In [1]:

```
import pandas as pd
import plotly.express as px
import plotly.graph_objects as go
from plotly.subplots import make_subplots
import numpy as np
import math
```

In [2]:

```
import warnings
warnings.filterwarnings('ignore')
```

In [3]:

```
df=pd.read_csv('superstore.csv')
```

In [4]:

```
df.head()
```

Out[4]:

| | Row ID | Order ID | Order Date | Ship Date | Ship Mode | Customer ID | Customer Name | Segment | Country | City | State | Postal Code | Region | Product ID | Category | Sub-Category | Product Name | Sales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | CA-2017-152156 | 08/11/2017 | 11/11/2017 | Second Class | CG-12520 | Claire Gute | Consumer | United States | Henderson | Kentucky | 42420.0 | South | FUR-BO-10001798 | Furniture | Bookcases | Bush Somerset Collection Bookcase | 261.9600 |
| **1** | 2 | CA-2017-152156 | 08/11/2017 | 11/11/2017 | Second Class | CG-12520 | Claire Gute | Consumer | United States | Henderson | Kentucky | 42420.0 | South | FUR-CH-10000454 | Furniture | Chairs | Hon Deluxe Fabric Upholstered Stacking Chairs,... | 731.9400 |
| **2** | 3 | CA-2017-138688 | 12/06/2017 | 16/06/2017 | Second Class | DV-13045 | Darrin Van Huff | Corporate | United States | Los Angeles | California | 90036.0 | West | OFF-LA-10000240 | Office Supplies | Labels | Self-Adhesive Address Labels for Typewriters b... | 14.6200 |
| **3** | 4 | US-2016-108966 | 11/10/2016 | 18/10/2016 | Standard Class | SO-20335 | Sean O'Donnell | Consumer | United States | Fort Lauderdale | Florida | 33311.0 | South | FUR-TA-10000577 | Furniture | Tables | Bretford CR4500 Series Slim Rectangular Table | 957.5775 |
| **4** | 5 | US-2016-108966 | 11/10/2016 | 18/10/2016 | Standard Class | SO-20335 | Sean O'Donnell | Consumer | United States | Fort Lauderdale | Florida | 33311.0 | South | OFF-ST-10000760 | Office Supplies | Storage | Eldon Fold 'N Roll Cart System | 22.3680 |

In [5]:

```
df['Order Date']=pd.to_datetime(df['Order Date'])
df['Ship Date']=pd.to_datetime(df['Ship Date'])
df['Date Diff']=(df['Ship Date']-df['Order Date'])
```

In [6]:

```
df['Order Date']=df['Order Date'].dt.to_period('M')
```

In [7]:

```
grouped=df.groupby('State')['Sales'].sum().reset_index().sort_values('Sales',ascending=False)
grouped['Mean']=grouped['Sales'].mean()
grouped['CumSum']=(grouped['Sales']/grouped['Sales'].sum()*100).cumsum()
#grouped
```

In [8]:

