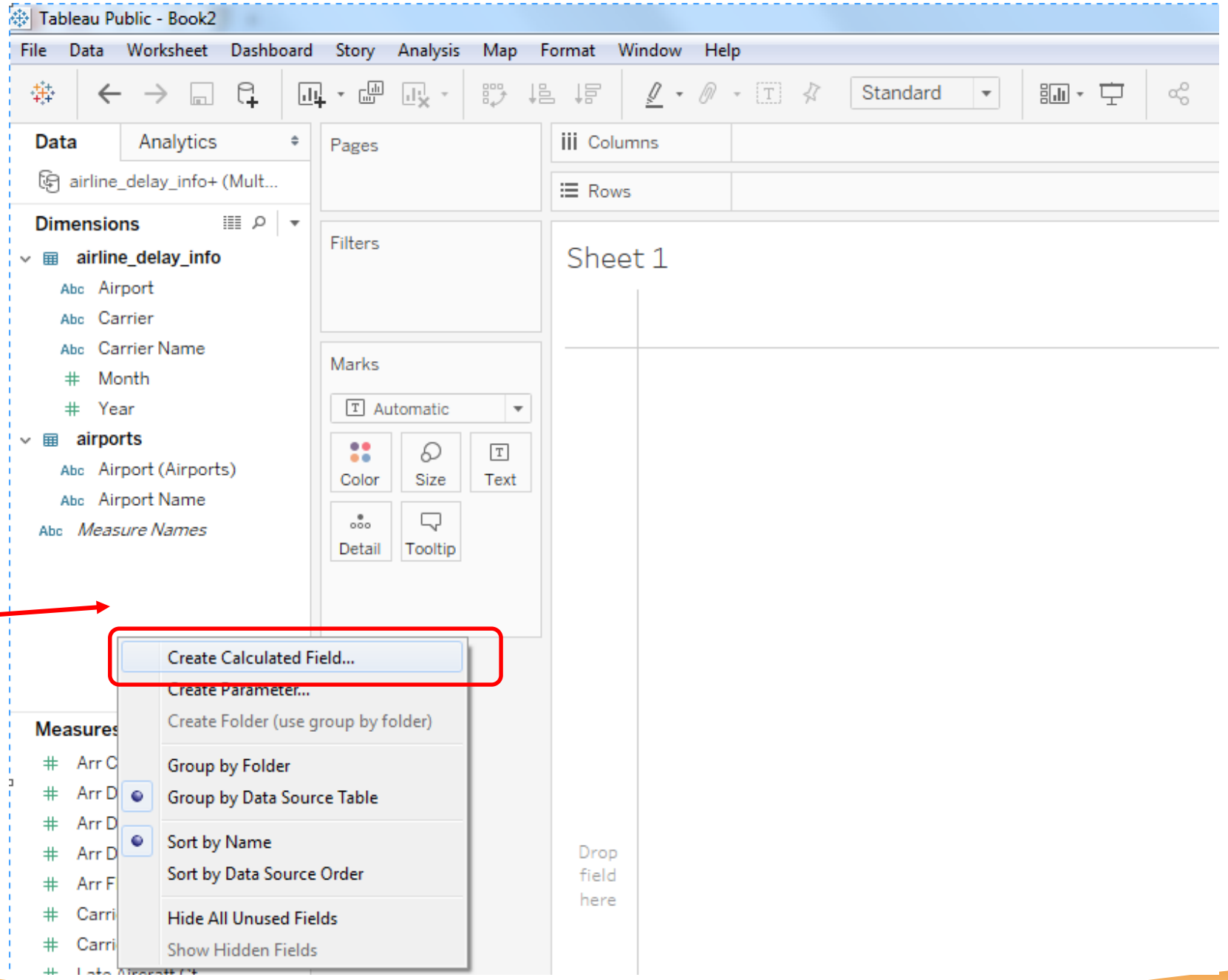
View Data: 347144772_42017_5440_airline_delay_causes

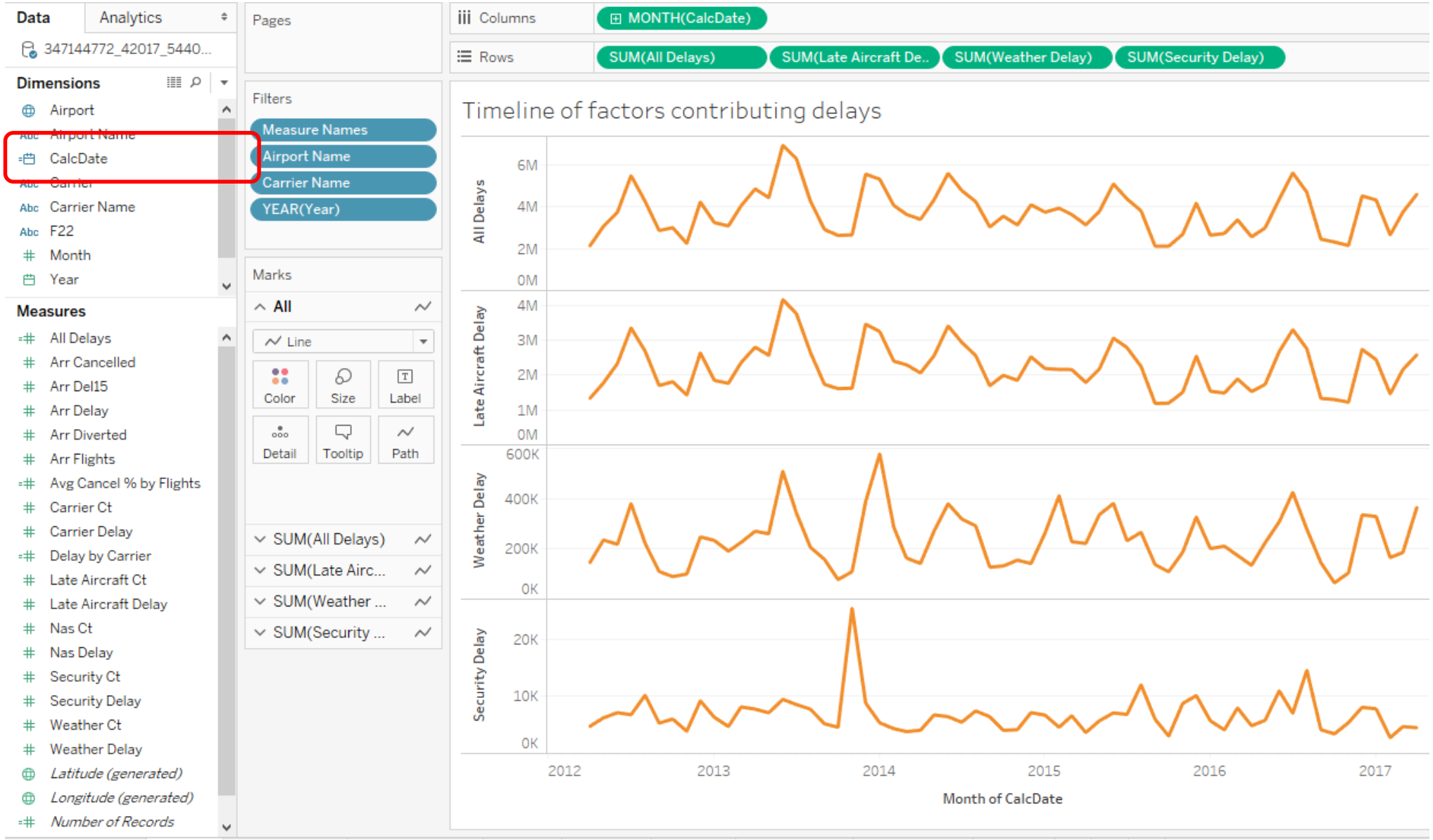
10,000 rows | Show aliases | Copy | Export All

Airport	Airport Name	Carrier	Carrier Name	F22	Month	Year	Arr Cancelled	Arr Del15	Arr Delay	Arr Diverted	Arr Flights	Carrier Ct	Carrier Delay	Late Aircraft Ct	Late Aircraft Delay	Nas Ct	Nas Delay	Number of Records	Security Ct	Security Delay	Weather C
RIC	Richmond, VA: Richmond International	WN	Southwest Airlines Co.	Null	11	2016	0.00	13.00	343.00	0.000	87.00	9.10	172.00	2.83	134.00	1.07	37.00	1	0.0000	0.000	0.00(
RNO	Reno, NV: Reno/Tahoe International	WN	Southwest Airlines Co.	Null	11	2016	0.00	82.00	3,662.00	0.000	585.00	16.85	619.00	56.76	2,826.00	8.39	217.00	1	0.0000	0.000	0.00(
ROC	Rochester, NY: Greater Rochester International	WN	Southwest Airlines Co.	Null	11	2016	2.00	21.00	593.00	0.000	154.00	8.42	178.00	6.17	152.00	4.56	135.00	1	0.0000	0.000	1.84(
RSW	Fort Myers, FL: Southwest Florida International	WN	Southwest Airlines Co.	Null	11	2016	0.00	33.00	1,689.00	0.000	573.00	16.66	993.00	14.70	659.00	1.63	37.00	1	0.0000	0.000	0.00(
SLC	Salt Lake City, UT: Salt Lake City International	WN	Southwest Airlines Co.	Null	11	2016	0.00	117.00	4,564.00	1.000	807.00	33.57	1,105.00	69.85	3,031.00	13.32	408.00	1	0.0000	0.000	0.25(
SMF	Sacramento, CA: Sacramento International	WN	Southwest Airlines Co.	Null	11	2016	1.00	268.00	10,241.00	0.000	1,943.00	68.88	2,849.00	172.05	6,566.00	25.78	762.00	1	0.0000	0.000	1.29(
SNA	Santa Ana, CA: John Wayne Airport-Orange County	WN	Southwest Airlines Co.	Null	11	2016	1.00	187.00	6,251.00	0.000	1,655.00	46.65	1,352.00	109.97	3,787.00	23.34	624.00	1	1.2400	66.000	5.79(
SAN	San Diego, CA: San Diego International	WN	Southwest Airlines Co.	Null	11	2016	12.00	383.00	15,767.00	8.000	2,805.00	97.37	3,862.00	202.17	8,827.00	68.09	2,105.00	1	1.7600	67.000	13.61(
SAT	San Antonio, TX: San Antonio International	WN	Southwest Airlines Co.	Null	11	2016	0.00	222.00	8,756.00	3.000	1,278.00	53.02	1,960.00	112.23	4,962.00	50.11	1,573.00	1	1.6200	42.000	5.01(
SDF	Louisville, KY: Louisville International-Standiford Field	WN	Southwest Airlines Co.	Null	11	2016	0.00	47.00	2,253.00	0.000	349.00	9.00	452.00	29.27	1,499.00	7.74	276.00	1	1.0000	26.000	0.00(
SEA	Seattle, WA: Seattle/Tacoma International	WN	Southwest Airlines Co.	Null	11	2016	0.00	127.00	4,966.00	0.000	1,089.00	37.60	1,612.00	52.16	2,219.00	37.24	1,135.00	1	0.0000	0.000	0.00(
SFO	San Francisco, CA: San Francisco International	WN	Southwest Airlines Co.	Null	11	2016	21.00	297.00	15,968.00	0.000	1,373.00	54.45	2,684.00	134.59	7,406.00	89.32	4,790.00	1	0.0000	0.000	18.64(
SJC	San Jose, CA: Norman Y. Mineta San Jose International	WN	Southwest Airlines Co.	Null	11	2016	6.00	289.00	10,983.00	1.000	2,035.00	74.54	2,916.00	169.35	6,699.00	44.84	1,358.00	1	0.0000	0.000	0.27(
SJU	San Juan, PR: Luis Munoz Marin International	WN	Southwest Airlines Co.	Null	11	2016	0.00	23.00	1,291.00	2.000	307.00	9.58	628.00	10.36	558.00	3.06	105.00	1	0.0000	0.000	0.00(
STL	St. Louis, MO: Lambert-St. Louis International	WN	Southwest Airlines Co.	Null	11	2016	2.00	359.00	15,586.00	2.000	2,904.00	102.51	5,149.00	170.69	7,998.00	79.41	2,274.00	1	2.6200	65.000	3.78(
TPA	Tampa, FL: Tampa International	WN	Southwest Airlines Co.	Null	11	2016	0.00	177.00	8,235.00	1.000	2,225.00	65.16	3,798.00	97.68	3,960.00	14.03	472.00	1	0.0000	0.000	0.13(
TUL	Tulsa, OK: Tulsa International	WN	Southwest Airlines Co.	Null	11	2016	0.00	57.00	2,186.00	0.000	402.00	17.79	614.00	26.77	1,236.00	12.38	328.00	1	0.0000	0.000	0.07(
TUS	Tucson, AZ: Tucson International	WN	Southwest Airlines Co.	Null	11	2016	0.00	59.00	1,972.00	0.000	372.00	20.84	589.00	30.19	1,170.00	7.97	213.00	1	0.0000	0.000	0.00(
LAX	Los Angeles, CA: Los Angeles International	WN	Southwest Airlines Co.	Null	11	2016	21.00	837.00	31,990.00	2.000	3,413.00	158.14	5,936.00	257.56	12,431.00	406.06	12,917.00	1	2.3700	74.000	12.87(
