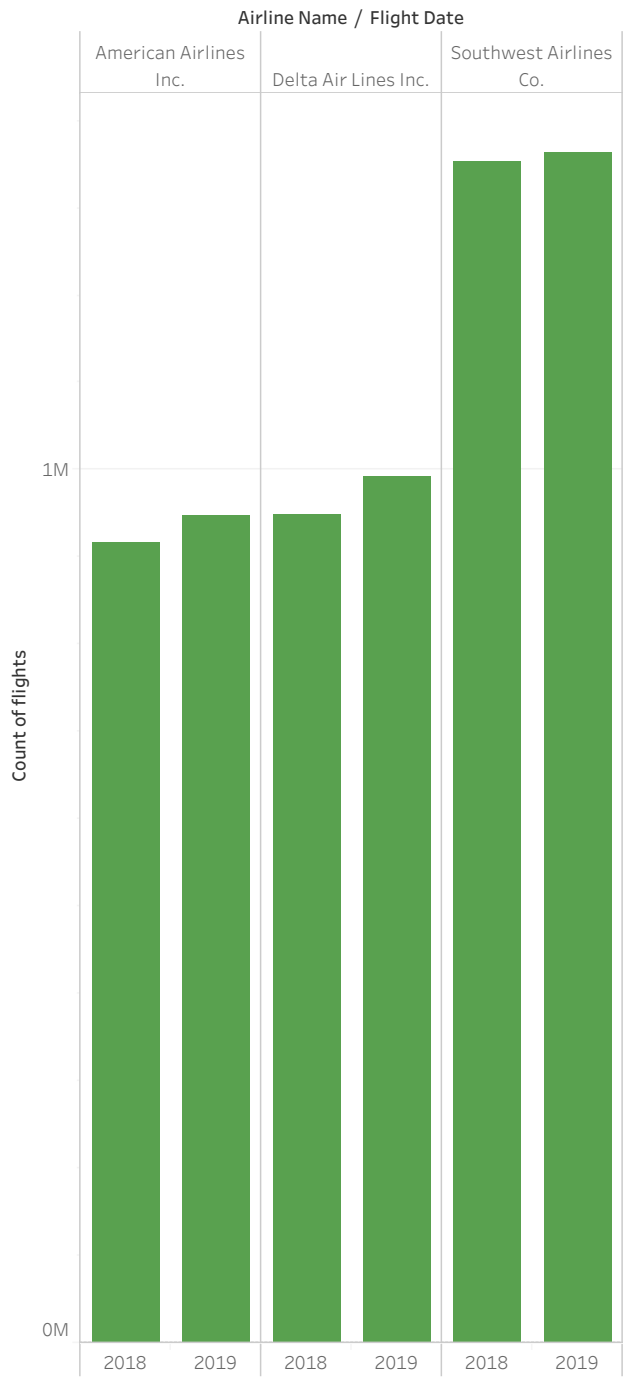


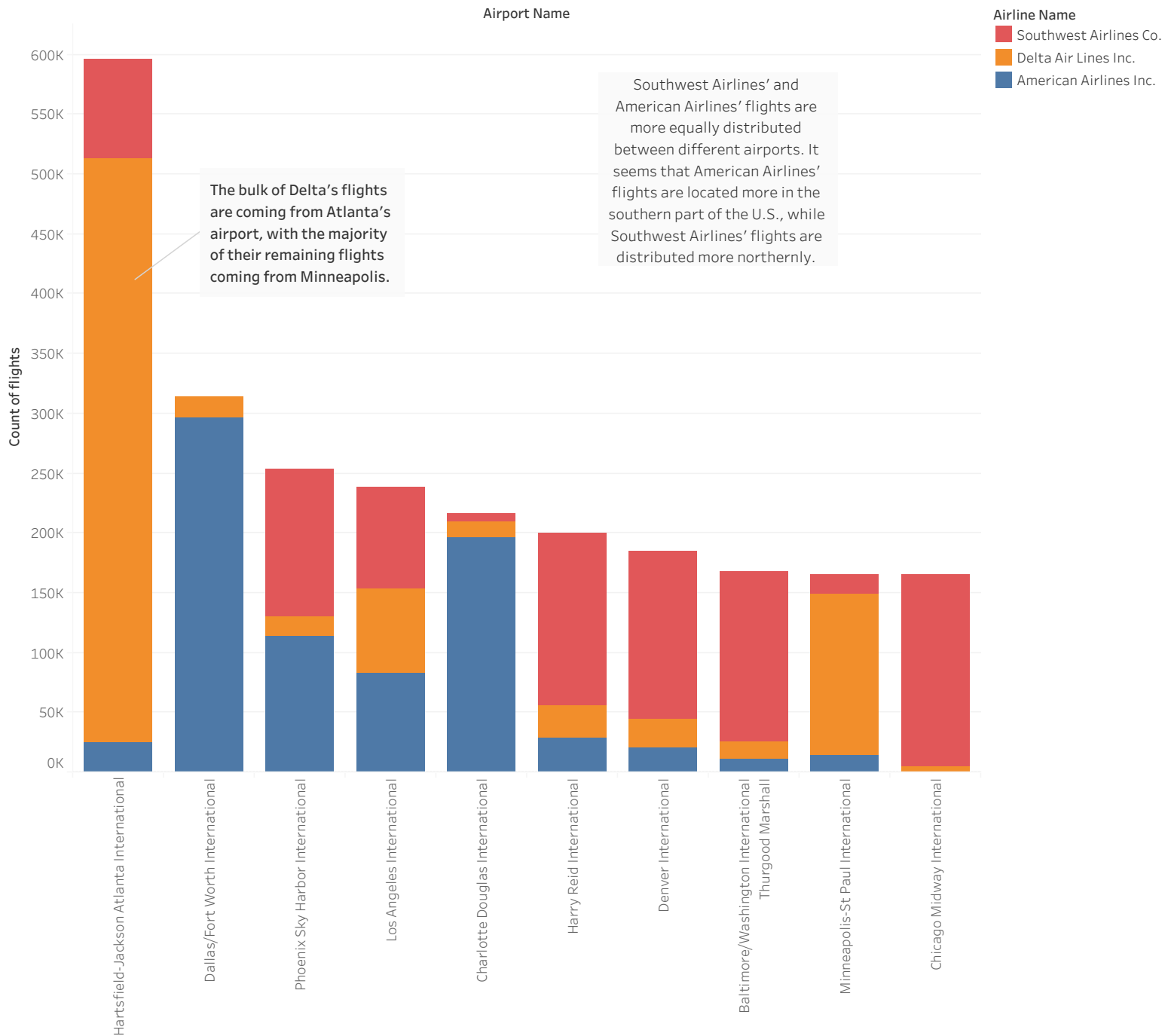
Total Flights per Carrier 2018-2019



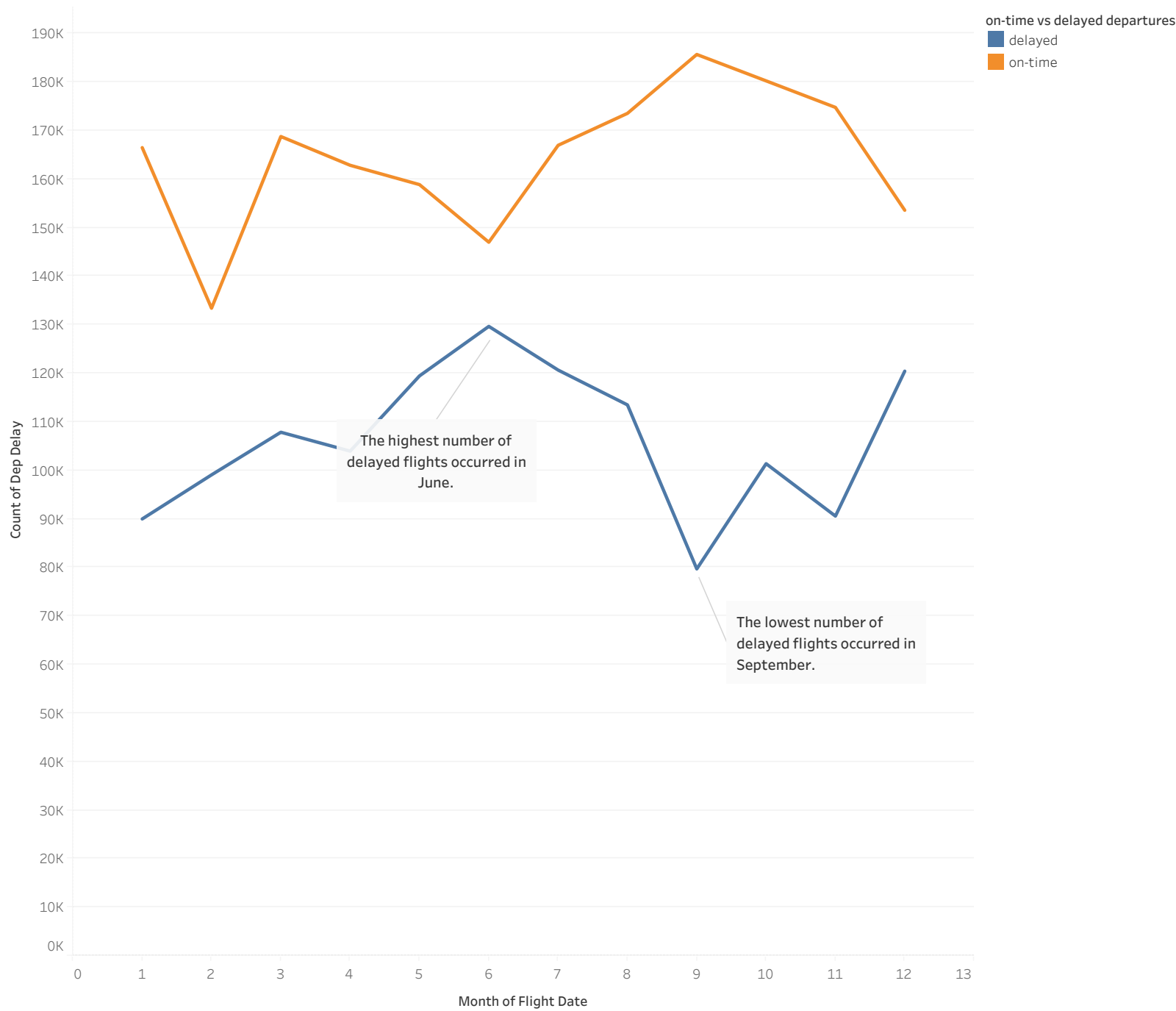
Monthly Flights per Carrier



Most Utilized Origin Airports per Carrier



On-time vs. Delayed Flights for 2019



Average Departure Delays by State and Quarter

State	Flight Date								Avg. Dep Delay	
	2018				2019				<div></div>	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	11.55	103.92
Alabama	26.80	34.82	35.89	24.33	29.03	40.02	35.13	26.68		
Alaska	48.26	57.21	52.55	58.93	41.58	52.91	35.58	54.57		
Arizona	24.62	25.66	32.49	24.32	26.12	29.36	28.82	25.13		
Arkansas	28.23	33.68	33.84	21.35	27.54	36.46	43.43	33.57		
California	27.82	26.95	27.41	26.06	28.65	28.52	26.55	26.88		
Colorado	25.78	29.15	29.41	22.28	29.24	32.27	28.78	25.77		
Connecticut	25.87	33.45	33.98	31.54	29.98	35.04	39.74	29.31		
Florida	29.25	36.54	42.23	30.66	31.46	40.18	41.91	27.83		
Georgia	25.89	32.03	32.28	23.76	25.96	32.97	32.74	21.79		
Hawaii	52.03	53.32	59.89	53.51	52.62	46.73	53.29	42.25		
Idaho	26.96	26.15	27.15	23.44	24.04	34.62	25.60	22.15		
Illinois	25.07	33.04	33.82	26.98	34.16	35.75	36.10	26.09		
Indiana	31.49	37.49	32.31	27.73	31.42	35.00	32.69	25.40		
Iowa	30.57	42.22	32.99	37.19	47.33	43.13	35.10	32.85		
Kansas	40.86	32.55	38.51	24.46	31.91	43.18	31.40	31.62		
Kentucky	28.74	31.82	32.01	24.49	30.58	35.09	31.20	25.72		
Louisiana	26.60	30.64	31.78	26.49	25.20	33.42	30.65	27.98		
Maine	33.95	42.26	42.98	38.89	40.89	33.61	35.47	25.02		
Maryland	22.55	29.17	33.15	28.83	28.99	29.76	30.78	23.09		
Massachusetts	33.30	37.17	43.33	35.28	47.18	41.34	42.94	40.22		
Michigan	34.23	33.08	34.33	24.85	34.46	36.53	39.39	28.92		
Minnesota	30.82	34.82	35.45	25.46	38.95	35.36	38.24	29.23		
Mississippi	33.07	38.80	63.91	39.34	36.64	37.17	40.90	36.91		

The states with the highest average departure delays are North Dakota, West Virginia, and Wyoming. These three states had the highest average delays in Q1 of 2019. North Dakota had the highest average departure delay of any state or time period with 103.92 minutes in quarter three of 2018, as well as pretty high delays in quarters one and two of 2018 and quarter one of 2019. West Virginia and Wyoming both had higher delays in quarters two and four of 2018 and quarter one of 2019. According to a news article from 2018, there was a big storm affecting flights at the end of that year in the Midwest and northern Plains. Likely this or other weather considerations caused the delays in these states.

Average Departure Delays by State and Quarter

State	Flight Date								Avg. Dep Delay	
	2018				2019				<div></div>	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	11.55	103.92
Missouri	24.02	27.00	27.48	23.85	25.89	29.10	25.77	24.17		
Montana	55.13	50.46	38.18	50.69	55.18	40.67	46.93	52.26		
Nebraska	27.80	31.13	34.00	25.18	30.72	32.56	29.17	25.37		
Nevada	24.87	24.96	27.85	23.02	27.39	28.73	24.73	25.50		
New Hampshire	30.97	26.57	35.89	29.23	35.12	31.78	33.05	25.68		
New Jersey	39.49	51.70	59.84	38.85	47.99	62.78	62.56	46.92		
New Mexico	25.98	28.77	27.70	25.09	25.11	26.86	24.91	25.61		
New York	36.34	40.71	47.50	33.93	38.80	46.93	53.03	35.89		
North Carolina	29.11	30.31	34.13	25.17	27.46	37.35	37.12	26.17		
North Dakota	77.11	81.65	103.92	36.39	91.00	42.46	23.92	36.38		
Ohio	32.70	32.59	33.54	28.08	30.55	34.99	32.32	24.36		
Oklahoma	29.63	31.65	30.72	27.59	29.60	35.02	32.23	26.33		
Oregon	24.57	24.54	25.06	22.27	25.12	24.98	25.03	20.62		
Pennsylvania	29.67	35.70	41.67	31.63	34.58	41.32	42.78	32.50		
Puerto Rico	27.36	31.51	43.20	34.21	34.72	40.88	37.10	32.86		
Rhode Island	26.77	33.45	33.89	30.68	32.35	40.91	35.03	27.92		
South Carolina	37.66	40.70	37.07	31.96	38.45	40.52	41.44	27.04		
South Dakota	84.56	64.81	35.43	44.78	61.34	39.46	80.00	57.38		
Tennessee	25.74	29.62	29.86	25.70	26.68	31.96	30.86	24.27		
Texas	27.00	31.89	33.60	28.49	28.64	37.29	31.04	27.28		
U.S. Virgin Islands	31.20	38.21	65.87	48.63	39.91	31.14	42.65	45.93		
Utah	26.71	26.29	27.00	23.77	26.93	29.29	31.86	27.04		
Vermont	41.52	46.04	59.28	29.96	16.33	11.55	18.88	31.71		

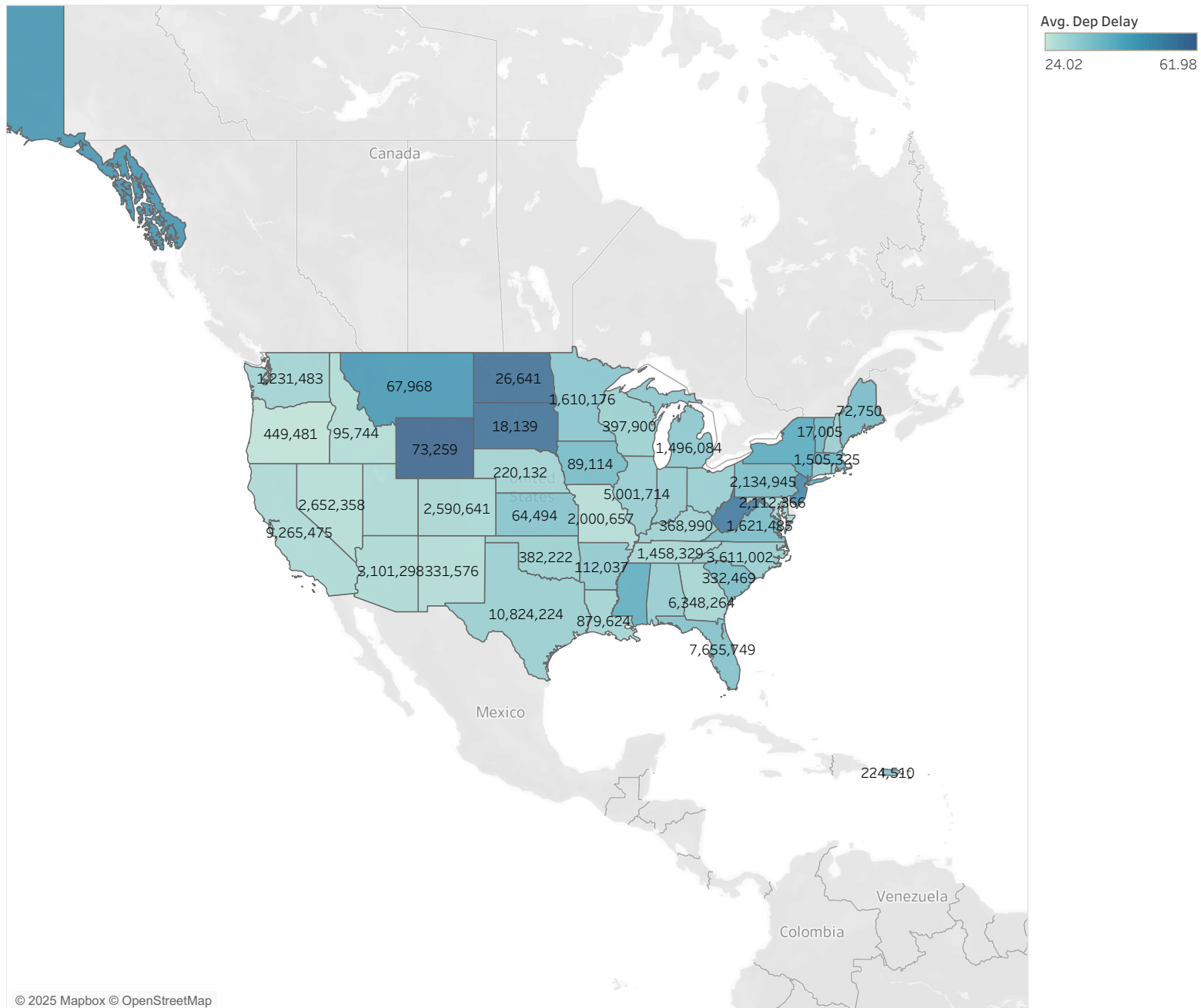
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Average Departure Delays by State and Quarter

State	Flight Date								Avg. Dep Delay <div><div></div><div>11.55103.92</div></div>
	2018				2019				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Virginia	33.82	39.75	41.16	31.36	35.50	40.96	41.04	30.87	
Washington	24.78	26.31	29.36	29.32	38.82	30.25	29.04	27.72	
West Virginia	35.63	74.25	55.43	98.06	87.75	55.50	14.06	23.07	
Wisconsin	30.36	33.41	31.33	27.05	30.41	34.08	30.96	25.57	
Wyoming	34.27	70.38	46.10	85.54	84.66	51.86	74.03	52.40	