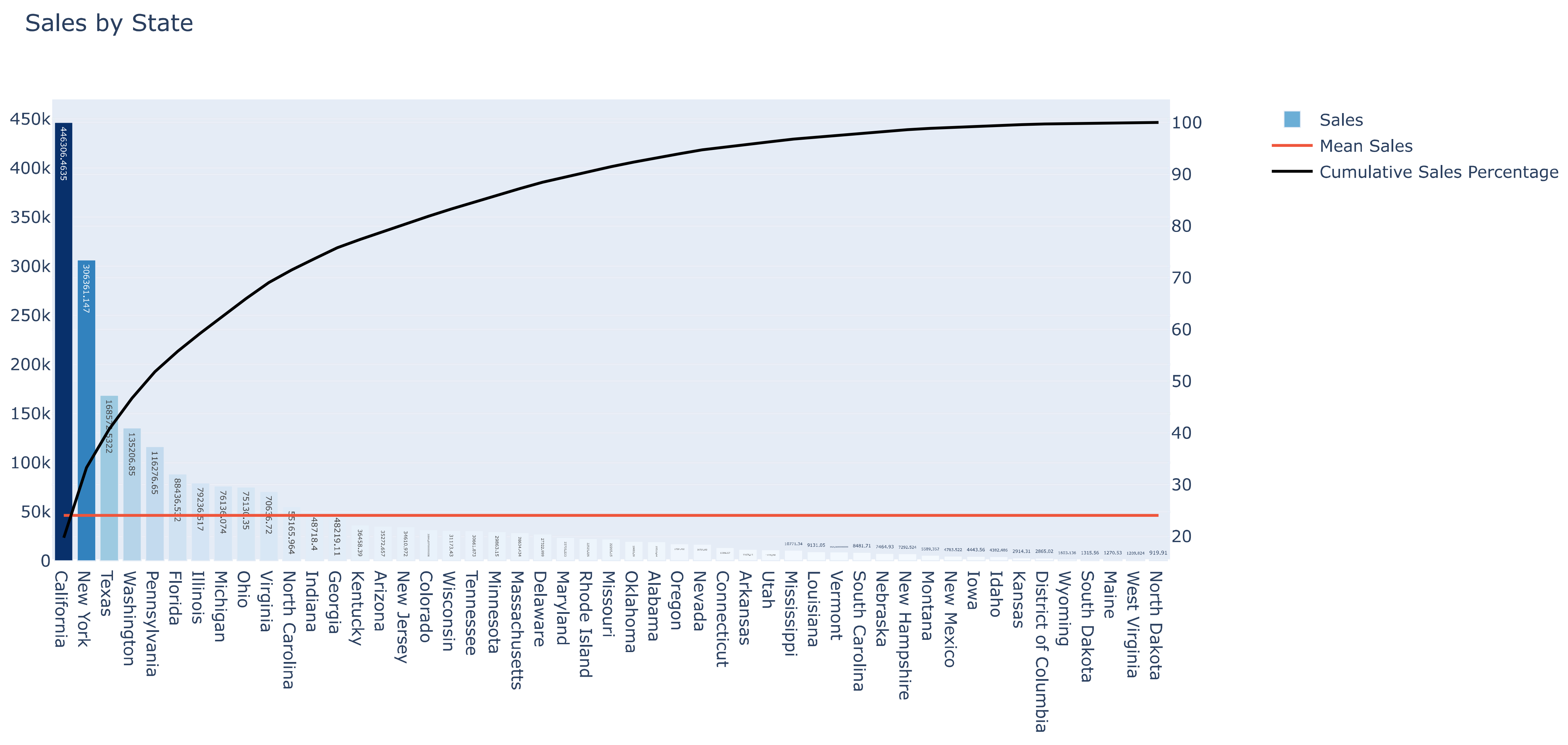
```
fig=make_subplots(specs=[[{'secondary_y':True}]])
trace1=go.Bar(name='Sales',x=grouped['State'],y=grouped['Sales'],text=grouped['Sales'])
trace2=go.Line(name='Cumulative Sales Percentage',x=grouped['State'],y=grouped['CumSum'])
trace3=go.Line(name='Mean Sales',x=grouped['State'],y=grouped['Mean'])

fig.add_trace(trace1,secondary_y=False)
fig.add_trace(trace3,secondary_y=False)
fig.add_trace(trace2,secondary_y=True)

fig.update_layout(title_text='Sales by State',width=1200,height=600)
fig.update_xaxes(title_text='State')
fig.update_traces(marker=dict(color=grouped['Sales'],colorscale='Blues'),secondary_y=False)
fig.update_traces(marker=dict(color='black'),secondary_y=True)
#fig.write_html(r'C:\Users\berid\OneDrive\Desktop\plotly.html')
fig.show()
```

```
C:\Users\berid\AppData\Local\Programs\Python\Python311\Lib\site-packages\plotly\graph_objs\_deprecations.py:378: DeprecationWarning:

plotly.graph_objs.Line is deprecated.
Please replace it with one of the following more specific types
  - plotly.graph_objs.scatter.Line
  - plotly.graph_objs.layout.shape.Line
  - etc.
```

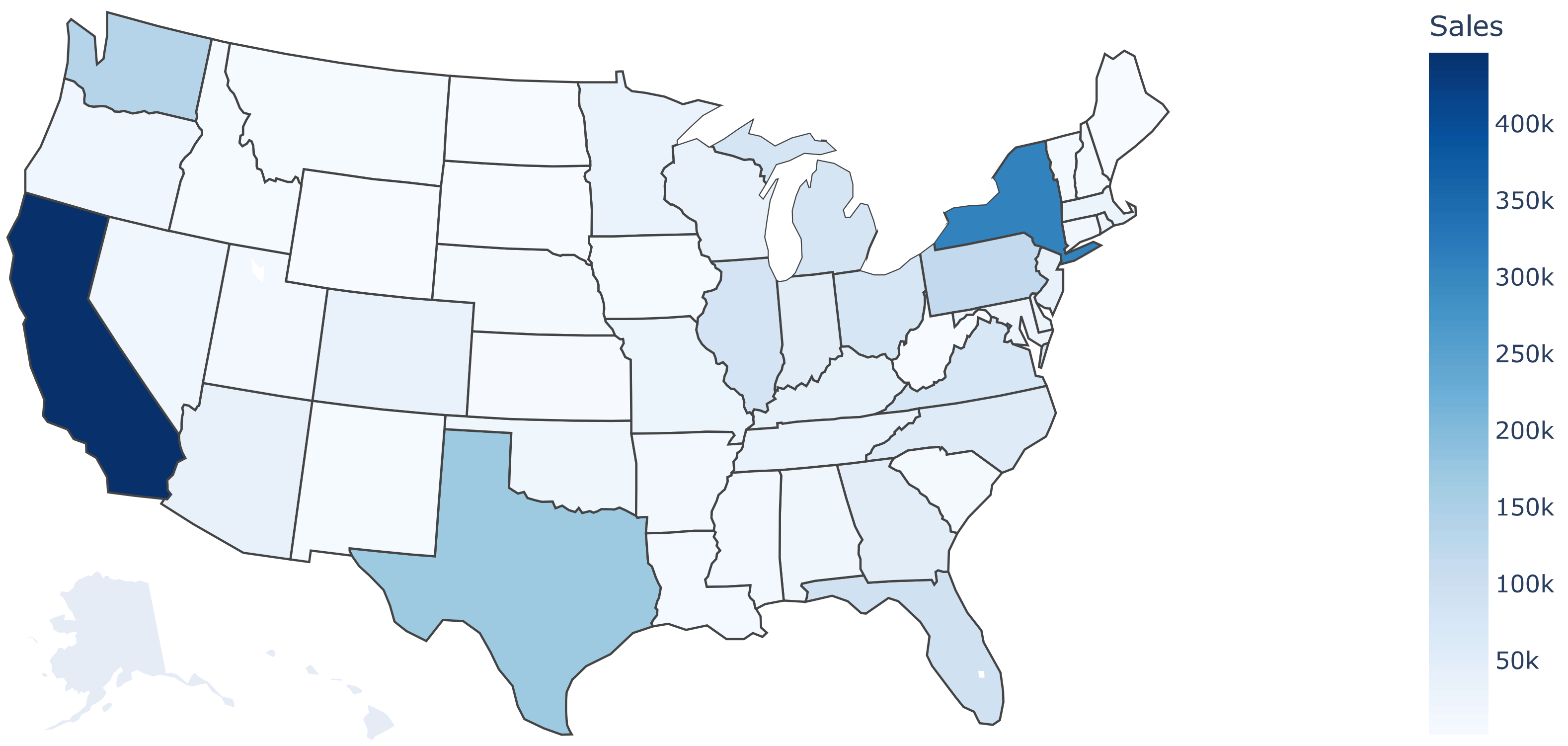


In [9]:
```
#px.choropleth(grouped,locations='State',scope='usa',color='Sales')
iso=pd.read_html('https://en.wikipedia.org/wiki/ISO_3166-2:US')[0]
iso['Code']=iso['Code'].str.split('-').str[-1].str.strip()
iso=iso[['Subdivision name (en)','Code']]
iso.columns=['State','iso']
grouped=grouped.merge(iso,on='State')
```