LBB	Lubbock, TX: Lubbock Preston Smith International	WN	Southwest Airlines Co.	Null	11	2016	1.00	36.00	1,522.00	0.000	216.00	10.68	505.00	17.31	763.00	6.08	190.00	1	0.0000	0.000	1.93(
LGA	New York, NY: LaGuardia	WN	Southwest Airlines Co.	Null	11	2016	1.00	298.00	16,752.00	1.000	896.00	43.41	1,904.00	56.93	3,044.00	160.60	9,098.00	1	1.4800	46.000	35.58(
LGB	Long Beach, CA: Long Beach Airport	WN	Southwest Airlines Co.	Null	11	2016	1.00	26.00	693.00	0.000	203.00	7.52	207.00	16.96	454.00	1.52	32.00	1	0.0000	0.000	0.00(
LIT	Little Rock, AR: Bill and Hillary Clinton Nat Adams Field	WN	Southwest Airlines Co.	Null	11	2016	0.00	33.00	1,524.00	0.000	208.00	11.82	547.00	13.68	747.00	7.21	215.00	1	0.0000	0.000	0.29(
MAF	Midland/Odessa, TX: Midland International Air and Space Port	WN	Southwest Airlines Co.	Null	11	2016	1.00	38.00	1,235.00	0.000	250.00	11.88	420.00	19.77	580.00	6.35	235.00	1	0.0000	0.000	0.00(
MCI	Kansas City, MO: Kansas City International	WN	Southwest Airlines Co.	Null	11	2016	2.00	257.00	11,556.00	0.000	1,984.00	85.57	4,095.00	112.21	5,637.00	55.88	1,679.00	1	0.0000	0.000	3.34(
SAV	Savannah, GA: Savannah/Hilton Head International	UA	United Air Lines Inc.	Null	11	2016	0.00	0.00	0.00	0.000	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.0000	0.000	0.00(
MSP	Minneapolis, MN: Minneapolis-St Paul International	AA	American Airlines Inc.	Null	12	2016	7.00	180.00	9,834.00	1.000	739.00	60.05	3,461.00	44.26	2,894.00	70.35	3,230.00	1	0.4400	16.000	4.90(
STL	St. Louis, MO: Lambert-St. Louis International	AA	American Airlines Inc.	Null	12	2016	5.00	122.00	6,703.00	0.000	678.00	48.08	2,560.00	45.34	2,972.00	24.09	890.00	1	0.3800	82.000	4.10(
DFW	Dallas/Fort Worth, TX: Dallas/Fort Worth International	AA	American Airlines Inc.	Null	12	2016	55.00	1,920.00	133,517.00	11.000	11,157.00	577.14	50,609.00	724.85	55,699.00	537.98	18,906.00	1	8.4000	364.000	71.63(
LAX	Los Angeles, CA: Los Angeles International	AA	American Airlines Inc.	Null	12	2016	20.00	1,040.00	66,107.00	18.000	3,394.00	231.73	17,961.00	173.64	14,717.00	601.52	30,090.00	1	1.9800	36.000	31.14(
ORD	Chicago, IL: Chicago O'Hare International	AA	American Airlines Inc.	Null	12	2016	112.00	1,016.00	68,522.00	6.000	5,037.00	275.69	21,631.00	299.28	24,546.00	418.08	19,234.00	1	3.0400	194.000	19.91(
MCO	Orlando, FL: Orlando International	AA	American Airlines Inc.	Null	12	2016	7.00	336.00	20,513.00	2.000	1,572.00	124.41	6,536.00	112.28	9,337.00	88.47	3,761.00	1	2.5100	102.000	8.32(
KOA	Kona, HI: Kona International Airport at Keahole	AA	American Airlines Inc.	Null	12	2016	0.00	30.00	2,637.00	0.000	83.00	12.97	1,350.00	5.17	846.00	11.86	441.00	1	0.0000	0.000	0.00(
MIA	Miami, FL: Miami International	AA	American Airlines Inc.	Null	12	2016	15.00	968.00	55,897.00	11.000	4,612.00	321.44	22,631.00	251.60	18,595.00	360.48	11,731.00	1	2.9000	162.000	31.59(
JFK	New York, NY: John F. Kennedy International	AA	American Airlines Inc.	Null	12	2016	1.00	291.00	20,562.00	1.000	1,511.00	96.85	6,550.00	122.20	10,548.00	68.82	2,704.00	1	0.2800	12.000	2.85(
SFO	San Francisco, CA: San Francisco International	AA	American Airlines Inc.	Null	12	2016	13.00	469.00	26,313.00	14.000	1,270.00	84.10	5,810.00	74.66	5,070.00	302.03	14,522.00	1	0.0000	0.000	8.21(
LAS	Las Vegas, NV: McCarran International	AA	American Airlines Inc.	Null	12	2016	6.00	319.00	19,454.00	0.000	1,174.00	92.06	5,750.00	87.13	7,389.00	127.35	4,698.00	1	1.6900	85.000	10.78(
MEM	Memphis, TN: Memphis International	AA	American Airlines Inc.	Null	12	2016	1.00	33.00	1,910.00	2.000	198.00	11.53	715.00	15.24	1,070.00	5.57	111.00	1	0.6700	14.000	0.00(
BOS	Boston, MA: Logan International	AA	American Airlines Inc.	Null	12	2016	17.00	296.00	16,602.00	1.000	1,884.00	98.77	5,003.00	107.09	7,571.00	79.17	3,315.00	1	0.0000	0.000	10.97(

Tableau Steps:
To create a Calculated Field

Right click on the **Dimensions** region





Create a calculated field

to create an additional field (CalcDate) by combining the Month and Year from the existing dataset

DATE(STR([Month])+ "/" + "01/" + STR([Year]))

DATE("01/"+STR([Month])+"/"+STR([Year]))

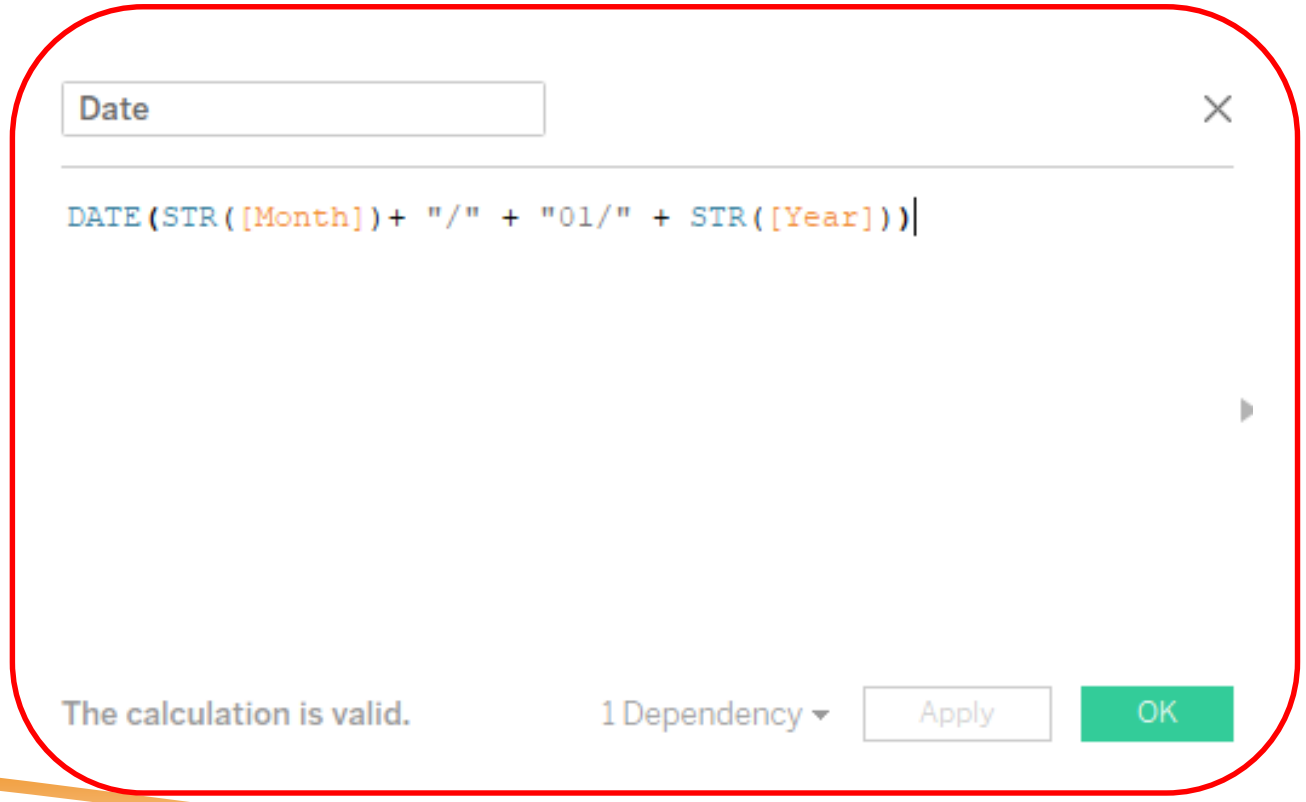
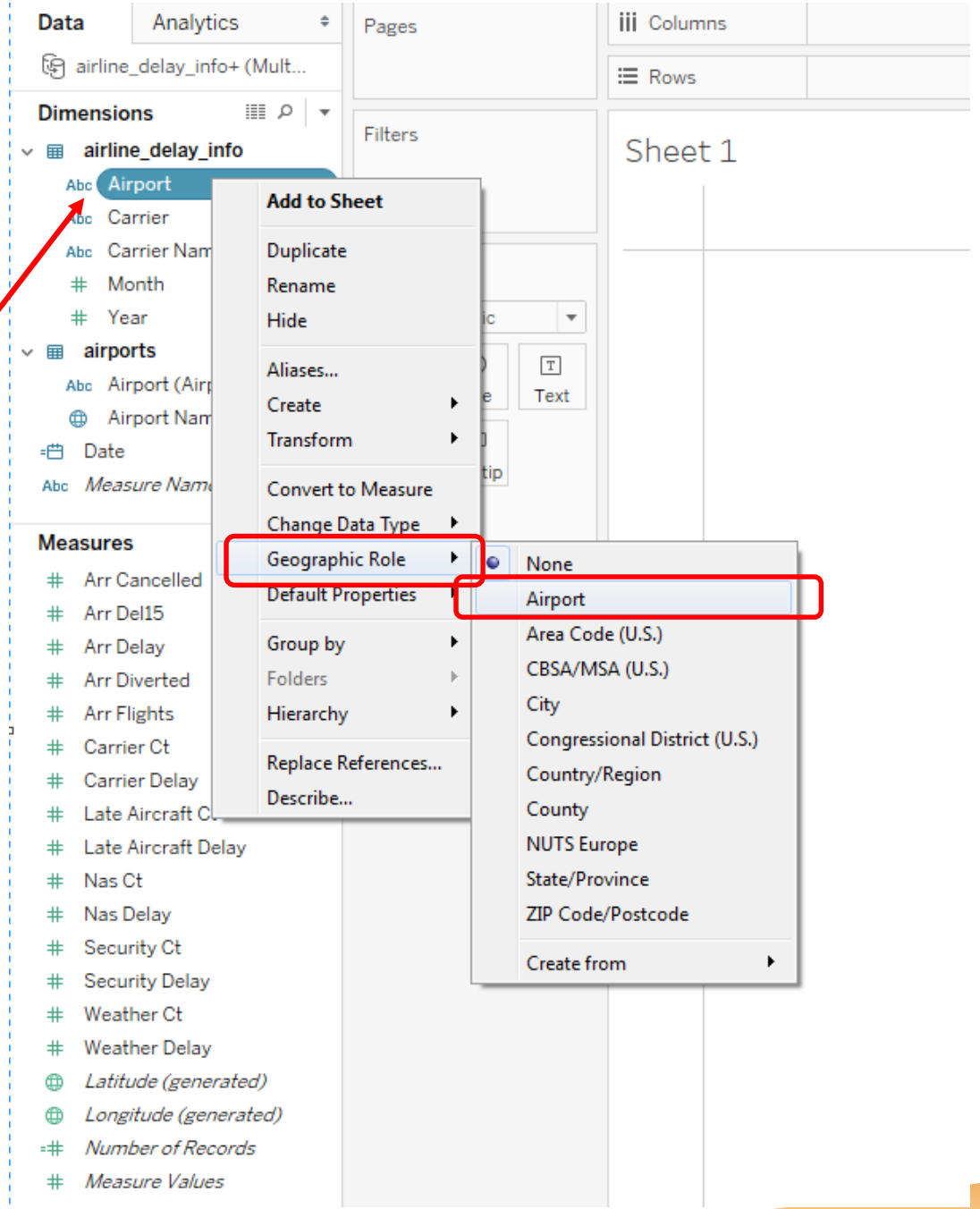
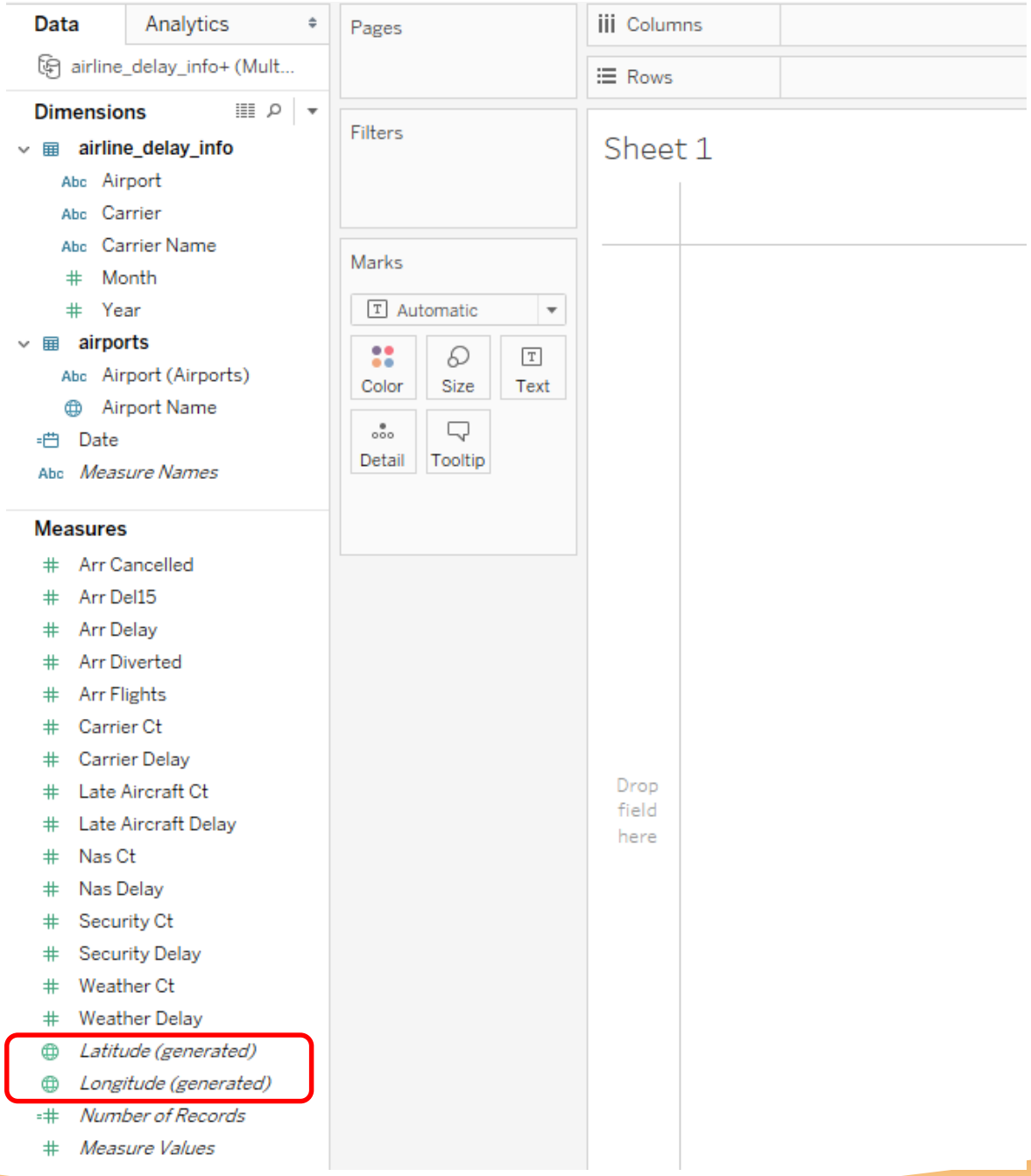


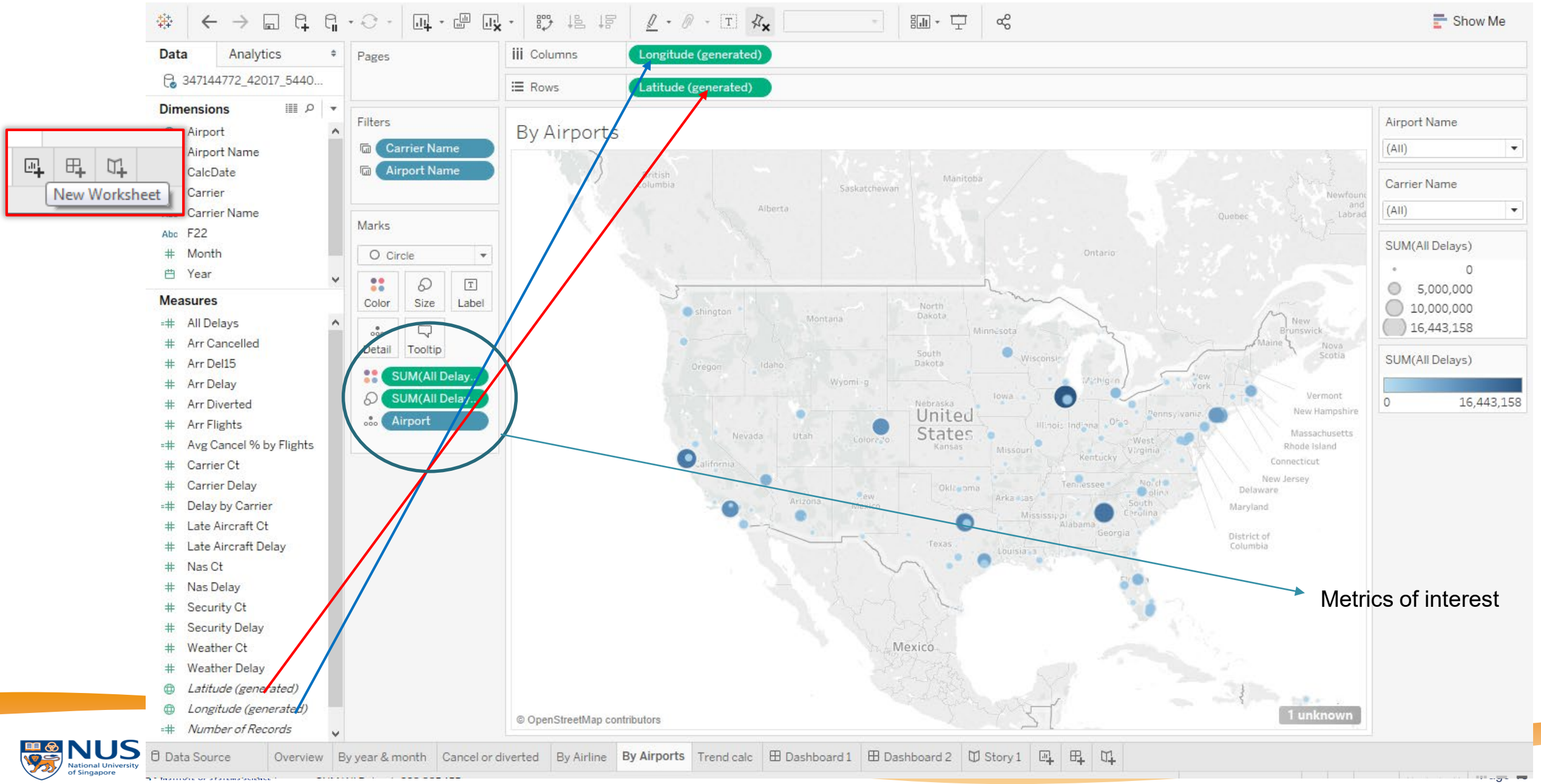
Tableau Steps:
To create Geolocations to answer 'where' in map

To convert the Airport name (text) into Coordinate (longitude, latitude)

Right click on Airport







Metrics of interest

Tableau Steps:
To create trend lines

Creating Trends

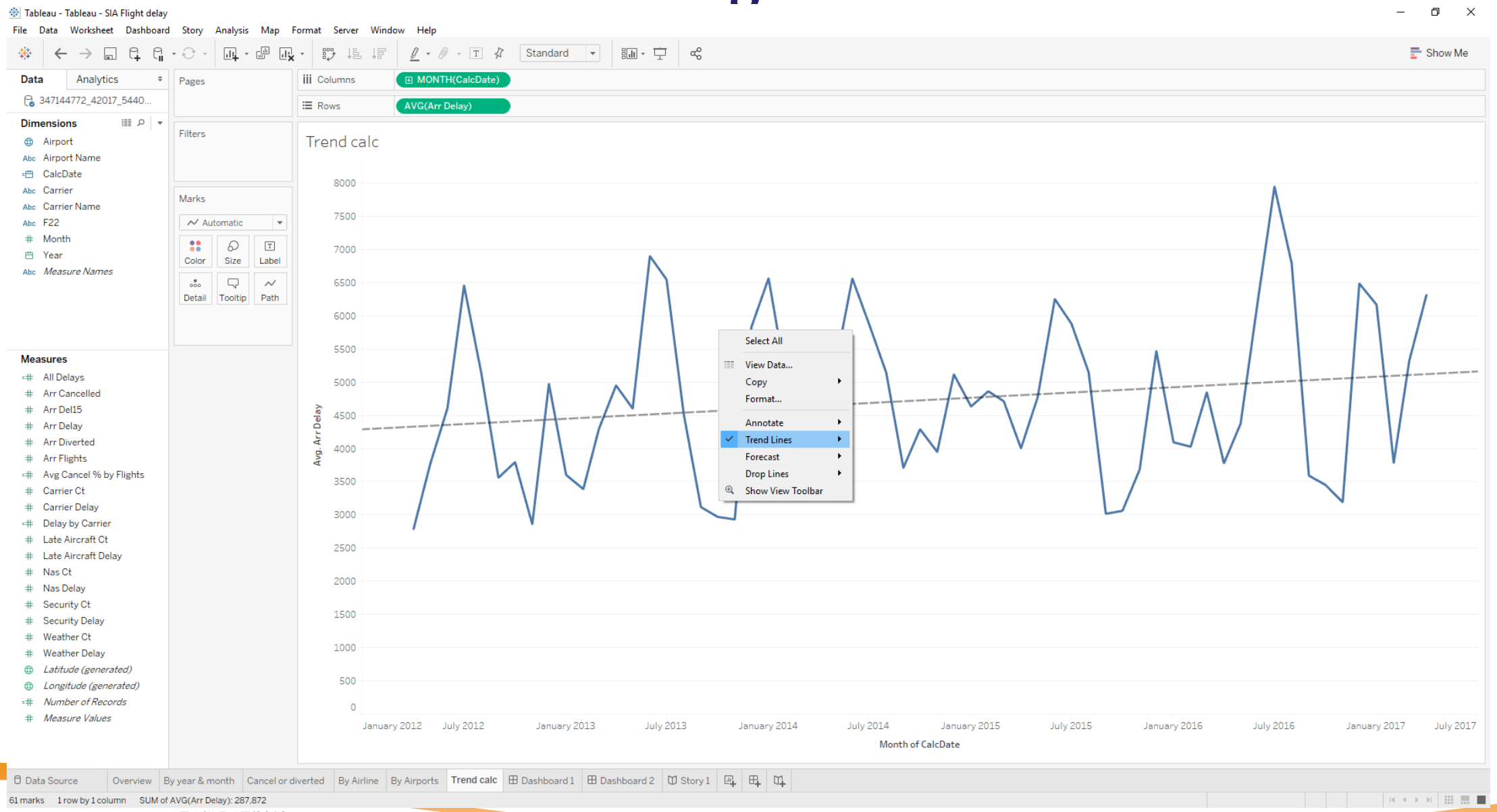


Tableau Steps:
To create dashboards

Creating Dashboards

1. Click the second button

2. Drag and drop the created charts onto the dashboard

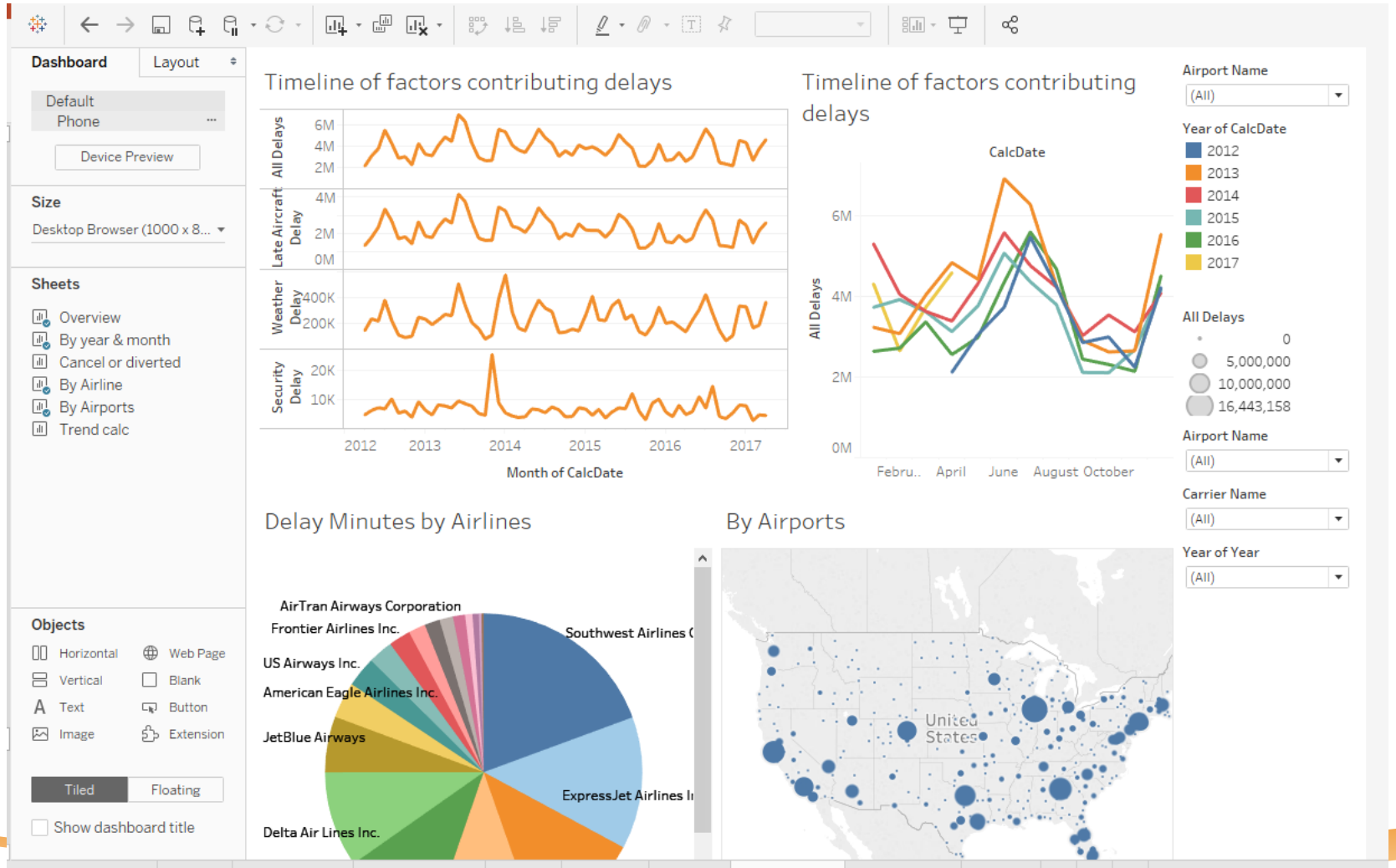


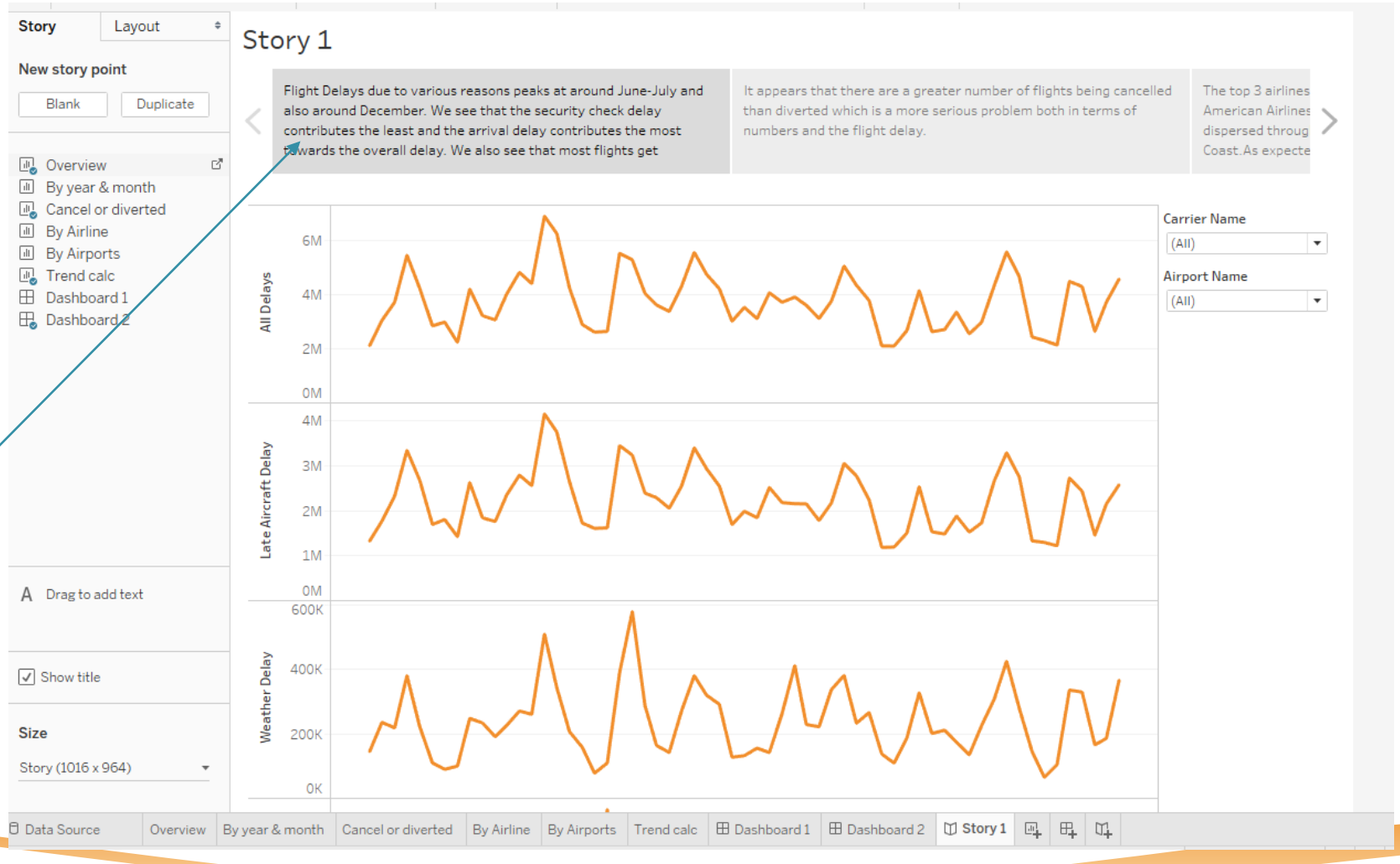
Tableau Steps:
To create storyboard

Creating Storyboards

1. Click the third button

2. Drag and drop the created charts onto the storyboard.

3. Know ‘what’ story you want to communicate first.



Creating Storyboard

- Storyboards are created from the individual dashboards and charts. A storyboard links up all the visuals together in order for you to tell a story.

- Captions in storyboard:
  - Flight Delays due to various reasons peaks at around June-July and also around December. We see that the security check delay contributes the least and the arrival delay contributes the most towards the overall delay. We also see that most flights get cancelled during February and most get delayed around May-July period. This may be due to extreme weather or holiday seasons as we see it peaks around summer and winter.
  - It appears that there are a greater number of flights being cancelled than diverted which is a more serious problem both in terms of numbers and the flight delay.
  - The top 3 airlines experiencing delays are SouthWest, Express, American Airlines.The airports affected by SouthWest are quite dispersed throughout USA, while for Express are largely on the East Coast.As expected the airport DFW affects mainly American Airlines.
  - There is a general trend of the number of delays going up each year.
    Avg. Arr Delay = 0.433513*Month of CalcDate -13450.7
    On average, there is an increase of 43 delays each month. However this model needs to be taken in retrospect due to its poor fit.

Key StoryBoard points

- Some key points of interest:
  - General increase in delays of 43 per month from 2012 to 2017
  - Most delays occur in winter months and are due to security checks.
  - The top 3 airlines affected are SouthWest, Jet Express and American Airlines with their specific locations.

Actionable insights?

_____

_____

Exercise Workshop 2

We will do a similar exercise (from scratch) to the earlier workshop but using more recent data from 2017 to 2018. The data is available in

Data File: 2017-2018_airline_delay_causes.csv

Group yourselves into groups of 4-5 members and perform the tasks below. Snapshot the slides into a Powerpoint slide and submit with your Group Name.

Eg. Group1_Day3PM.ppt The first page should contain the names of the members. Upload to a Google Drive (https://tinyurl.com/yyedln5s)

Exercise Workshop 2

Answer the following questions in your presentation.

- Prepare a chart and then dashboard that highlights the trend of delay types from 2017 to 2018.
- Which months experience the highest number of delays in these 2 years?
- Which airport and airlines are the most notorious in having the most delays?
- What is the general trend being experienced month on month (if any) in these 2 years?
- What actionable insights do you propose in view of your findings? (optional)