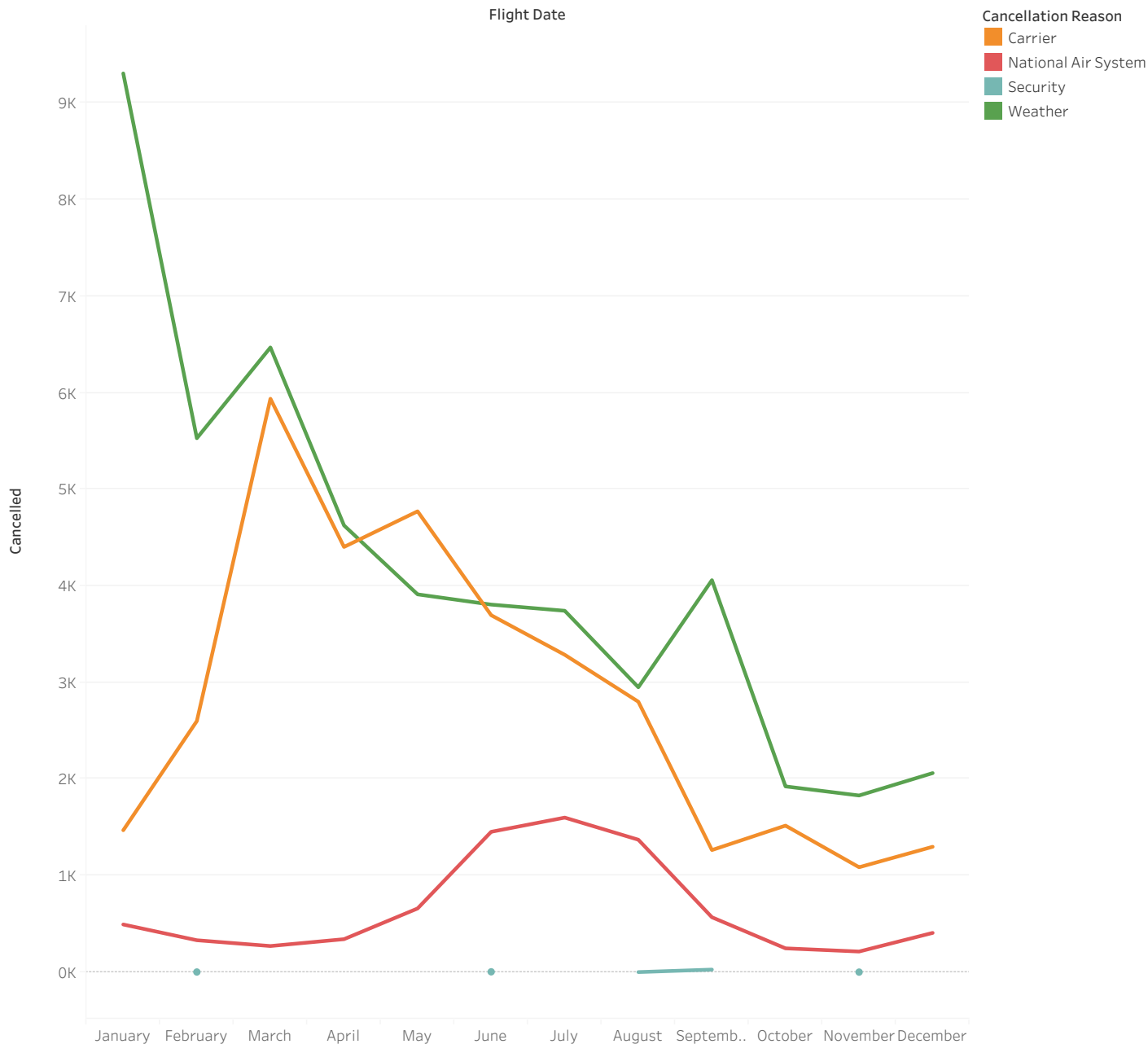
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Average Departure Delays by State




Based on this graphic and the table from the previous slide, it looks like the states with higher average departure delays are more often located in the northern part of the U.S. This makes sense if weather is the largest contributing factor to flight delays.

Number of Cancelled Flights per Month and Reason




Cancellations from weather start out high and decrease as the year goes along. Cancellations because of the carrier peak in March but decrease thereafter. Cancellations because of the National Air System peak in the summer months. Delays of this sort occur when there's a high volume of flights, so this makes sense if there's increased travel in the summer.

Cancellations by Reason and State

State	Cancellation Reason				Count of Cancellation R..
	Carrier	National ..	Security	Weather	
Alabama	33	7		69	1  8,551
Alaska	6		1	2	
Arizona	1,653	164	12	995	
Arkansas	14	2		40	
California	8,280	1,799	8	2,440	
Colorado	974	172		1,953	
Connecticut	114	34		417	
Florida	2,254	387	1	4,248	
Georgia	1,116	216	2	1,871	
Hawaii	143			11	
Idaho	17	3		18	
Illinois	1,947	643	2	6,144	
Indiana	210	32	1	304	
Iowa	30	1		40	
Kansas	21	1		54	
Kentucky	103	37		302	
Louisiana	450	63	1	600	
Maine	23	18		73	
Maryland	1,122	807		2,149	
Massachusetts	769	366		1,641	
Michigan	250	58		621	
Minnesota	229	60	1	893	
Mississippi	1	1		9	
Missouri	921	146		1,673	
Montana	3	1		11	
Nebraska	85	11		201	

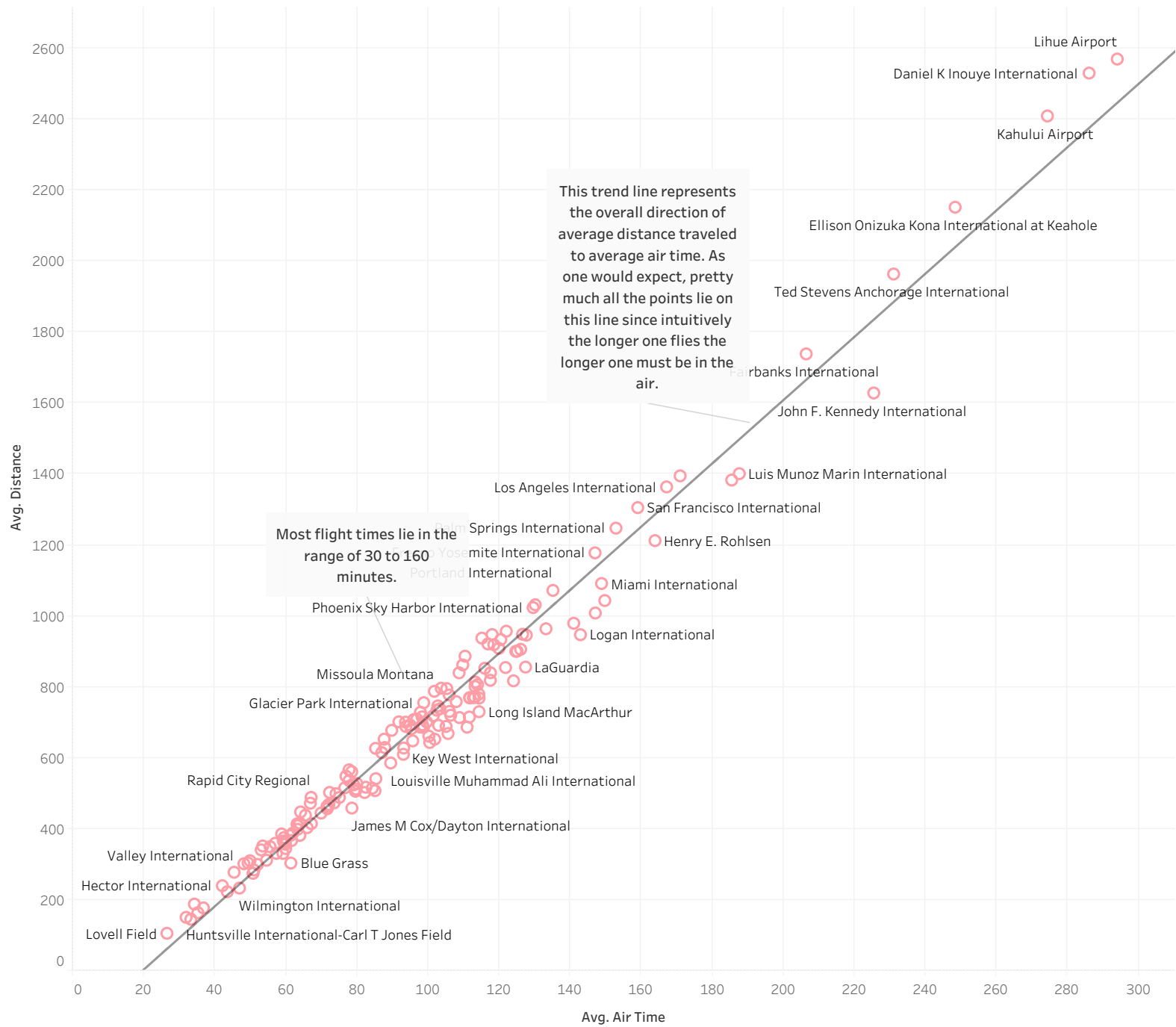
Count of Cancellation Reason broken down by Cancellation Reason vs. State. Color shows count of Cancellation Reason. The marks are labeled by count of Cancellation Reason. The view is filtered on Cancellation Reason and State. The Cancellation Reason filter keeps Carrier, National Air System, Security and Weather. The State filter keeps 51 of 51 members.