In [10]:

```
fig=px.choropleth(grouped,
              locations='iso',
              locationmode="USA-states",
              scope='usa',
              color='Sales',
             color_continuous_scale='Blues',hover_name='State')
fig.update_layout(title_text='Sales by State')
#fig.write_html(r'C:\Users\berid\OneDrive\Desktop\plotly_choropleth.html')
fig.show()
```

Sales by State



In [11]:

```
import geopandas
import matplotlib.pyplot as plt
```

In [12]:

```
cities=geopandas.read_file(r"C:\Users\berid\python\geopandas\tl_2022_us_cities\tl_2022_us_county.shp")
states=geopandas.read_file(r"C:\Users\berid\python\geopandas\s_22mr22_states\s_22mr22.shp")
```

In [13]:

```
states['States_long']=states['geometry'].centroid.x
states['States_lat']=states['geometry'].centroid.y
```

In [14]:

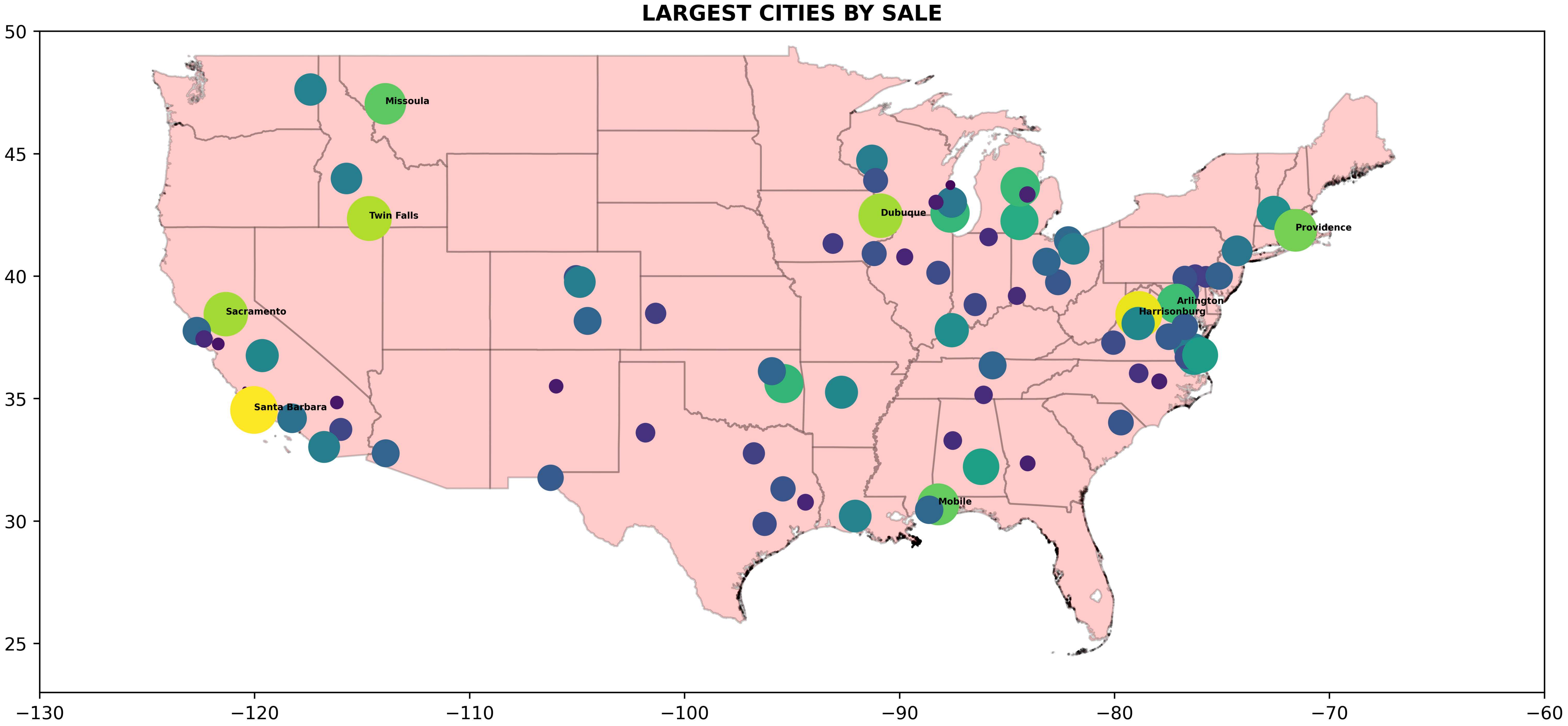
```
cities['Long']=cities['geometry'].centroid.x
cities['Lat']=cities['geometry'].centroid.y
cities=cities[['STATEFP','NAME','Long','Lat']]
cities=cities.merge(states[['FIPS','NAME','States_long','States_lat']],left_on='STATEFP',right_on='FIPS')
```

