In [4]:
```
import pandas as pd
import plotly.express as px
import plotly.io as pio
import plotly.graph_objects as go
pio.templates.default = "plotly_white"

data = pd.read_csv("downloads/customer_acquisition_cost_dataset.csv")
print(data.head())
```

```
  Customer_ID Marketing_Channel  Marketing_Spend  New_Customers
0    CUST0001   Email Marketing      3489.027844             16
1    CUST0002        Online Ads      1107.865808             33
2    CUST0003      Social Media      2576.081025             44
3    CUST0004        Online Ads      3257.567932             32
4    CUST0005   Email Marketing      1108.408185             13
```

In [5]:
```
data.info()
```

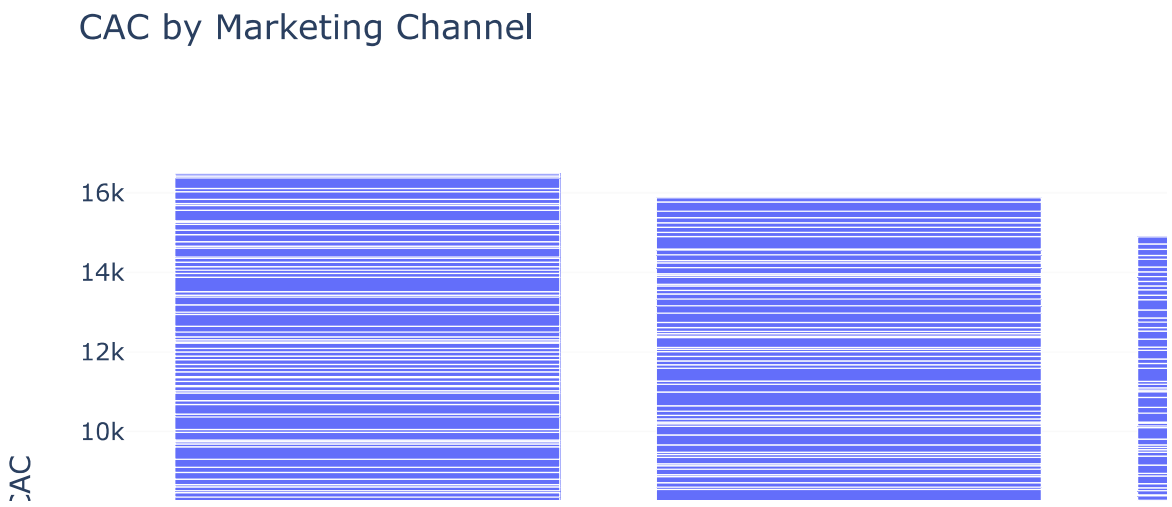
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 500 entries, 0 to 499
Data columns (total 4 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   Customer_ID        500 non-null    object 
 1   Marketing_Channel  500 non-null    object 
 2   Marketing_Spend    500 non-null    float64
 3   New_Customers      500 non-null    int64  
dtypes: float64(1), int64(1), object(2)
memory usage: 15.8+ KB
```

In [6]:
```
#calculate the customer acquistion cost
data['CAC'] = data['Marketing_Spend'] / data['New_Customers']
print(data['CAC'])
```

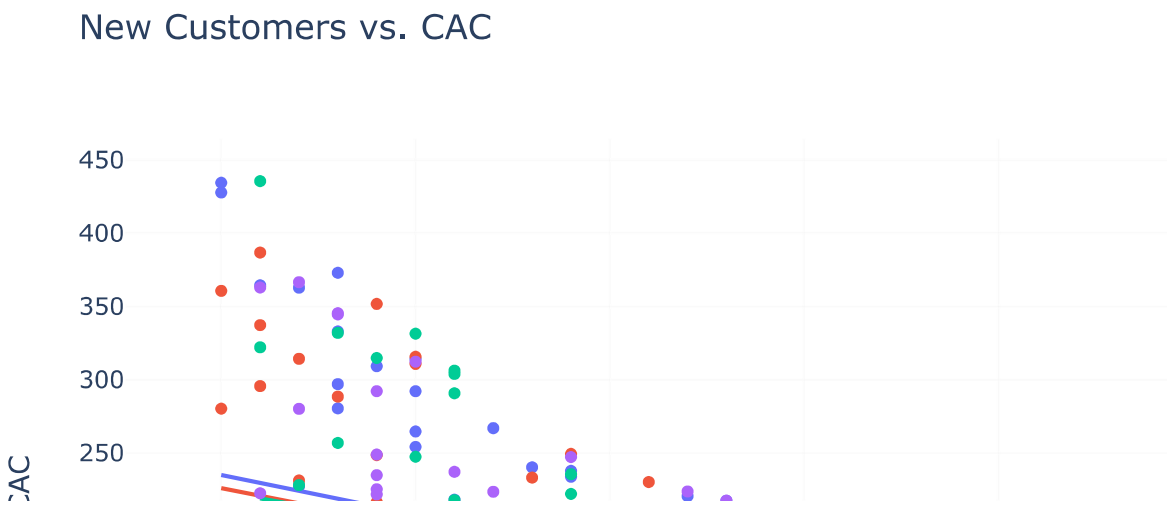
```
0      218.064240
1       33.571691
2       58.547296
3      101.798998
4       85.262168
          ...    
495     59.519218
496    137.895546
497    231.127695
498    171.507881
499    110.545019
Name: CAC, Length: 500, dtype: float64
```

In [7]:
```
#CAC by Marketing Channels