Cancellations by Reason and State

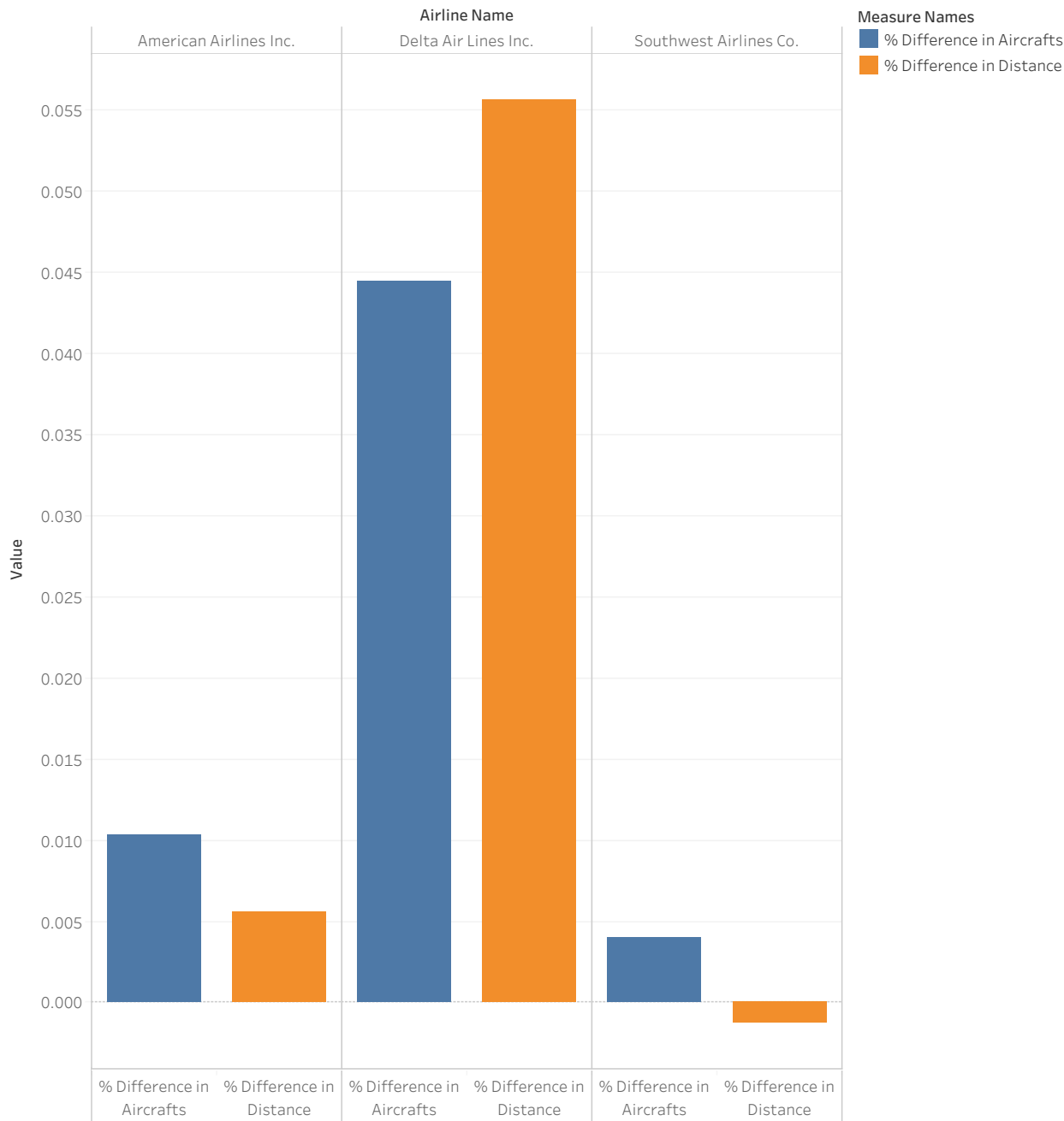
State	Cancellation Reason				Count of Cancellation R..
	Carrier	National ..	Security	Weather	
Nevada	1,426	210		825	 18,551
New Hampshire	43	32		132	
New Jersey	218	201		573	
New Mexico	92	13		209	
New York	1,165	679		3,235	
North Carolina	1,282	304	2	2,731	
North Dakota	1			19	
Ohio	292	58		554	
Oklahoma	153	9		357	
Oregon	157	22		134	
Pennsylvania	900	215		1,894	
Puerto Rico	57	6		50	
Rhode Island	87	48		306	
South Carolina	58	22		430	
South Dakota	1			12	
Tennessee	612	112		914	
Texas	5,402	609	3	8,551	
U.S. Virgin Islands	5			6	
Utah	141	20		221	
Vermont	13	3		5	
Virginia	823	297		1,643	
Washington	278	34		286	
West Virginia	1				
Wisconsin	158	38	1	340	
Wyoming	8	1		19	

Count of Cancellation Reason broken down by Cancellation Reason vs. State. Color shows count of Cancellation Reason. The marks are labeled by count of Cancellation Reason. The view is filtered on Cancellation Reason and State. The Cancellation Reason filter keeps Carrier, National Air System, Security and Weather. The State filter keeps 51 of 51 members.

Average Flight Time vs. Average Distance Traveled

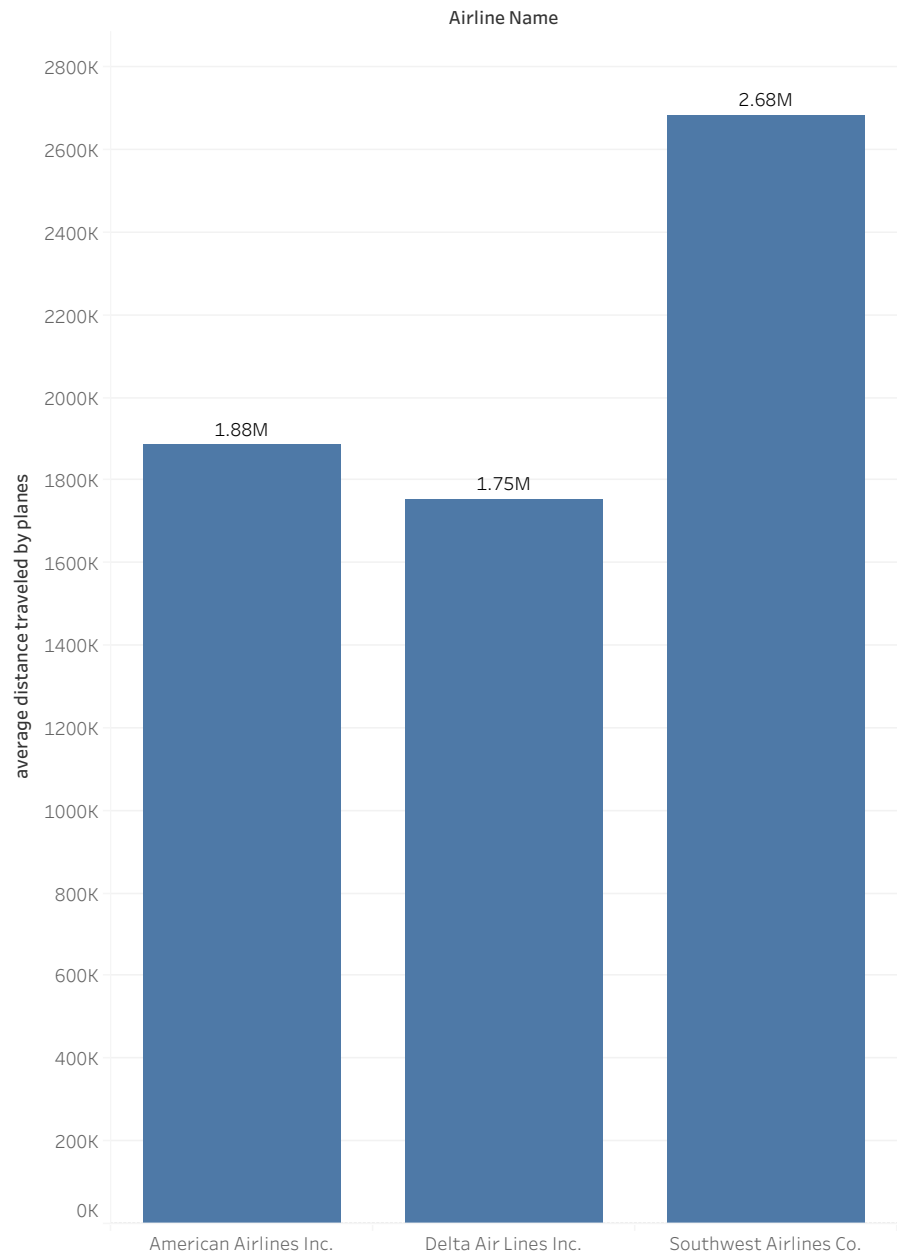


Year Over Year Growth for Distance and Aircrafts



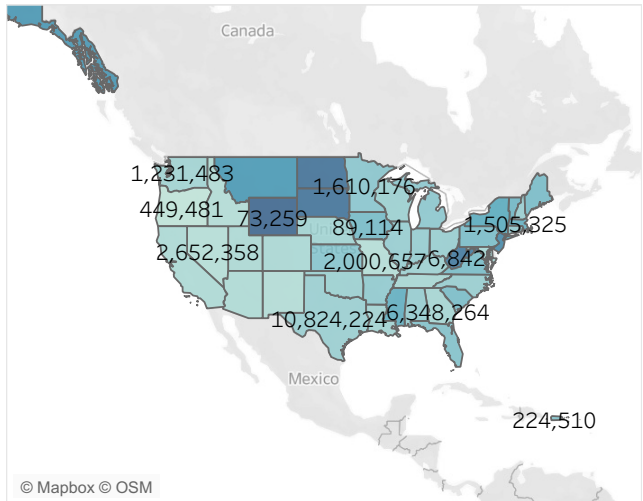
Delta Air Lines shows by far the most growth for both total distance traveled and number of planes. Notably, Southwest Airlines has minimal growth in the number of planes and a decrease in the total distance traveled.

Average Distance Traveled by Planes per Carrier



Southwest Airlines has the highest average distance traveled by plane, plus, based on the previous visualization, they have the lowest growth in the number of planes. Taken together with the fact that they cover the most distance in total (visualization Q1.1), it seems that they are the most efficient in terms of getting the most out of their aircrafts.

Average Departure Delays by State



Cancellations by Reason and State

State	Cancellation Reason			
	Carrier	National ..	Security	Weather
Alabama	33	7		69
Alaska	6		1	2
Arizona	1,653	164	12	995
Arkansas	14	2		40
California	8,280	1,799	8	2,440
Colorado	974	172		1,953
Connecticut	114	34		417
Florida	2,254	387	1	4,248
Georgia	1,116	216	2	1,871
Hawaii	143			11
Idaho	17	3		18
Illinois	1,947	643	2	6,144

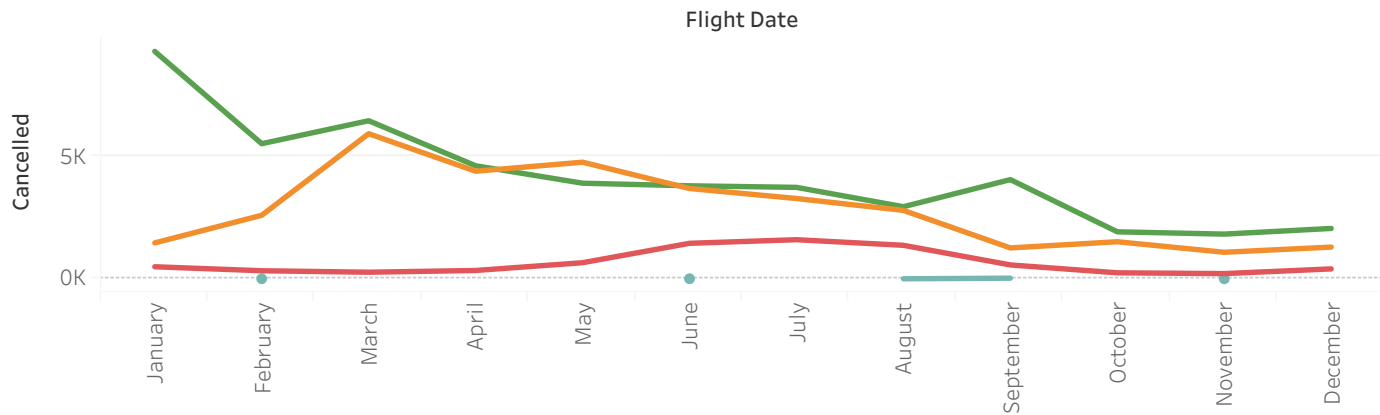
Avg. Dep Delay



State

- ☒ Alabama
- ☒ Alaska
- ☒ Arizona
- ☒ Arkansas
- ☒ California
- ☒ Colorado
- ☒ Connecticut
- ☒ Florida
- ☒ Georgia
- ☒ Hawaii
- ☒ Idaho
- ☒ Illinois
- ☒ Indiana
- ☒ Iowa
- ☒ Kansas
- ☒ Kentucky
- ☒ Louisiana
- ☒ Maine
- ☒ Maryland
- ☒ Massachusetts
- ☒ Michigan
- ☒ Minnesota
- ☒ Mississippi
- ☒ Missouri
- ☒ Montana
- ☒ Nebraska
- ☒ Nevada
- ☒ New Hampshire

Number of Cancelled Flights per Month and Reason



Count of Cancellation Rea..



Cancellation Reason

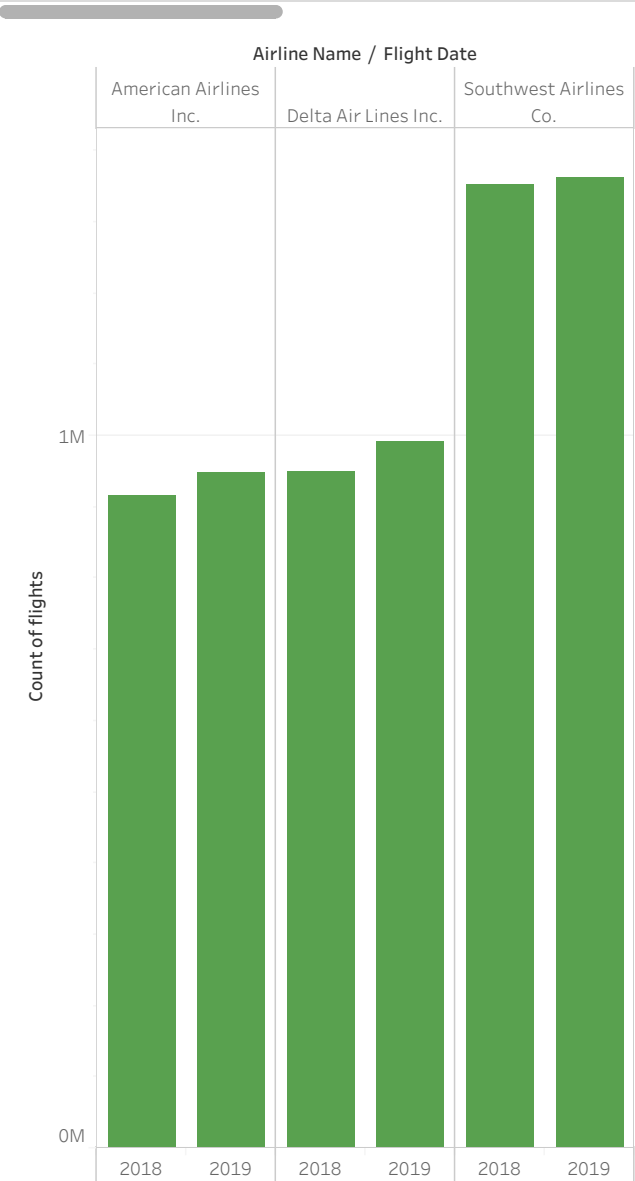
- Carrier
- National Air System
- Security
- Weather

Air Traffic Analysis

To start of the analysis, we'll look at a basic measure. This bar chart compares the number of total flights over 2018-2019 for each airline carrier. Southwest Airlines has the most with over 2.5 million, while Delta Air Lines and American Airlines both come in under 2 million.

Breaking the previous measure down a bit more, here we can see how many flights each airline carrier totals each month over the same time period.

This visualization shows similar data in a different format, this time ..



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Breaking the previous measure down a bit more, here we can see how many flights each airline carrier totals each month over the same time period.

This visualization shows similar data in a different format, this time it's the number of flights broken up by the top ten origin airports.

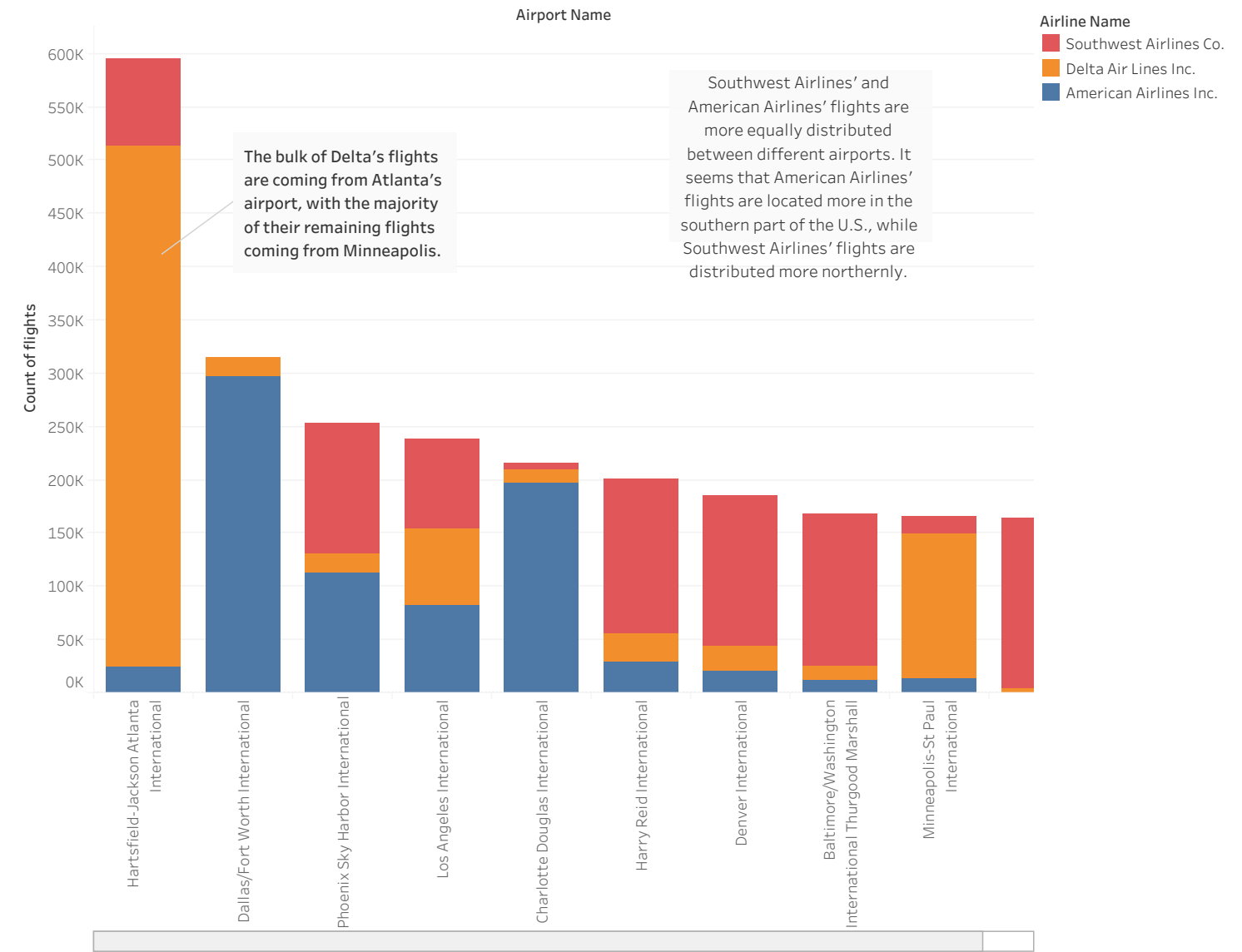


Air Traffic Analysis

Breaking the previous measure down a bit more, here we can see how many flights each airline carrier totals each month over the same time period.

This visualization shows similar data in a different format, this time it's the number of flights broken up by the top ten origin airports.

Here we start an analysis of delayed and cancelled flights. This chart shows the number of delayed flights per month in 2019.