In [19]:

```
grouped=df.groupby(['State','City'])['Sales'].mean().reset_index()
grouped=grouped.merge(cities,left_on=['State','City'],right_on=['NAME_y','NAME_x'])
```

In [20]:

```
fig,ax=plt.subplots(figsize=(15,10),dpi=500)
ax=states.plot(ax=ax,color='red',ec='black',alpha=0.2)
ax.scatter(x=grouped['Long'],y=grouped['Lat'],s=grouped['Sales'],c=grouped['Sales'])
plt.title('LARGEST CITIES BY SALE',fontweight='bold')
plt.xlim(-130,-60)
plt.ylim(23,50)
for i in range(len(grouped)):
    #ax.text(grouped['States_Long'][i],grouped['States_Lat'][i],grouped['NAME_y'][i],fontweight='bold',size=5)
    if grouped['Sales'][i]>grouped['Sales'].quantile(0.9):
        ax.text(grouped['Long'][i],grouped['Lat'][i],grouped['City'][i],fontweight='bold',size=5)
    else:
        None
plt.show()
```



```
In [17]: grouped=df.groupby(['Category','Sub-Category'])['Sales'].sum().reset_index().sort_values(['Category','Sales'],ascending=[True,False])
         grouped['CumSales']=grouped.groupby('Category')['Sales'].transform(lambda x:(x/x.sum()*100).cumsum())
```

In [18]:

```
fig=make_subplots(rows=2,cols=2,
                  specs=[[{'secondary_y':True} for i in range(2)] for j in range(2)],
                  subplot_titles=[cat for cat in grouped['Category'].unique()],

                 )

for i,cat in enumerate(grouped['Category'].unique(),start=1):
    filtered=grouped[grouped['Category']==cat]

    trace1=go.Bar(x=filtered['Sub-Category'],y=filtered['Sales'],name='Sales')
    trace2=go.Line(x=filtered['Sub-Category'],y=filtered['CumSales'],name='Cumulative Sales')

    fig.add_trace(trace1,row=math.ceil(i/2),col=math.ceil(i%2)+1 if i<grouped['Category'].nunique() else 1,secondary_y=False)
    fig.add_trace(trace2,row=math.ceil(i/2),col=math.ceil(i%2)+1 if i<grouped['Category'].nunique() else 1,secondary_y=True)

    fig.update_traces(marker=dict(color=grouped['Sales'],colorscale='Blues'),secondary_y=False)
    fig.update_traces(marker=dict(color='black'),secondary_y=True)

fig.update_layout(font=dict(family="Arial",size=10))
fig.show()
```

```
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  - etc.
```

