Variance Analysis (Budget vs Actual)

EOMonth	Aspen	Carlota	Quad
1/31/2019	261026.28	165161.1	177625.63
2/28/2019	266139.2	205856.3	180197.12
3/31/2019	242084.62	229690.8	122247.42
4/30/2019	255810.62	242299.2	196508.89
5/31/2019	336485	207927	249977.68
6/30/2019	314705.98	239581.2	146357.82
7/31/2019	301014.26	184332.8	160984.85
8/31/2019	318504.4	210655.9	212605.12
9/30/2019	275060.39	172385.2	178230.74
10/31/2019	1375480.94	1110606	913136.07
11/30/2019	2830524.51	2506367	2036848.89
12/31/2019	2345748.75	2115293	1577168.89
1/31/2020	325463.31	240171.1	165238.34
2/29/2020	266471.58	164923.1	136111.22
3/31/2020	343068.28	171700.1	240491.86
4/30/2020	210544.84	216189	186988.46
5/31/2020	183812.48	212709.7	191078.15
6/30/2020	269180.63	284865.2	257248.81
7/31/2020	290873.23	227074.2	153180.66
8/31/2020	247731.24	266354.3	193006.78
9/30/2020	291061.68	262863.5	251355.99
10/31/2020	953278.45	779194.6	743120.17

Figure 1: Budget Table

Date	Product	Sales
10/23/2020	Aspen	920.16
12/13/2020	Aspen	498.42
12/21/2019	Quad	131.85
12/2/2019	Quad	2215.08
11/9/2019	Aspen	316.31
12/9/2020	Aspen	747.63
12/11/2020	Carlota	365.81
11/25/2020	Aspen	747.63
12/25/2020	Aspen	1610.28
12/11/2019	Aspen	498.42
12/23/2019	Aspen	316.31
10/23/2019	Aspen	127.8
12/16/2019	Carlota	152.42
3/18/2019	Carlota	110.85
11/14/2019	Aspen	1150.2
12/12/2019	Aspen	1840.32
11/18/2020	Aspen	31.95
4/14/2019	Carlota	152.42
3/17/2019	Carlota	152.42
11/10/2019	Carlota	576.42
9/5/2020	Quad	87.9
10/16/2019	Carlota	365.81
12/10/2020	Aspen	498.42
12/14/2019	Quad	87.9
12/22/2020	Quad	2531.52

Figure 2: Actual Table

Data Cleaning

Power Query

- Load both Budget and actual tables from the Excel Data Source.
- Change the tables names according to the data model standards (fAcual, fBudget)
- Unpivot the Budget table around the product through 'Unpivot only selected columns.

EOMonth	Product	Budget
1/31/2019	Aspen	$261,026.28
2/28/2019	Aspen	$266,139.2
3/31/2019	Aspen	$242,084.62
4/30/2019	Aspen	$255,810.62
5/31/2019	Aspen	$336,485
6/30/2019	Aspen	$314,705.98
7/31/2019	Aspen	$301,014.26
8/31/2019	Aspen	$318,504.4
9/30/2019	Aspen	$275,060.39
10/31/2019	Aspen	$1,375,480.94
11/30/2019	Aspen	$2,830,524.51

- Adjust the data types of both tables.
- Create a Product table from the budget file by referencing budget table.
  In the referenced budget table, select product column and remove other columns. Then remove the duplicates.

Product ID	Product
1	Aspen
2	Carlota
3	Quad

- Close and apply to quit Power Query.

Table View

- Create the dcalendar table

```
dcalendar = CALENDARAUTO()
```

- Add the following columns

```
Year = dcalendar[Date].[Year]
```

```
Year = YEAR(dCalendar[Date])
```

```
Month = dcalendar[Date].[Month]
```

```
Month = FORMAT(dCalendar[Date], "MMM")
```

(Output is in this form: Jan/Feb) (To get the full name use" MMMM")

```
Month no. = dcalendar[Date].[MonthNo]
```

```
Month # = FORMAT(dCalendar[Date], "MM")
```

```
Quarter = dcalendar[Date].[Quarter]
```

```
Quarter # = FORMAT(dCalendar[Date], "Q")
```

```
Quarter = CONCATENATE( "Q", dCalendar[Quarter #])
```