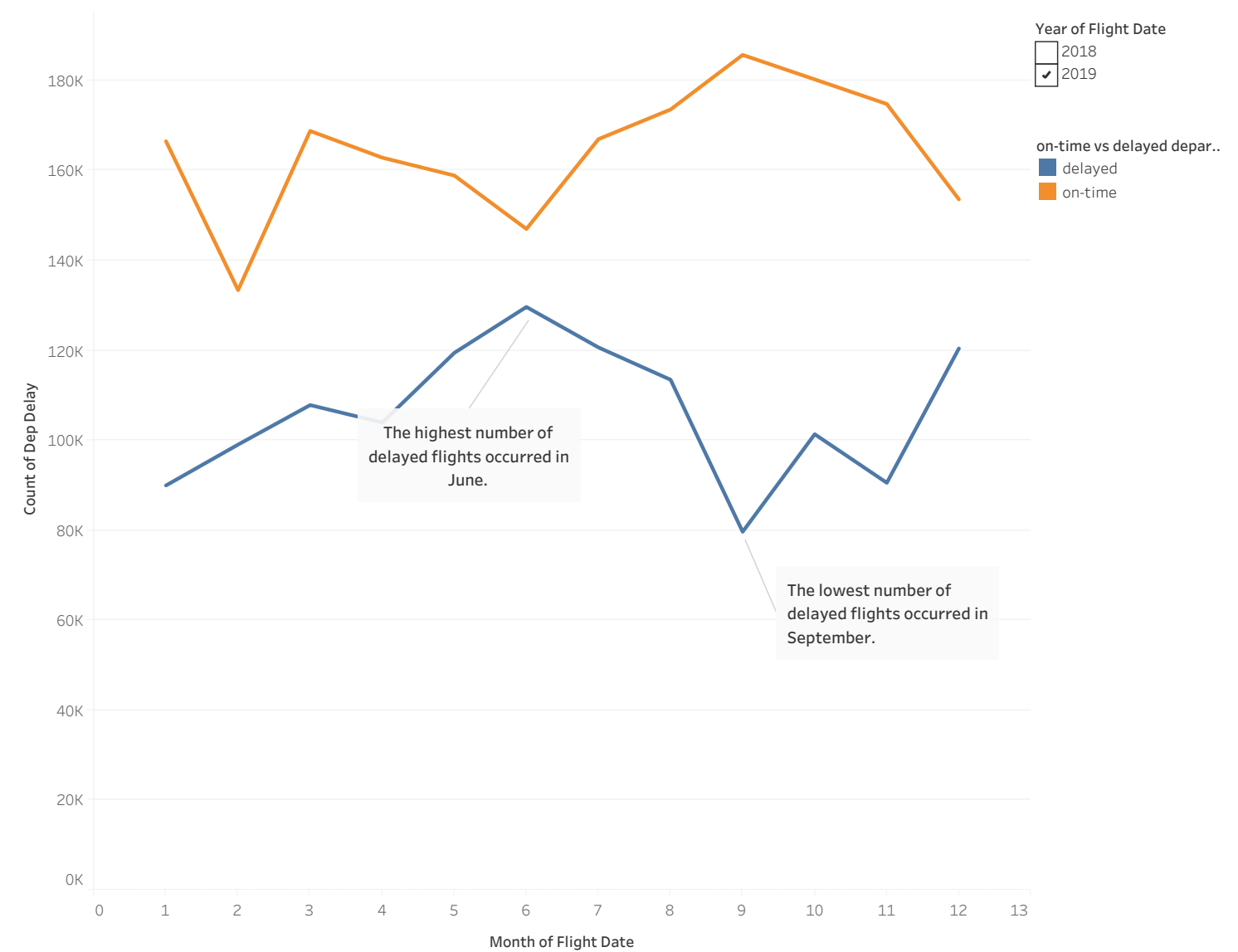


Air Traffic Analysis

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This chart goes more in depth into the average departure delay times, but this time per state. The three states with the highest average delay times are North Dakota, West Virginia, and Wy..



Air Traffic Analysis

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This chart goes more in depth into the average departure delay times, but this time per state. The three states with the highest average delay times are North Dakota, West Virginia, and Wyoming.

Here we can view similar data in a more intuitive geographic visual. We can see that it's largely states in the northern part of the U.S. that have higher average departure delays.

State	Flight Date							
	2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Alabama	26.80	34.82	35.89	24.33	29.03	40.02	35.13	26.68
Alaska	48.26	57.21	52.55	58.93	41.58	52.91	35.58	54.57
Arizona	24.62	25.66	32.49	24.32	26.12	29.36	28.82	25.13
Arkansas	28.23	33.68	33.84	21.35	27.54	36.46	43.43	33.57
California	27.82	26.95	27.41	26.06	28.65	28.52	26.55	26.88
Colorado	25.78	29.15	29.41	22.28	29.24	32.27	28.78	25.77
Connecticut	25.87	33.45	33.98	31.54	29.98	35.04	39.74	29.31
Florida	29.25	36.54	42.23	30.66	31.46	40.18	41.91	27.83
Georgia	25.89	32.03	32.28	23.76	25.96	32.97	32.74	21.79
Hawaii	52.03	53.32	59.89	53.51	52.62	46.73	53.29	42.25
Idaho	26.96	26.15	27.15	23.44	24.04	34.62	25.60	22.15
Illinois	25.07	33.04	33.82	26.98	34.16	35.75	36.10	26.09
Indiana	31.49	37.49	32.31	27.73	31.42	35.00	32.69	25.40
Iowa	30.57	42.22	32.99	37.19	47.33	43.13	35.10	32.85
Kansas	40.86	32.55	38.51	24.46	31.91	43.18	31.40	31.62
Kentucky	28.74	31.82	32.01	24.49	30.58	35.09	31.20	25.72
Louisiana	26.60	30.64	31.78	26.49	25.20	33.42	30.65	27.98
Maine	33.95	42.26	42.98	38.89	40.89	33.61	35.47	25.02
Maryland	22.55	29.17	33.15	28.83	28.99	29.76	30.78	23.09
Massachusetts	33.30	37.17	43.33	35.28	47.18	41.34	42.94	40.22
Michigan	34.23	33.08	34.33	24.85	34.46	36.53	39.39	28.92
Minnesota	30.82	34.82	35.45	25.46	38.95	35.36	38.24	29.23
Mississippi	33.07	38.80	63.91	39.34	36.64	37.17	40.90	36.91
Missouri	24.02	27.00	27.48	23.85	25.89	29.10	25.77	24.17
Montana	55.13	50.46	38.18	50.69	55.18	40.67	46.93	52.26
Nebraska	27.80	31.13	34.00	25.18	30.72	32.56	29.17	25.37
Nevada	24.87	24.96	27.85	23.02	27.39	28.73	24.73	25.50
New Hampshire	30.97	26.57	35.89	29.23	35.12	31.78	33.05	25.68
New Jersey	39.49	51.70	59.84	38.85	47.99	62.78	62.56	46.92
New Mexico	25.98	28.77	27.70	25.09	25.11	26.86	24.91	25.61
New York	36.34	40.71	47.50	33.93	38.80	46.93	53.03	35.89
North Carolina	29.11	30.31	34.13	25.17	27.46	37.35	37.12	26.17
North Dakota	77.11	81.65	103.92	36.39	91.00	42.46	23.92	36.38
Ohio	32.70	32.59	33.54	28.08	30.55	34.99	32.32	24.36
Oklahoma	29.63	31.65	30.72	27.59	29.60	35.02	32.23	26.33

on-time vs delayed depar..

- ☒ delayed
- ☐ on-time

Avg. Dep Delay

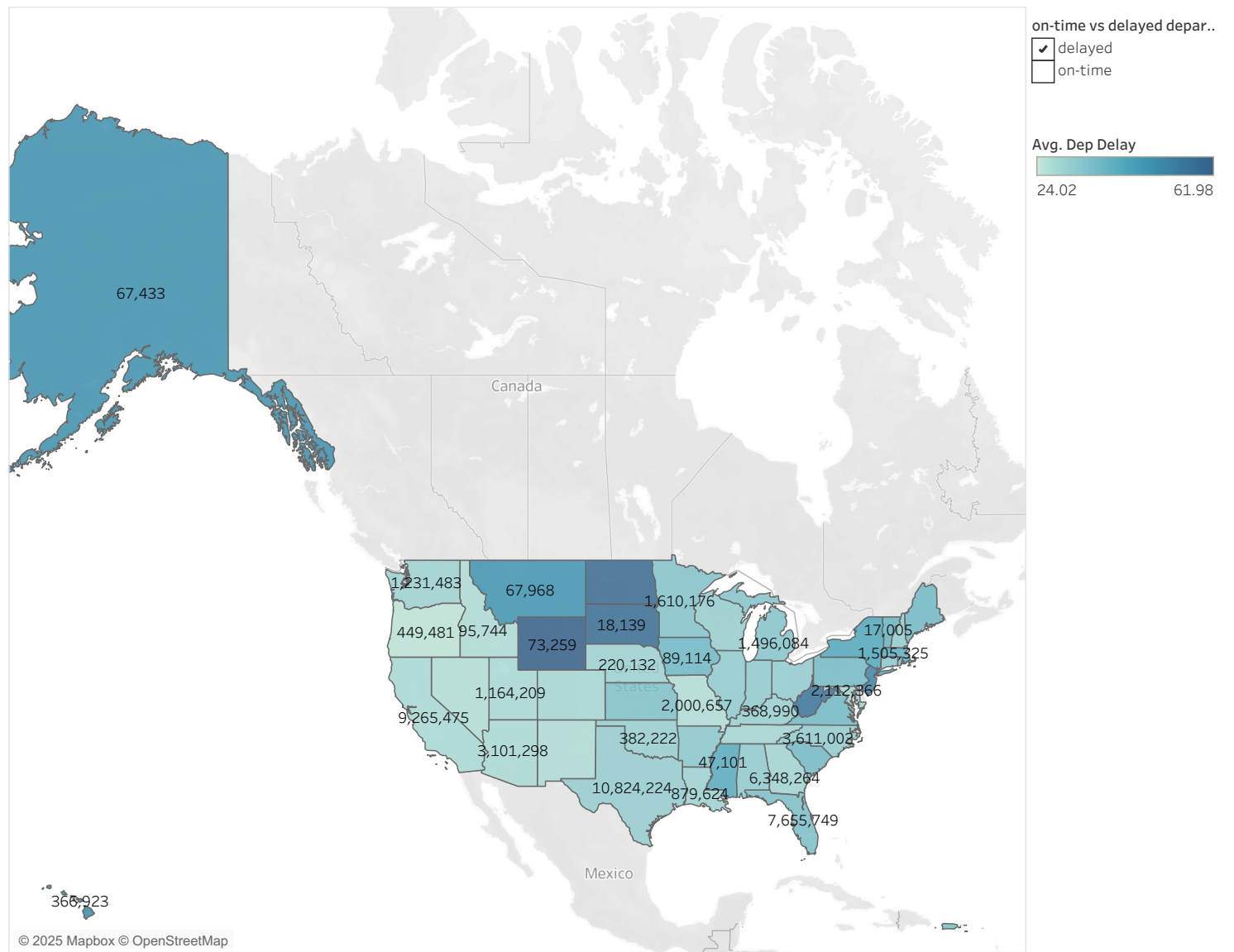


Air Traffic Analysis

This chart goes more in depth into the average departure delay times, but this time per state. The three states with the highest average delay times are North Dakota, West ..

Here we can view similar data in a more intuitive geographic visual. We can see that it's largely states in the northern part of the U.S. that have higher average departure delays.

Now we look at the numbers of cancelled flights instead of delayed. This chart shows how many flights were cancelled in each month broken up by cancellation reason.

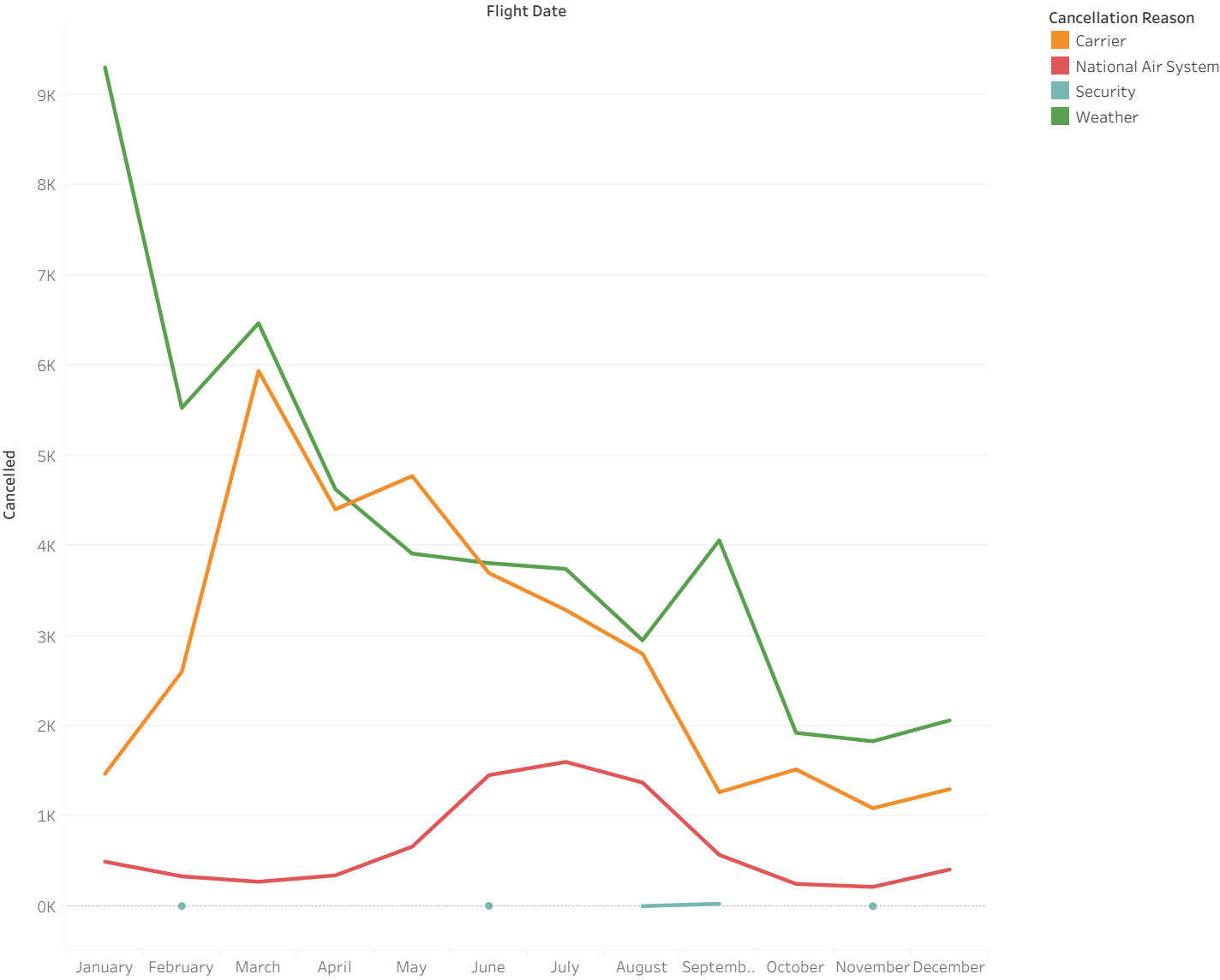


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Now we want to estimate the costs for each airline. We'll start with this chart that shows the average distance compared to the average air time per flight. Unsurprisingly, the airports tha..

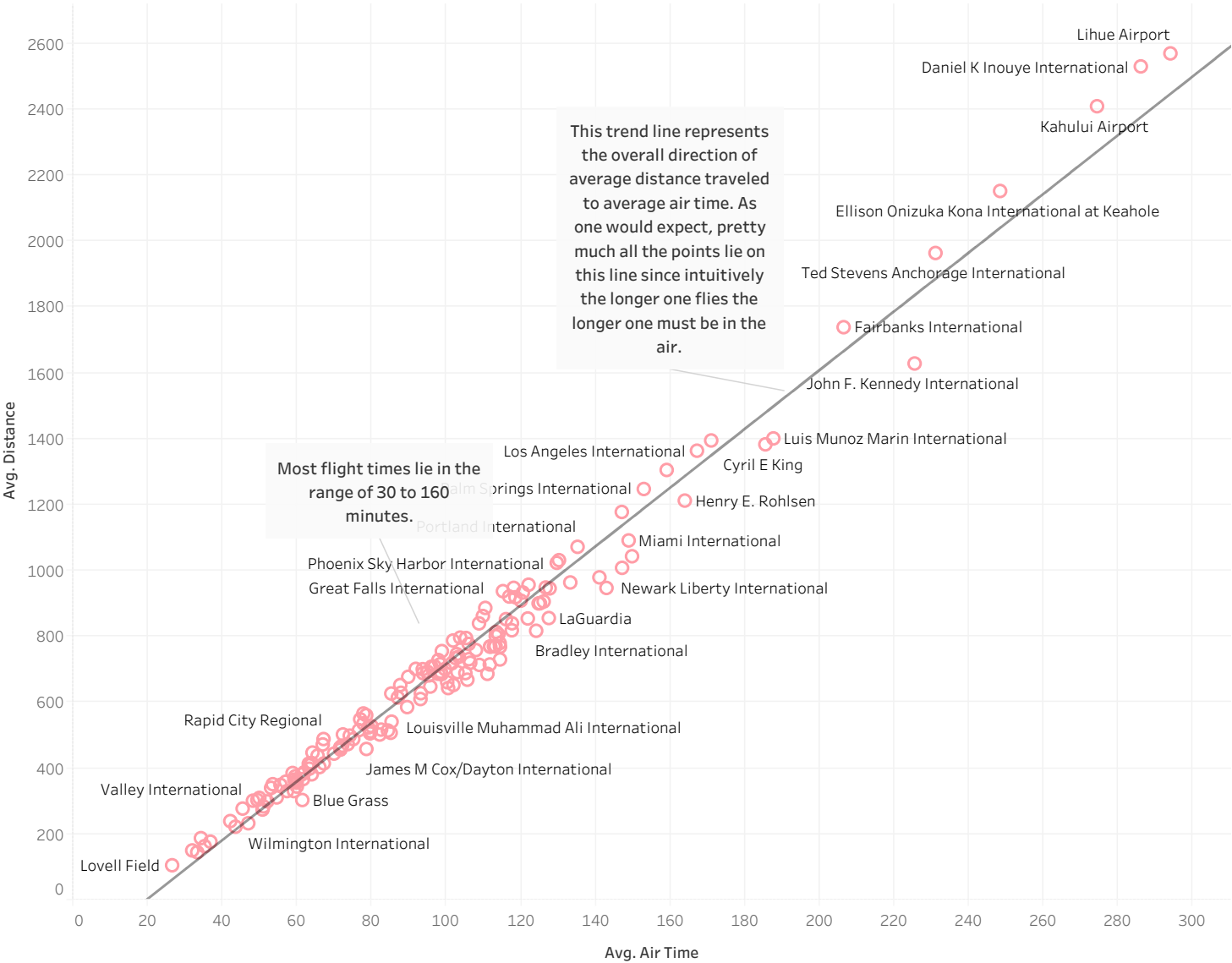


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Here we see the Year over Year Growth for planes and for total distance by airline. Delta Air Lines shows the highest growth by far, which can be interpreted as a positive sign for the compan..