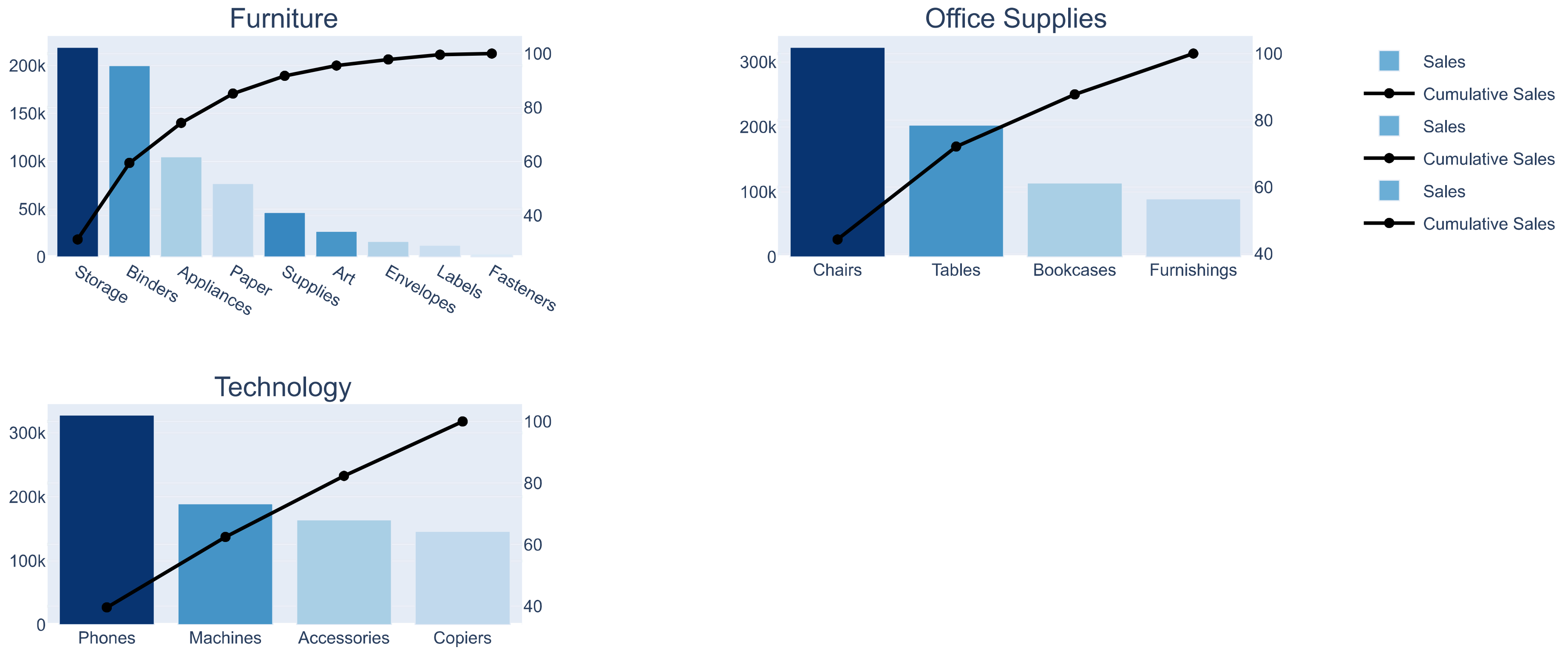
Furniture
0
50k
100k
150k
200k
40
60
80
100
Storage
Binders
Appliances
Paper
Supplies
Art
Envelopes
Labels
Fasteners
Office Supplies
0
100k
200k
300k
40
60
80
100
Chairs
Tables
Bookcases
Furnishings
Technology
0
100k
200k
300k
40
60
80
100
Phones
Machines
Accessories
Copiers
Sales
Cumulative Sales
Sales
Cumulative Sales
Sales
Cumulative Sales

```
In [ ]:
```