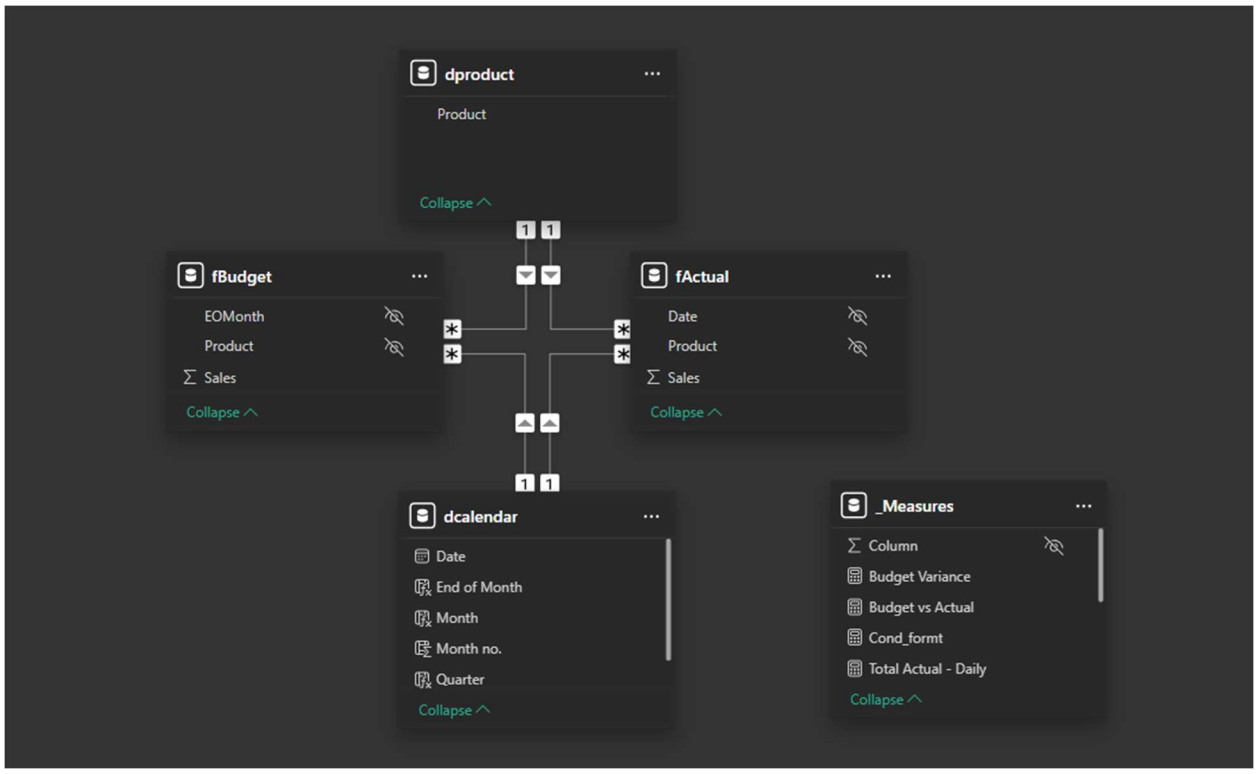
```
End of Month = EOMONTH(dcalendar[Date],0)
```

```
EOMONTH(StartDate, Months)
```

Returns the date in datetime format of the last day of the month before or after a specified number of months.

- Adjust the data formats before quitting table view

Data Model



- Hide the foreign keys in both fact tables.

Dax Measures

- Create a new table named _measures to host all DAX measures using the formula _Measures =

1) Calculate Total Budget

```
Total Budget = SUM(fBudget[Sales])
```

2) Calculate Total Actual (Daily - Monthly)

```
Total Actual - Daily = SUM(fActual[Sales])
```

```
Total Actual - Monthly = CALCULATE(
                            [Total Actual - Daily],
                            DATESBETWEEN(dcalendar[Date],
                                STARTOFMONTH(dcalendar[Date]),
                                ENDOFMONTH(dcalendar[Date])
                            )
)
```

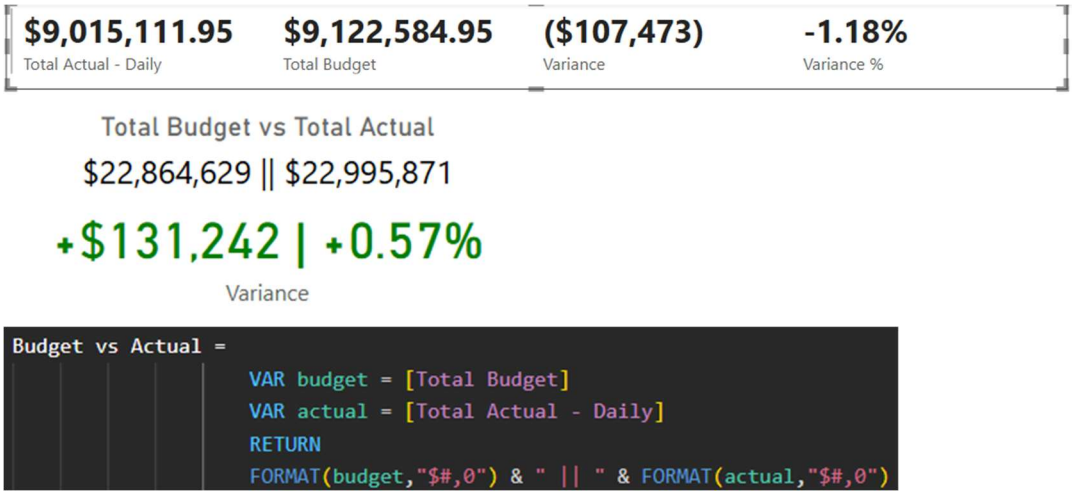
3) Calculate Variance (Absolute and percentage)

```
Variance = [Total Actual - Daily] - [Total Budget]
```

```
Variance % = DIVIDE([Variance],[Total Budget],0)
```

Visuals

KPIs




```
Budget vs Actual =
                VAR budget = [Total Budget]
                VAR actual = [Total Actual - Daily]
                RETURN
                FORMAT(budget,"$#,0") & " || " & FORMAT(actual,"$#,0")
```

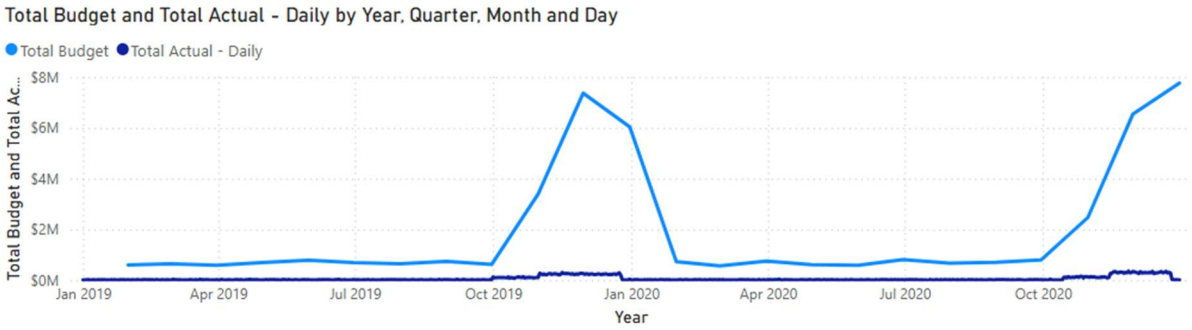
Figure 3: Subtitle

```
Variance =
            VAR variance2 = [Budget Variance]
            VAR variance_percent = [Variance %]
            VAR POSITIVE_SIGN = IF([Variance %] > 0, "+")
            RETURN
            POSITIVE_SIGN & FORMAT(variance2,"$#,0") & " | " & POSITIVE_SIGN & FORMAT(variance_percent,"#0.00%")
```

Figure 4: Callout Value

Line Graph

- Total Budget & Total Actual – Daily



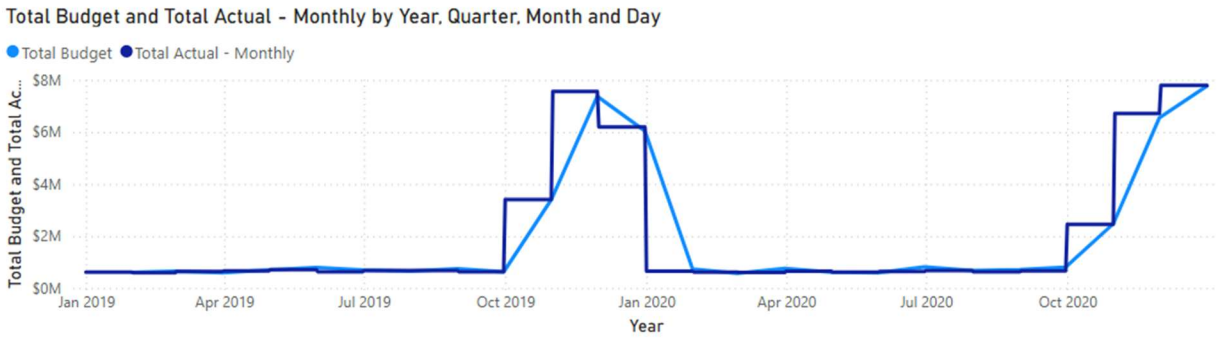
Why This Happens?