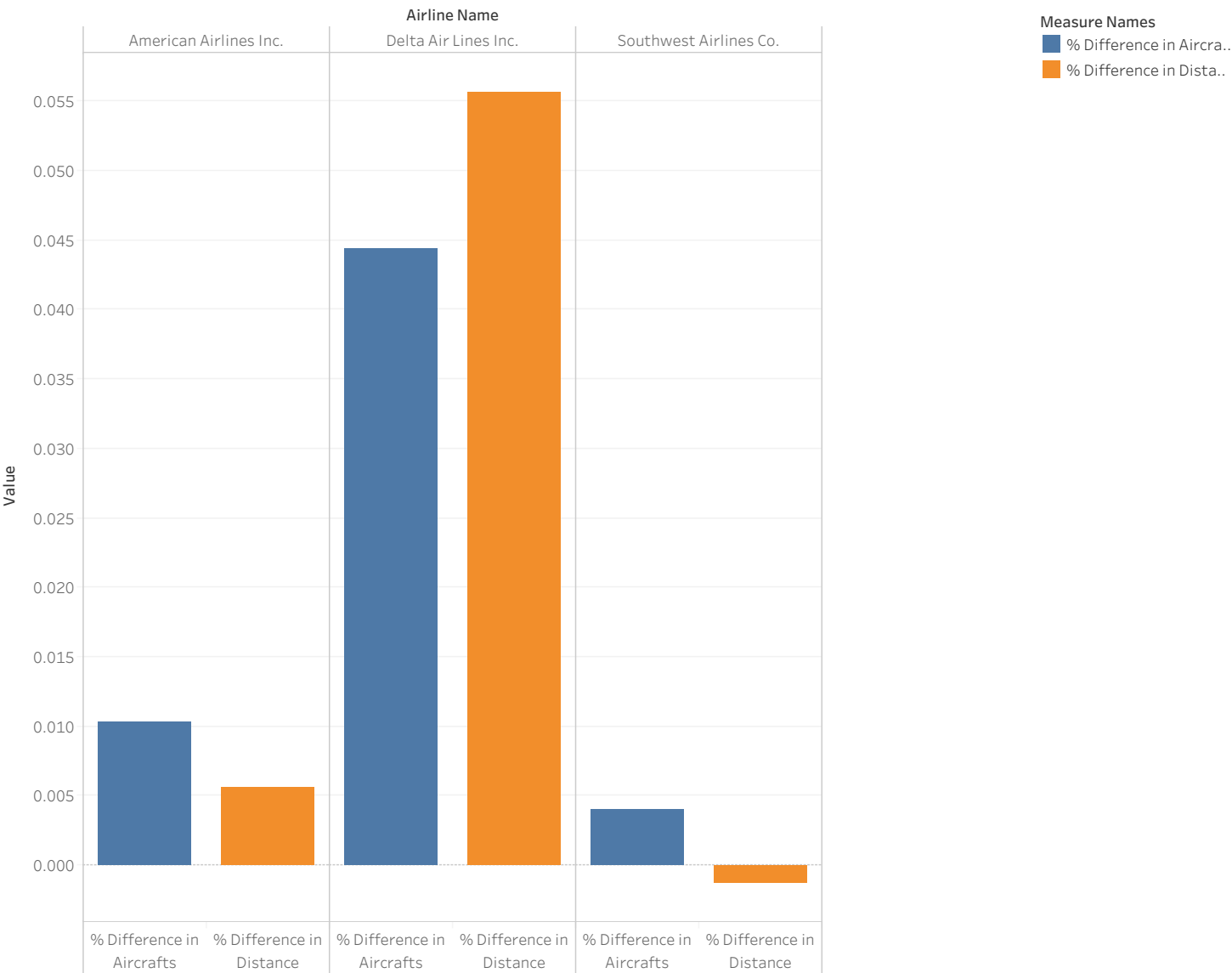


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Here we see the Year over Year Growth for planes and for total distance by airline. Delta Air Lines shows the highest growth by far, which can be interpreted as a positive sign for the company. However, Southwest Airlines' lack of growth could indicate higher efficiency in terms of plane ..

This graphic shows the average distance traveled by each plane owned by the different airlines. Southwest Airlines has the highest average, which again, could indicate higher effi..

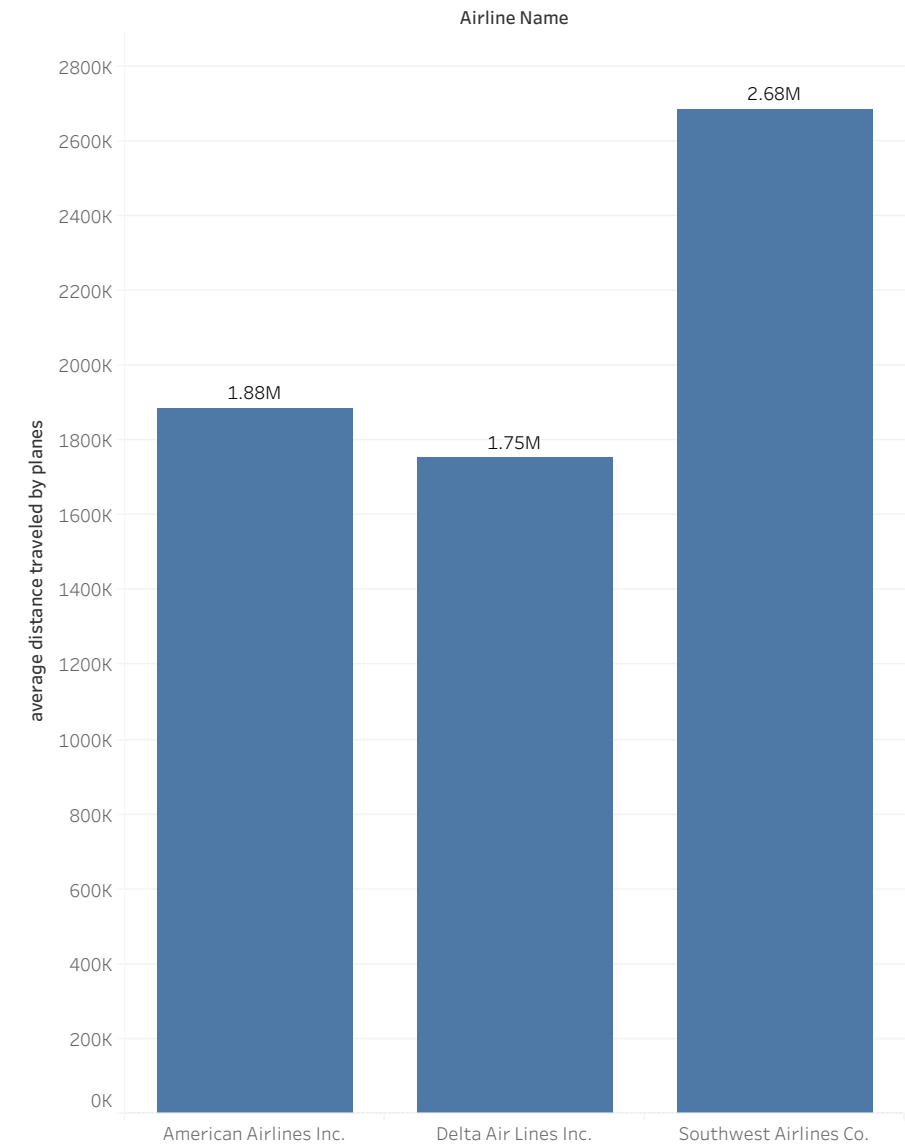


Air Traffic Analysis

Here we see the Year over Year Growth for planes and for total distance by airline. Delta Air Lines shows the highest growth by far, which can be interpreted as a positive sign f..

This graphic shows the average distance traveled by each plane owned by the different airlines. Southwest Airlines has the highest average, which again, could indicate higher efficiency, however it could also mean higher equipment costs.

This chart shows the number of cancellations broken up by reason and state. It should help ascertain where most cancellations are happening, and by combining this information ..



Air Traffic Analysis

This graphic shows the average distance traveled by each plane owned by the different airlines. Southwest Airlines has the highest average, which again, could indicate higher e..

This chart shows the number of cancellations broken up by reason and state. It should help ascertain where most cancellations are happening, and by combining this information with the airlines' frequent origin airports, could help determine which airlines are more susceptible to can..

This dashboard shows a cohesive view of cancellations and delays. The filters on the side allow for varied views.

State	Cancellation Reason			
	Carrier	National ..	Security	Weather
Alabama	33	7		69
Alaska	6		1	2
Arizona	1,653	164	12	995
Arkansas	14	2		40
California	8,280	1,799	8	2,440
Colorado	974	172		1,953
Connecticut	114	34		417
Florida	2,254	387	1	4,248
Georgia	1,116	216	2	1,871
Hawaii	143			11
Idaho	17	3		18
Illinois	1,947	643	2	6,144
Indiana	210	32	1	304
Iowa	30	1		40
Kansas	21	1		54
Kentucky	103	37		302
Louisiana	450	63	1	600
Maine	23	18		73
Maryland	1,122	807		2,149
Massachusetts	769	366		1,641
Michigan	250	58		621
Minnesota	229	60	1	893
Mississippi	1	1		9
Missouri	921	146		1,673
Montana	3	1		11
Nebraska	85	11		201
Nevada	1,426	210		825
New Hampshire	43	32		132
New Jersey	218	201		573
New Mexico	92	13		209
New York	1,165	679		3,235
North Carolina	1,282	304	2	2,731
North Dakota	1			19
Ohio	292	58		554
Oklahoma	153	9		357
Oregon	157	22		134

- State
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Alabama
- ☒

Alaska
- ☒

Arizona
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Arkansas
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California
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Connecticut
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Missouri
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Montana
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Nebraska
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Nevada
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New Hampshire
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New Jersey
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New Mexico
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New York
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North Carolina
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North Dakota
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Ohio
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Oklahoma
- ☒

Oregon
- ☒

Pennsylvania

Count of Cancellation Rea..

1

8,551

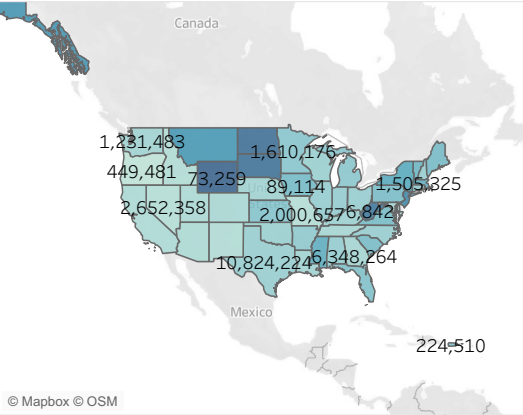
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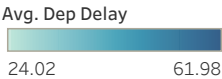
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Average Departure Delays by State



Cancellations by Reason and State

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 - ☒ Maine
 - ☒ Maryland
 - ☒ Massachusetts
 - ☒ Michigan
 - ☒ Minnesota
 - ☒ Mississippi
 - ☒ Missouri
 - ☒ Montana
 - ☒ Nebraska
 - ☒ Nevada
 - ☒ New Hampshire



- Cancellation Reason
- Carrier
 - National Air System
 - Security
 - Weather

Number of Cancelled Flights per Month and Reason