fig1 = px.bar(data, x='Marketing_Channel',
              y='CAC', title='CAC by Marketing Channel')
fig1.show()
```



In [19]:
```
# Relationship between new customers acquired and CAC
fig2 = px.scatter(data, x='New_Customers',
                  y='CAC', color='Marketing_Channel',
                  title='New Customers vs. CAC',
                  trendline='ols')
fig2.show()
```



In [9]:
```
# Summary statistics of all the marketing channels
summary_stats = data.groupby('Marketing_Channel')['CAC'].describe()
print(summary_stats)
```

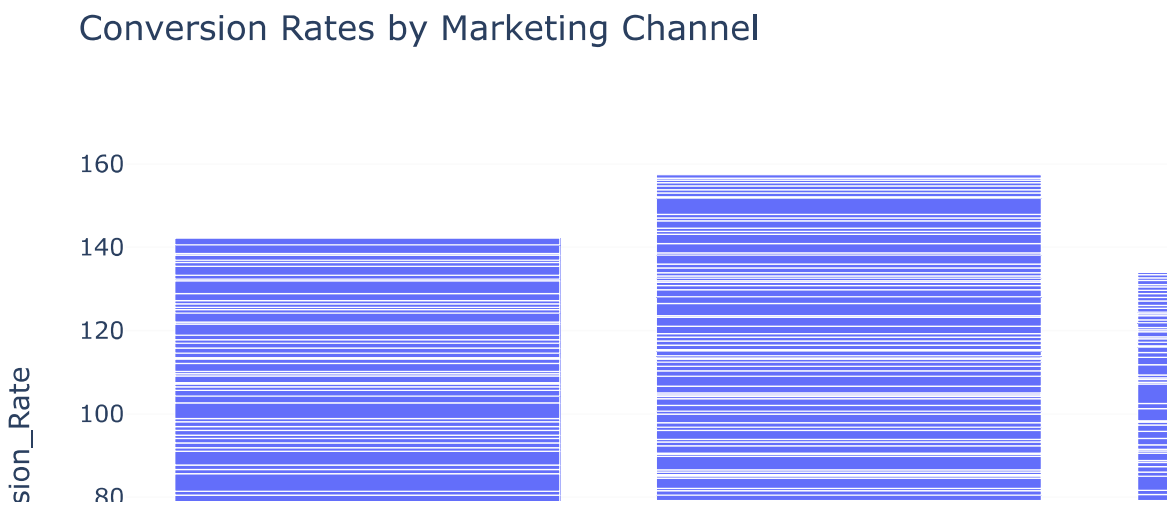
```
                    count        mean        std        min        25%  \
Marketing_Channel
Email Marketing     124.0  132.913758  89.597107  23.491784  68.226195
Online Ads          130.0  122.135938  79.543793  24.784414  62.207753
Referral            128.0  119.892174  74.101916  22.012364  71.347939
Social Media        118.0  126.181913  77.498788  21.616453  75.633389