The budget is recorded at a monthly level, but in the daily graph, Power BI is interpolating it incorrectly.

The spikes in the daily graph suggest that **Power BI is assigning the entire monthly budget to a single day in each month (likely the first day of each month)** instead of distributing it evenly across the days.

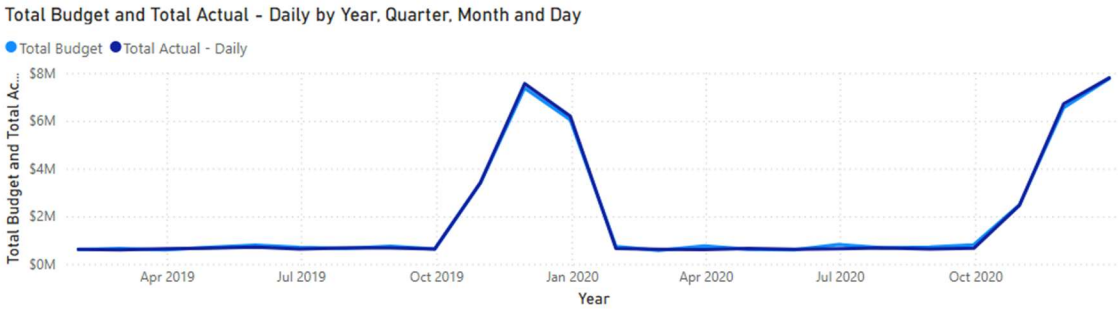
Solutions:

- Aggregate the Actual Sales monthly instead of daily. This is better



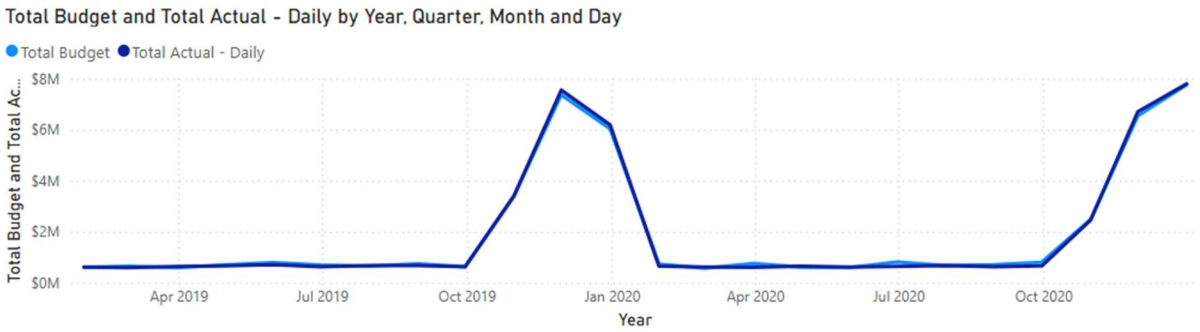
- Use “End of month” instead of “Date” and the Total Actual - Daily

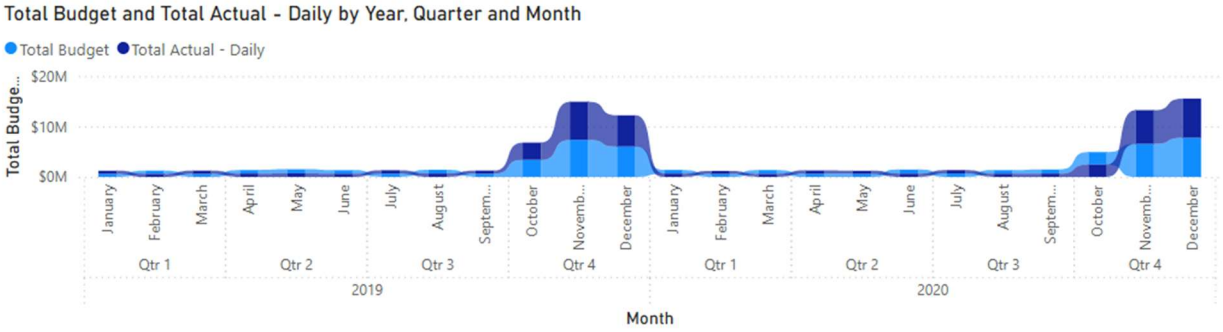
```
End of Month = EOMONTH(dcalendar[Date],0)
```



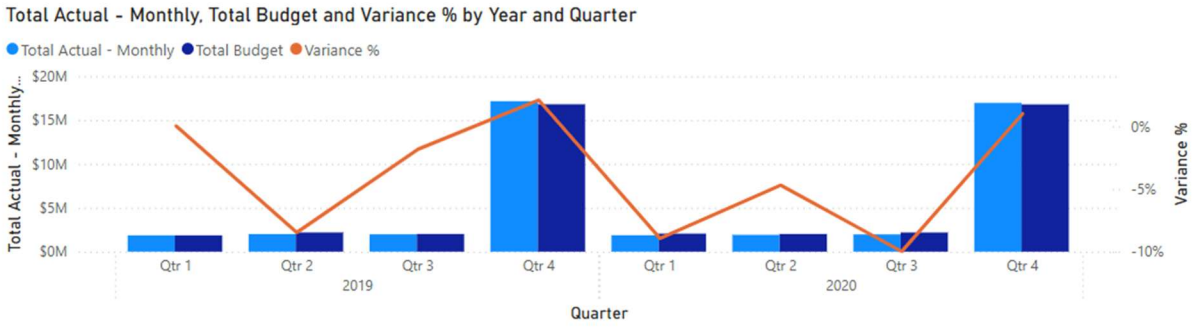
Ribbon Chart

The Ribbon Chart is the better for clarifying minor deflection than the line chart





Combo Chart



Table

Year	Month	Month no.	Total Budget	Total Actual - Monthly	Variance	Variance 1	Variance %
2019	January	1	$603,812.96	$615,173.96	$11,361	+$11,361	1.88%
2019	February	2	$652,192.64	$590,465.64	($61,727)	-$61,727	-9.46%
2019	March	3	$594,022.82	$645,006.82	$50,984	+$50,984	8.58%
2019	April	4	$694,618.68	$662,755.68	($31,863)	-$31,863	-4.59%
2019	May	5	$794,389.67	$714,067.67	($80,322)	-$80,322	-10.11%
2019	June	6	$700,644.98	$627,411.98	($73,233)	-$73,233	-10.45%
2019	July	7	$646,331.91	$675,708.91	$29,377	+$29,377	4.55%
2019	August	8	$741,765.44	$670,482.44	($71,283)	-$71,283	-9.61%
2019	September	9	$625,676.3	$630,832.3	$5,156	+$5,156	0.82%
2019	October	10	$3,399,223.05	$3,409,807.05	$10,584	+$10,584	0.31%
2019	November	11	$7,373,740.03	$7,560,464.03	$186,724	+$186,724	2.53%
2019	December	12	$6,038,210.72	$6,193,694.72	$155,484	+$155,484	2.58%
Total			**$22,864,629.2**	**$22,995,871.2**	**$131,242**	**+$131,242**	**0.57%**

To solve the problem of the "-" sign in Variance, Variance 1 has been introduced

```
Variance 1 =
            VAR POSITIVE_SIGN = IF([Variance %] > 0, "+")
            RETURN
            POSITIVE_SIGN & FORMAT([Variance], "$#,0")
```

The format function alone solves the problem of the "-" sign, but if the want to add the positive sign I should write the DAX measure as shown above.

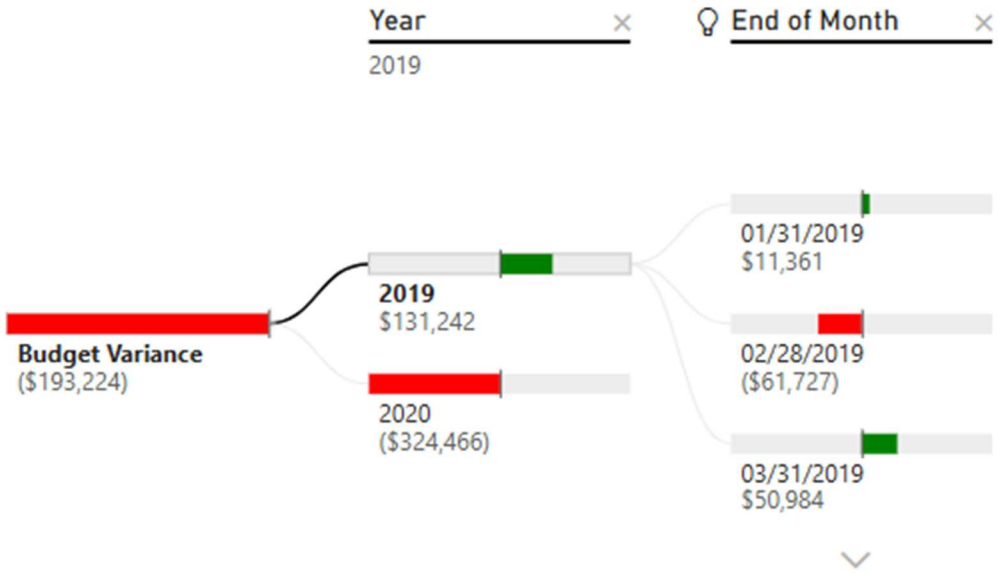
```
Cond_formt =
            VAR color  = IF([Variance %] > 0,"#008000", "#FF0000" )
            RETURN
            color
```

Figure 5: Conditional Formatting Field

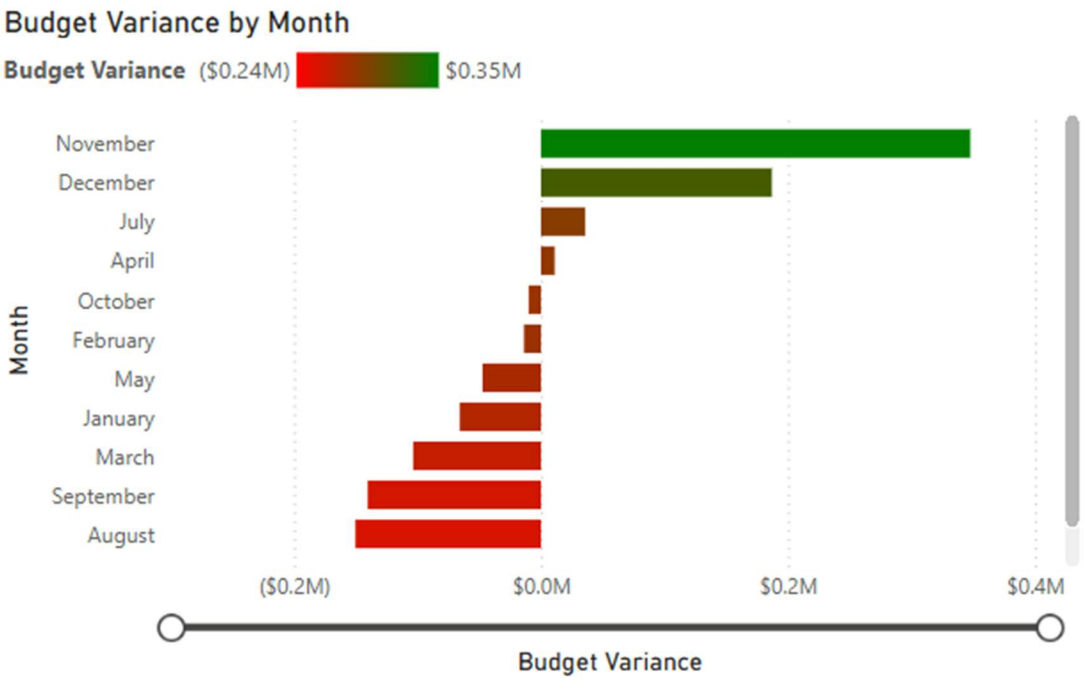
Product Table

Product	Total Budget	Total Actual - Daily	Budget Variance
Carlota	$15,378,988.17	$15,452,210.17	$73,222
Quad	$12,448,203.35	$12,463,004.35	$14,801
Aspen	$18,082,244.45	$17,800,997.45	($281,247)
Total	**$45,909,435.97**	**$45,716,211.97**	**($193,224)**

Variance Explanation



Monthly Performance



Using the zoom slider and the gradient format for the bars.