                           50%         75%         max
Marketing_Channel
Email Marketing     106.940622  177.441898  434.383446
Online Ads           97.736027  163.469540  386.751285
Referral             99.835688  137.577935  366.525209
Social Media        102.620356  167.354709  435.487346
```

In [15]:
```
#calculating conversion rate of the marketing campaign
data['Conversion_Rate'] = data['New_Customers'] / data['Marketing_Spend'] * 100
print(data['Conversion_Rate'])
```

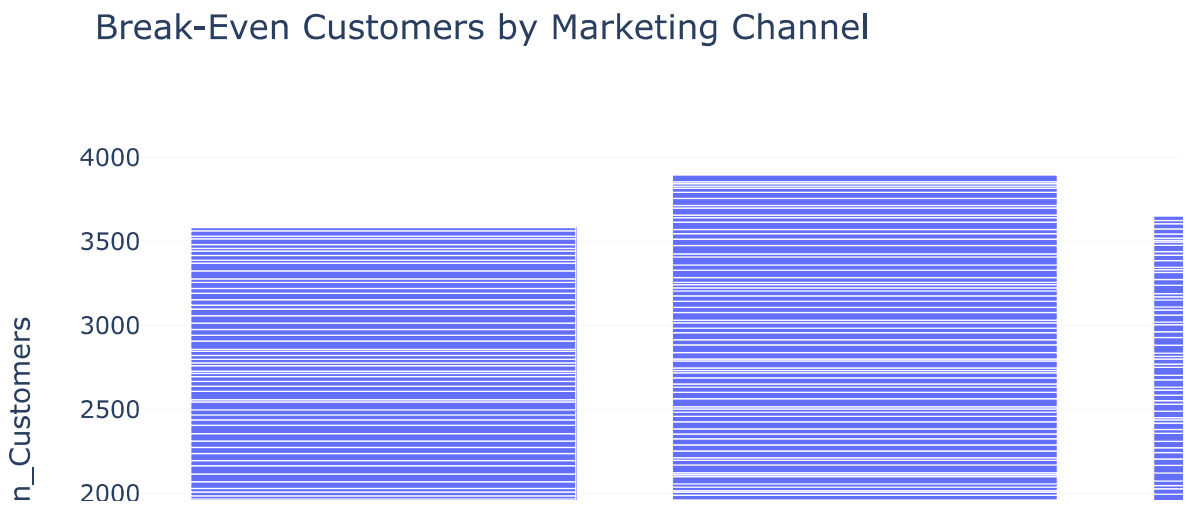
```
0      0.458580
1      2.978700
2      1.708021
3      0.982328
4      1.172853
         ...
495    1.680130
496    0.725187
497    0.432661
498    0.583064
499    0.904609
Name: Conversion_Rate, Length: 500, dtype: float64
```

In [16]:
```
# Conversion Rates by Marketing Channel
fig = px.bar(data, x='Marketing_Channel',
             y='Conversion_Rate',
             title='Conversion Rates by Marketing Channel')
fig.show()
```



In [17]:
```
# Calculate the break-even customers for this marketing campaign
data['Break_Even_Customers'] = data['Marketing_Spend'] / data['CAC']

fig = px.bar(data, x='Marketing_Channel',
             y='Break_Even_Customers',
             title='Break-Even Customers by Marketing Channel')
fig.show()
```

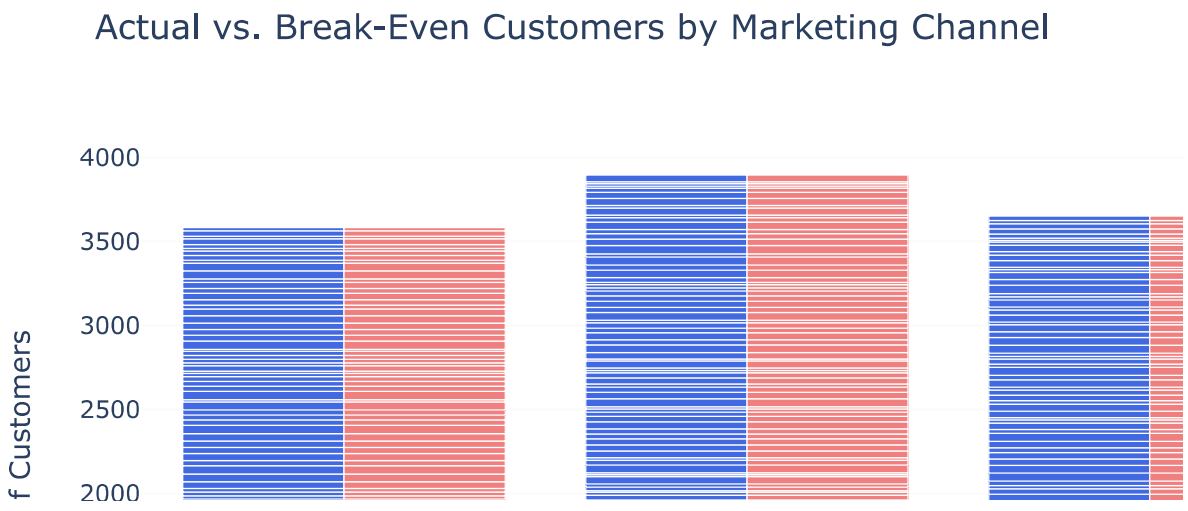


In [18]:
```
# compare the actual customers acquired with the break-even customers for each marketi
fig = go.Figure()

# Actual Customers Acquired
fig.add_trace(go.Bar(x=data['Marketing_Channel'], y=data['New_Customers'],
                     name='Actual Customers Acquired', marker_color='royalblue'))

# Break-Even Customers
fig.add_trace(go.Bar(x=data['Marketing_Channel'], y=data['Break_Even_Customers'],
                     name='Break-Even Customers', marker_color='lightcoral'))

# Update the layout
fig.update_layout(barmode='group', title='Actual vs. Break-Even Customers by Marketing
                  xaxis_title='Marketing Channel', yaxis_title='Number of Customers')
```


Actual vs. Break-Even Customers by Marketing Channel
4000
3500
3000
2500
2000
f Customers

In [ ]: