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Cufflinks in Python

An overview of cufflinks, a library for easy interactive Pandas charting with Plotly.

Cufflinks binds Plotly directly to pandas dataframes.

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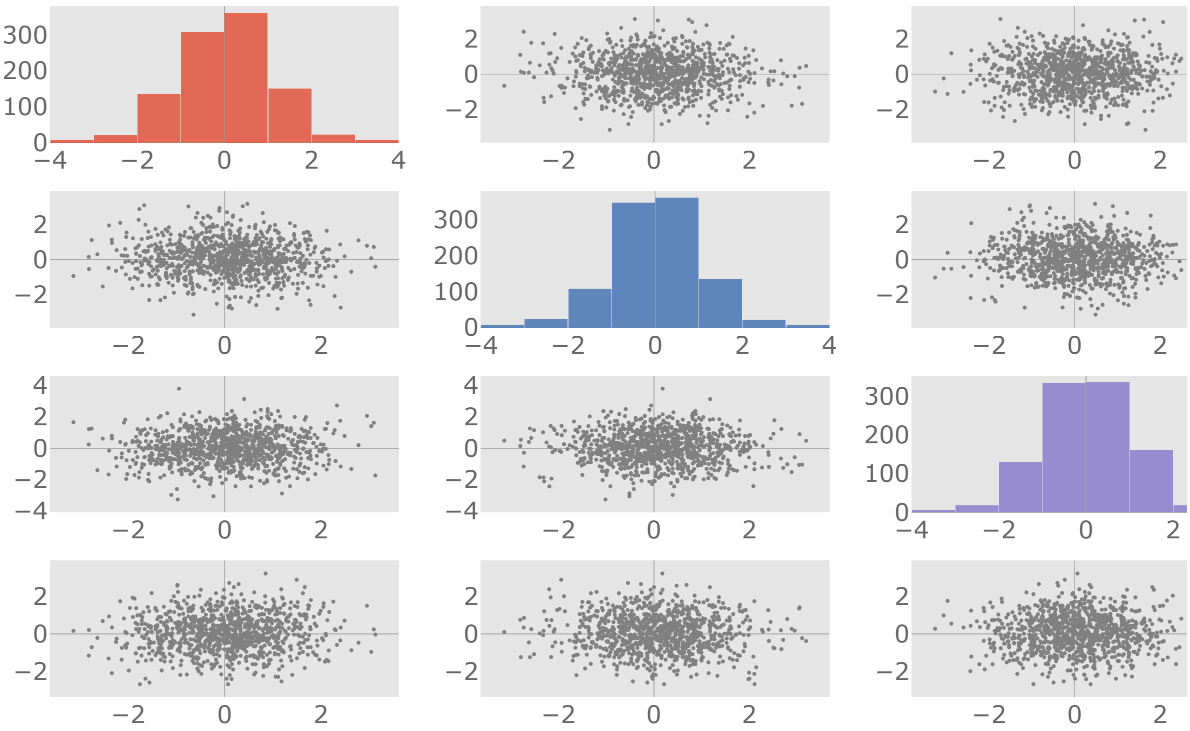
Out[1]:



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Packages

Run `! pip install cufflinks --upgrade` to install Cufflinks. In addition to Plotly, pandas and Cufflinks, this tutorial will also use NumPy.

```
import numpy as np
print cf.__version__
```

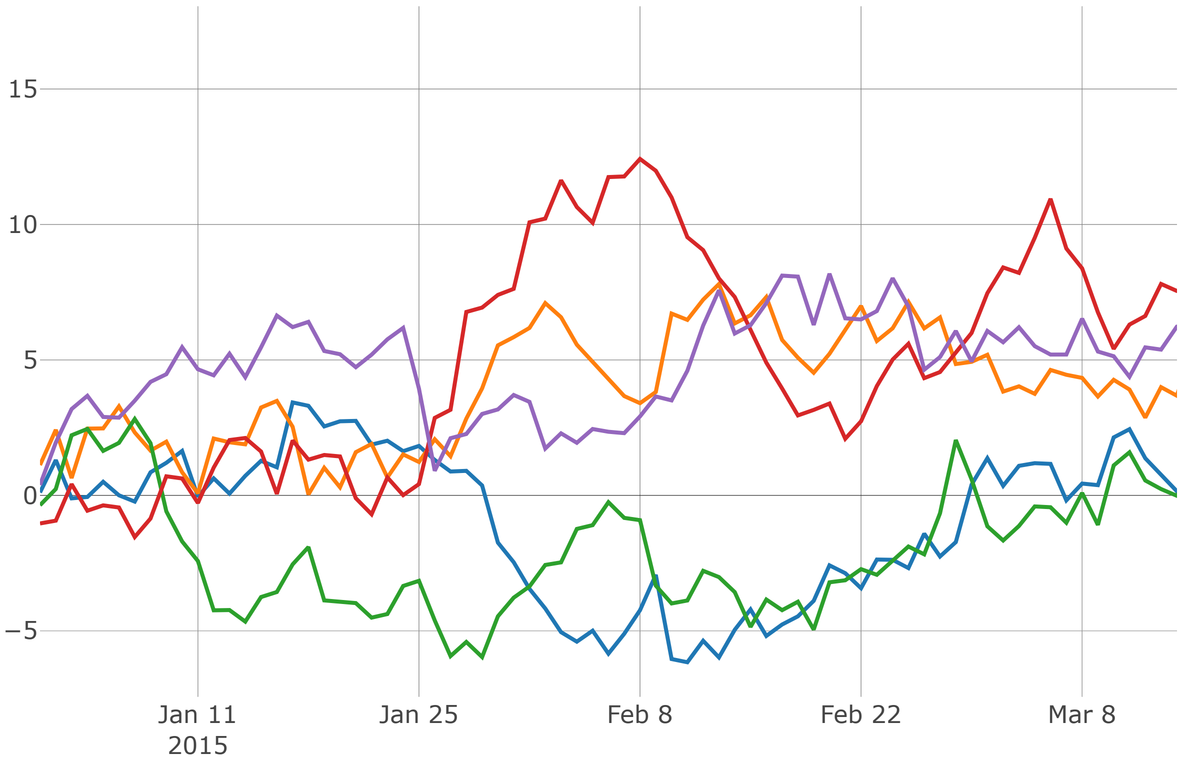
```
0.8.2
```

Dataframes

With Plotly's Python library, you can describe figures with DataFrame's series and index's

```
        'x': df.index,
        'y': df[col],
        'name': col
    }  for col in df.columns], filename='cufflinks/simple-line')
```

Out[3]:



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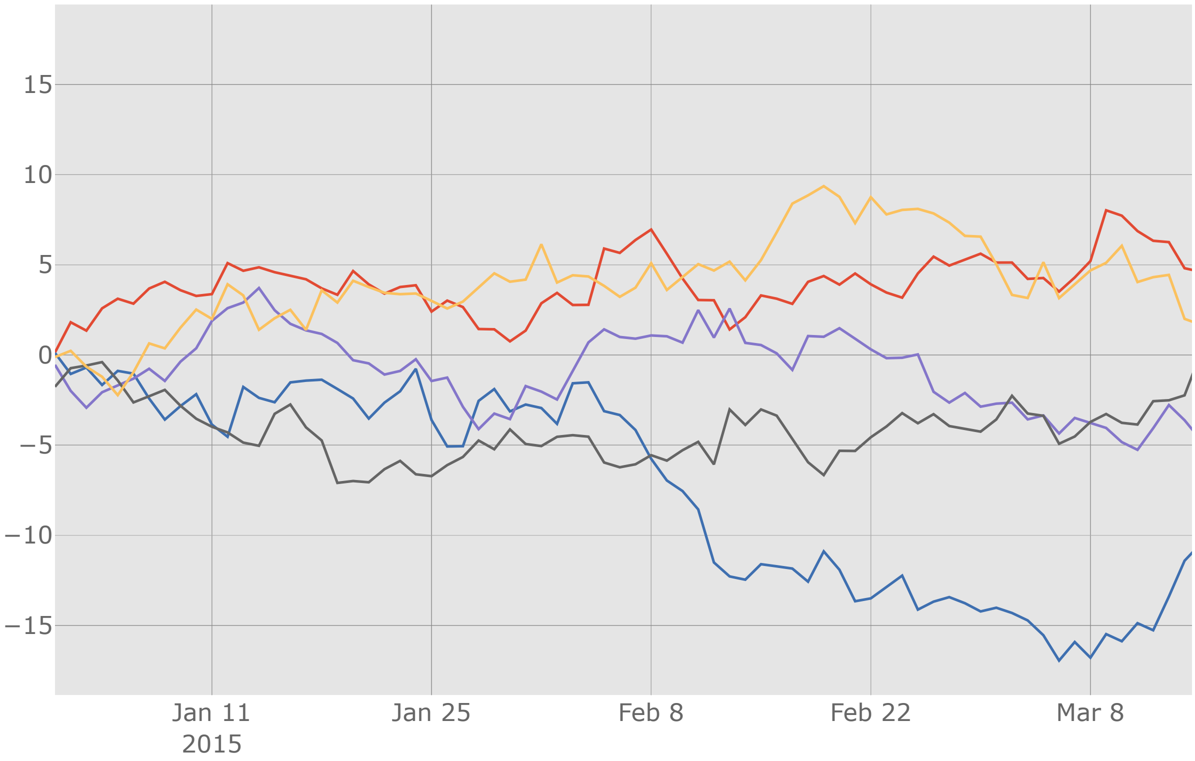
But with `cufflinks`, you can plot them directly

Out[5]:



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Almost every chart that you make in `cufflinks` will be created with just one line of code.

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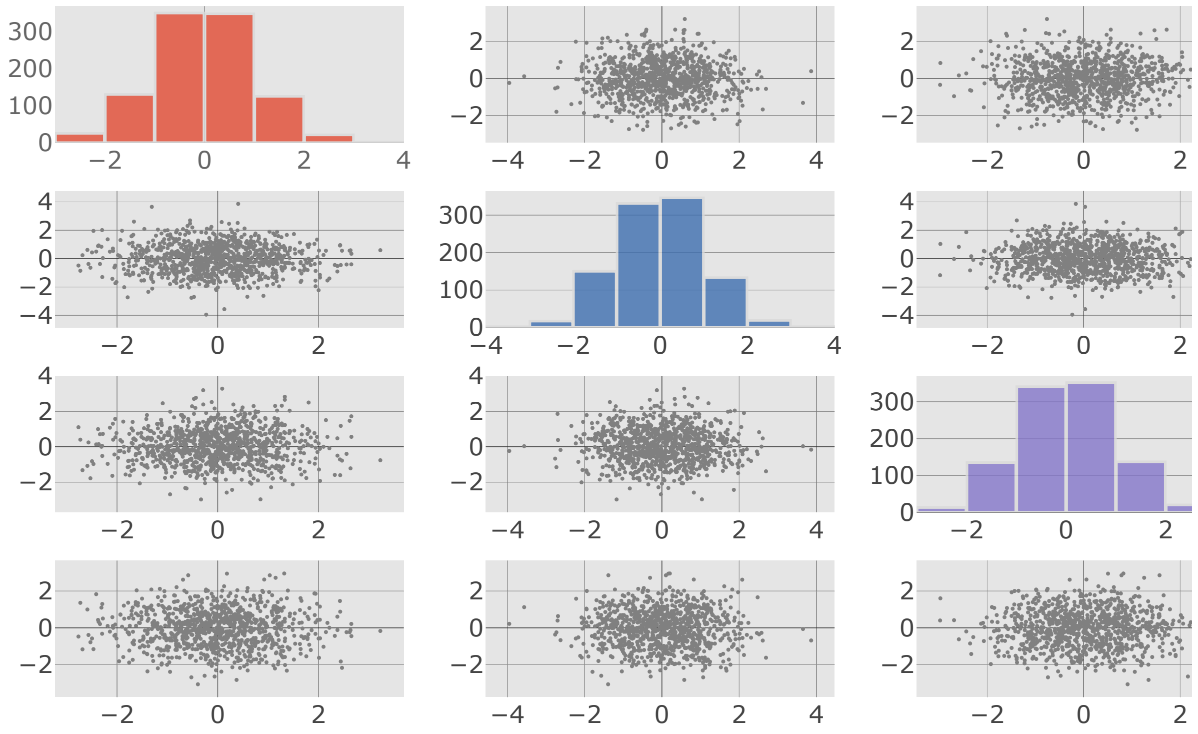
Out[6]:



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Charts created with `cufflinks` are synced with your online Plotly account. You'll need to configure your credentials to get started. `cufflinks` can also be configured to work offline in IPython notebooks with Plotly Offline. To get started with Plotly Offline, download a trial library and run `cf.go_offline()`.

In [14]:

```
cf.go_online() # switch back to online mode, where graphs are saved on your
 online plotly account
```

In [15]:

```
df.a.iplot(kind='histogram', world_readable=False)
```

Out[15]:

4 4

Plot twist!

There's nothing here...

You might need to sign in to see this plot.
Chart Studio is free to view plots that have been shared with you.

Only *you* (the creator) will be able to see this chart, or change the global, default settings with `cf.set_config_file`

In [16]:

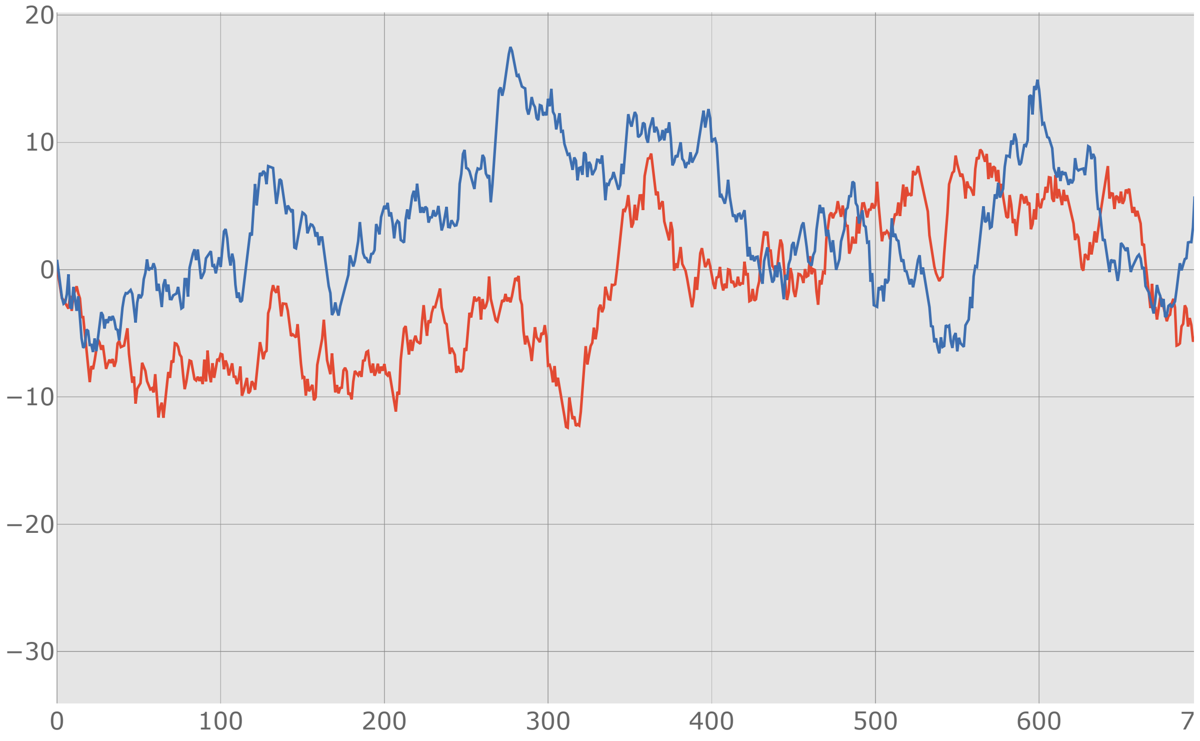
```
cf.set_config_file(offline=False, world_readable=True, theme='ggplot')
```

Line Charts

In [17]:

```
df = pd.DataFrame(np.random.randn(1000, 2), columns=['A', 'B']).cumsum()
df.iplot(filename='cufflinks/line-example')
```

Out[17]:



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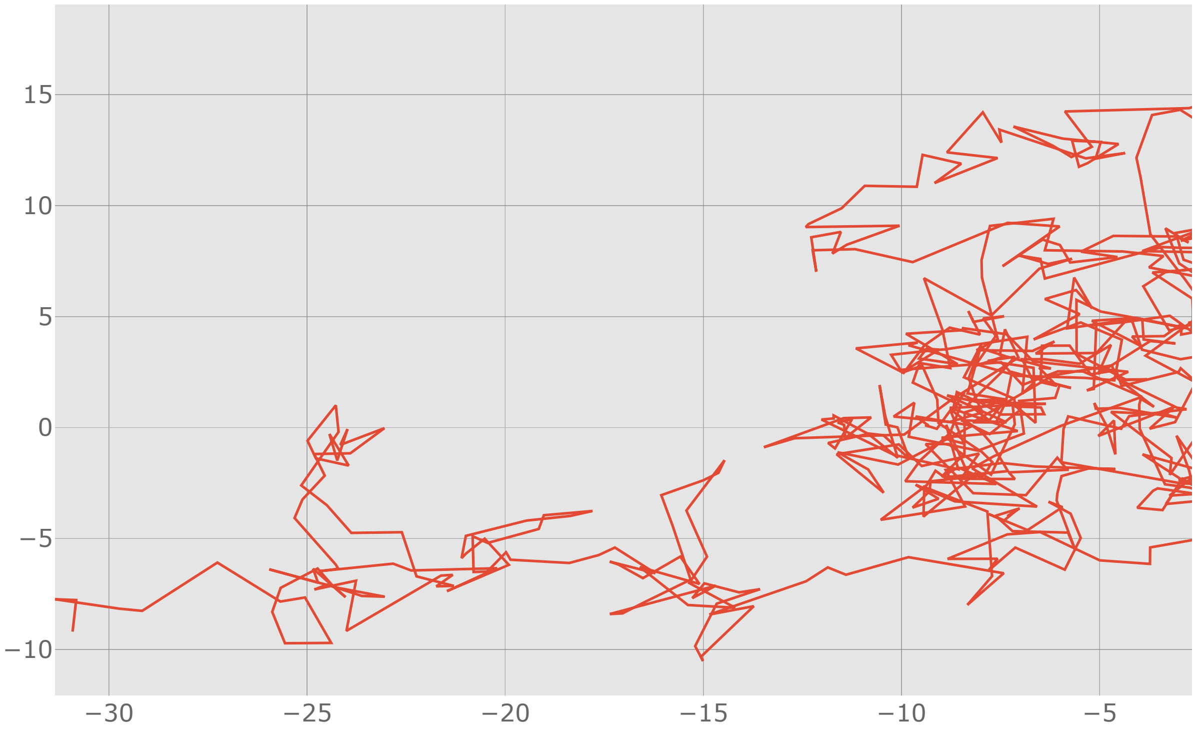
Plot one column vs another with x and y keywords

Out[15]:



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Bar Charts

Download some civic data. A time series log of the 311 complaints in NYC.

In [ ]:

```
df = pd.read_csv('https://raw.githubusercontent.com/plotly/widgets/master/ip
ython-examples/311_150k.csv', parse_dates=True, index_col=1)
df.head(3)
```

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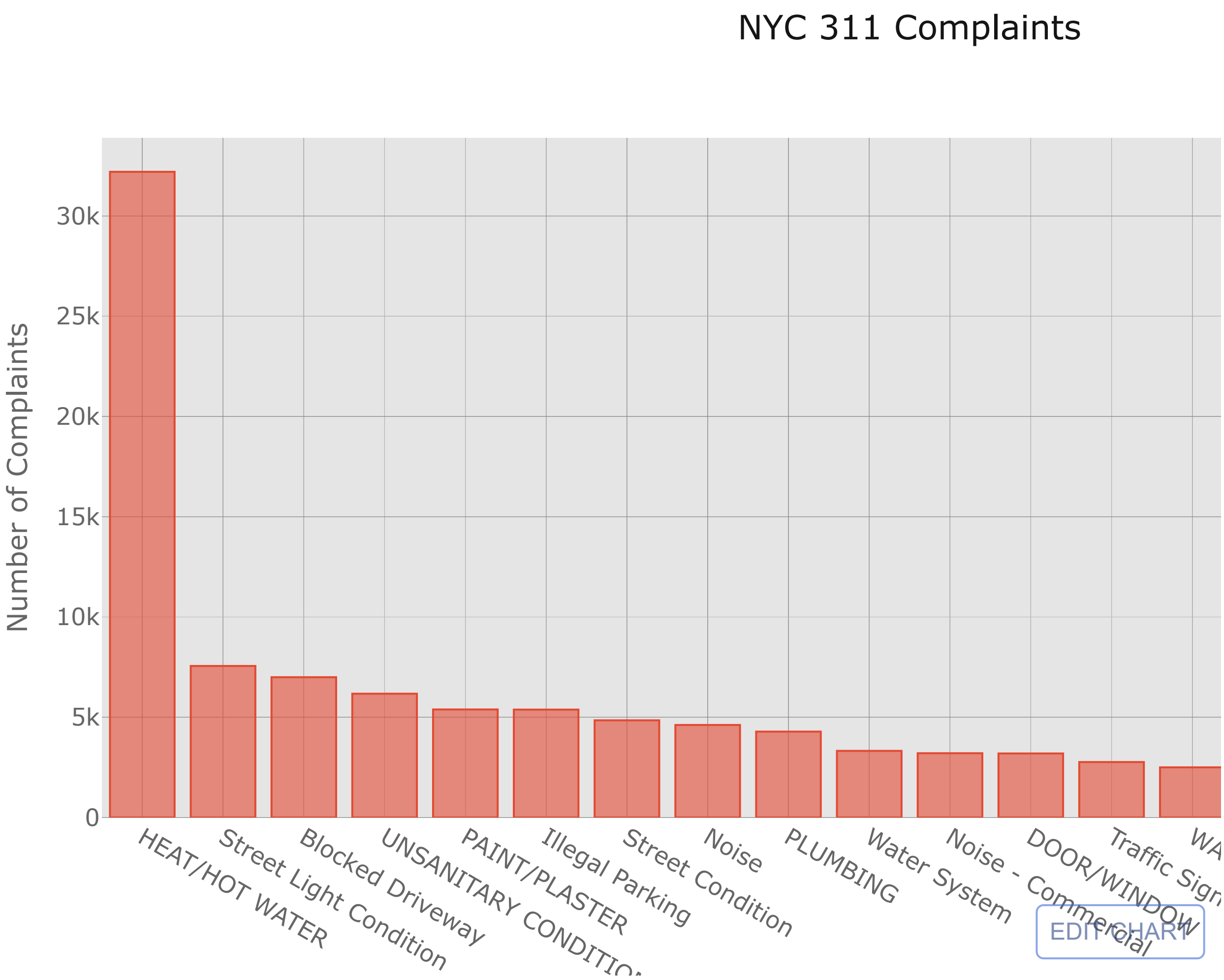
Plot a series directly

In [18]:

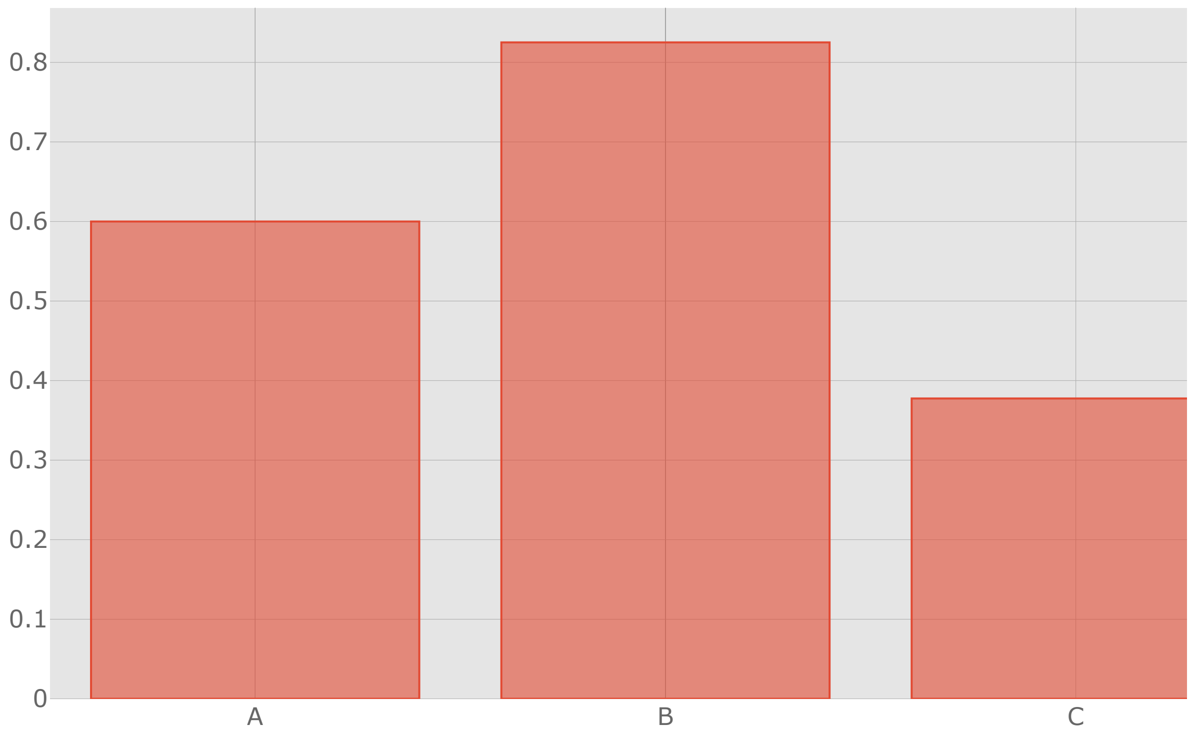
```
series.iplot(kind='bar', yTitle='Number of Complaints', title='NYC 311 Complaints',
             filename='cufflinks/categorical-bar-chart')
```

Out[18]:



```
df = pd.DataFrame(np.random.rand(10, 4), columns=['A', 'B', 'C', 'D'])
row = df.ix[5]
row.iplot(kind='bar', filename='cufflinks/bar-chart-row')
```

Out[19]:



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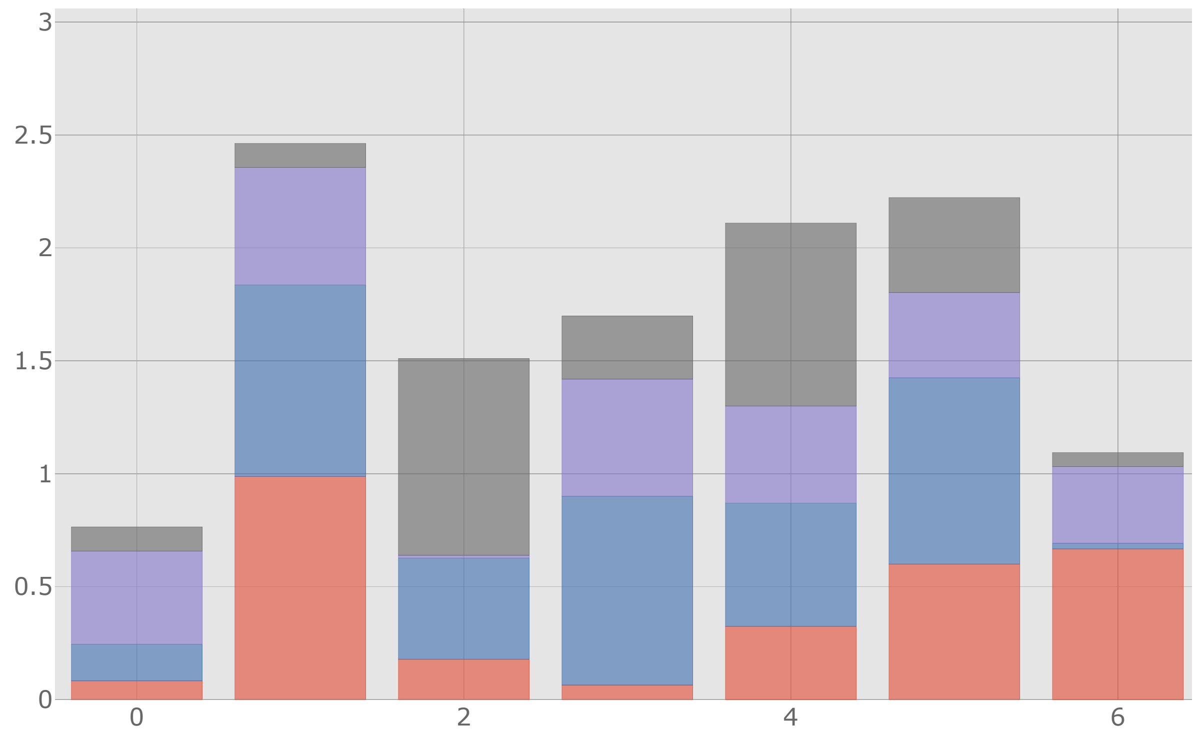
Call `iplot(kind='bar')` on a dataframe to produce a grouped bar chart

Out[[illegible]]:



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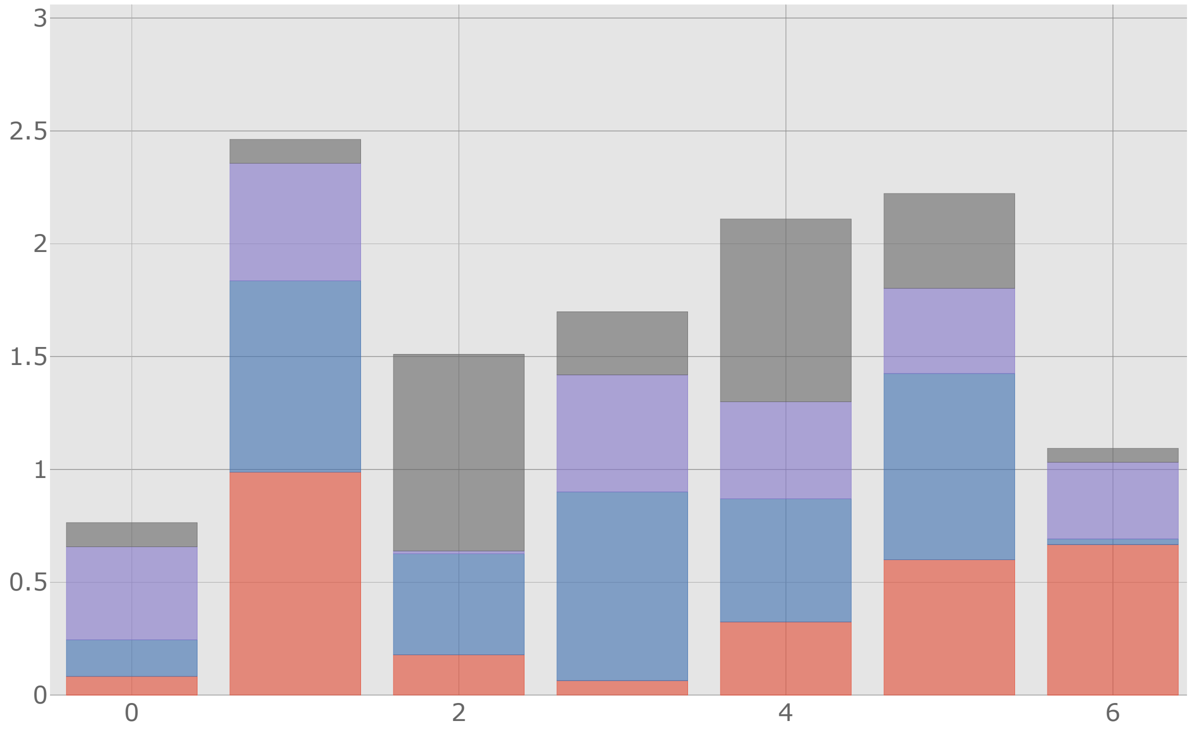
Out[21]:



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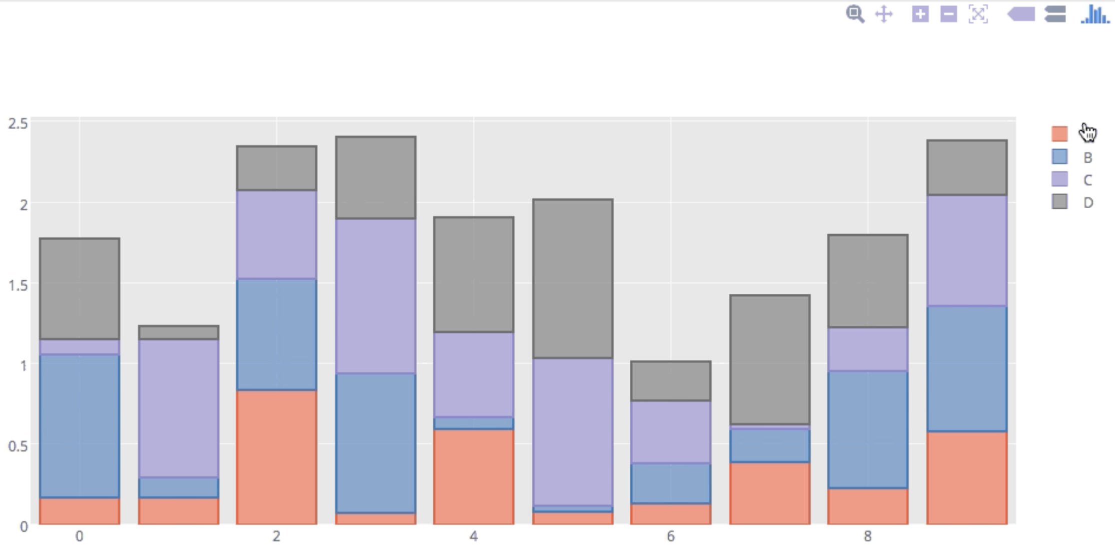
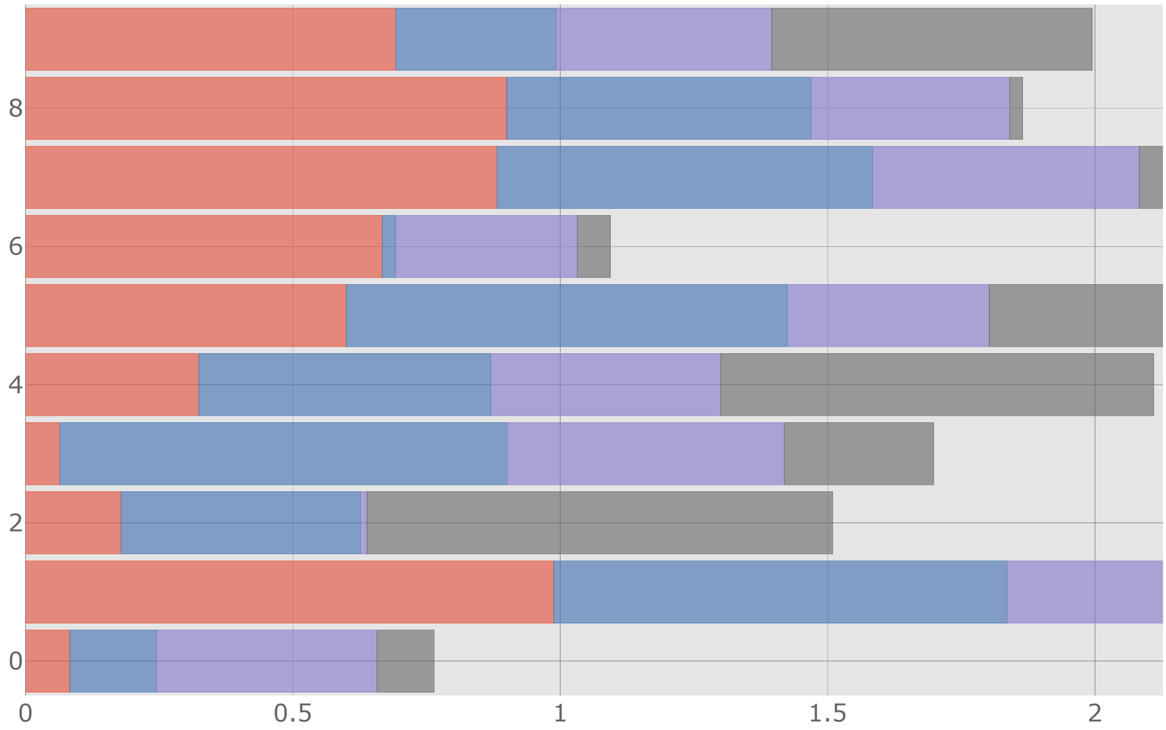


Make your bar charts horizontal with `kind='barh'`



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Themes

cufflinks ships with a few themes. View available themes with `cf.getThemes`, apply them with `cf.set_config_file`

```
['pearl', 'white', 'ggplot', 'solar', 'space']
```

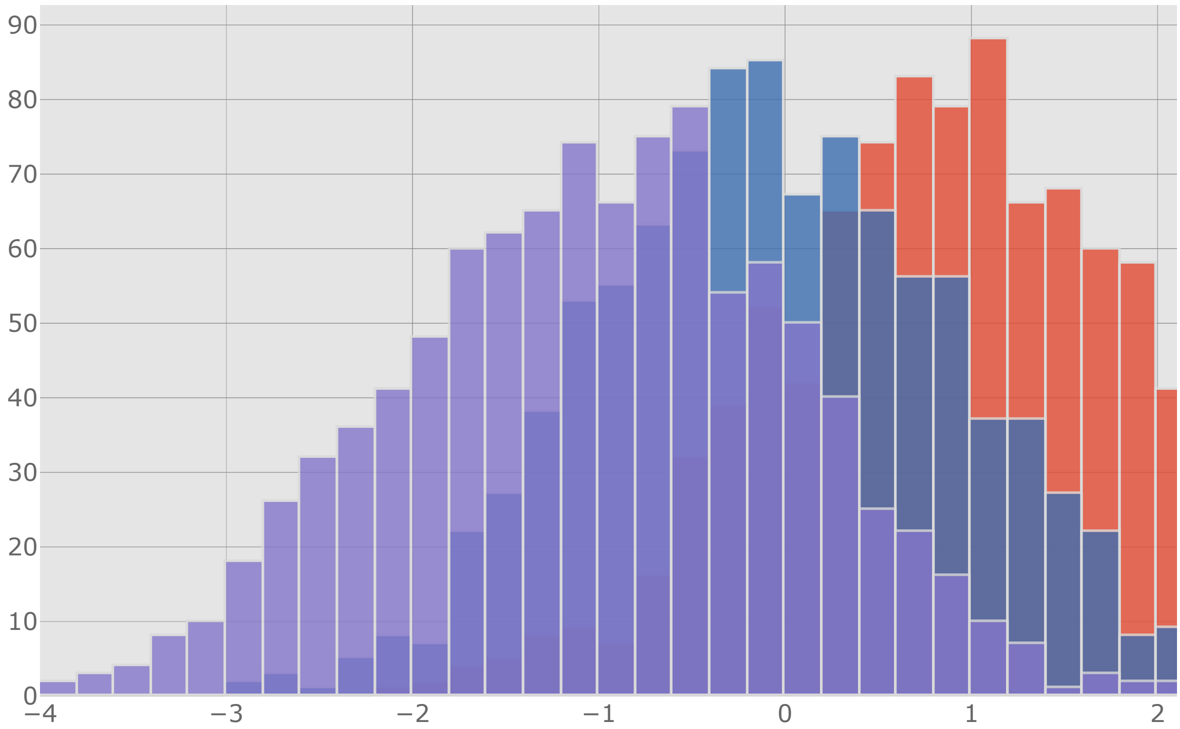
In [24]:

```
cf.set_config_file(theme='pearl')
```

Histograms

```
df.iplot(kind='histogram', filename='cufflinks/basic-histogram')
```

Out[4]:



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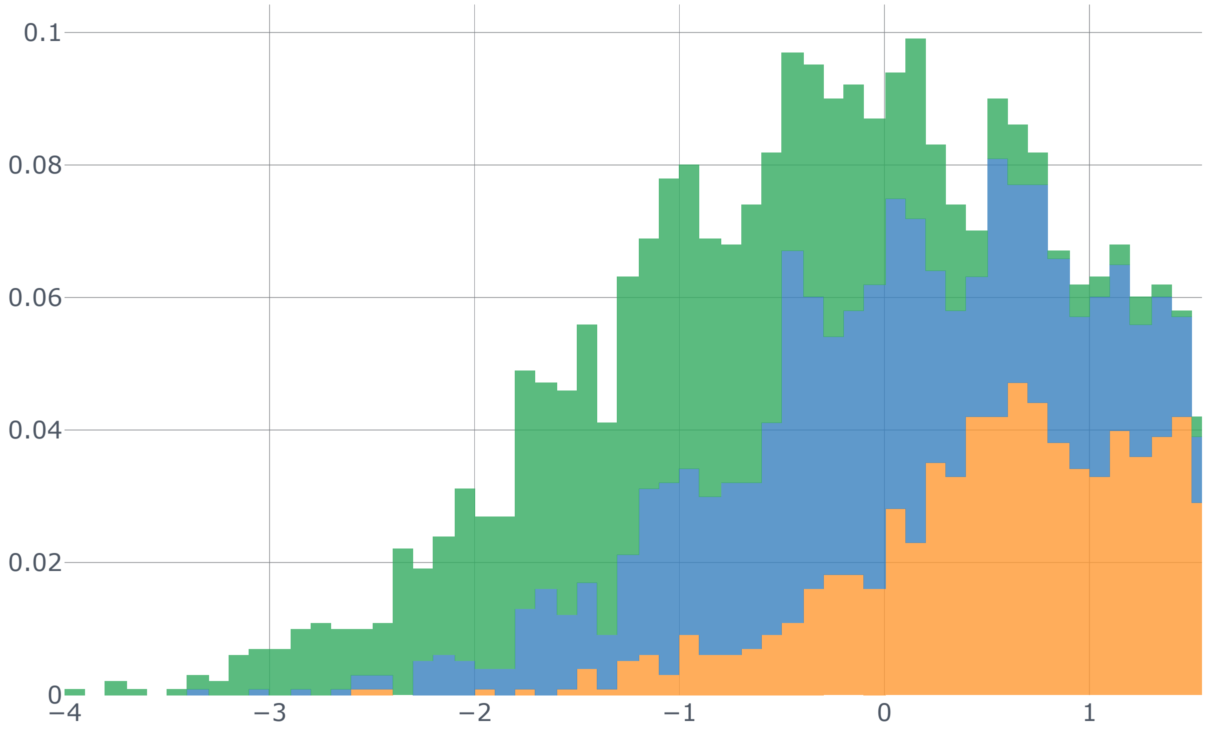
- `bins` (`int`)
- `histnorm` (`''` | `'percent'` | `'probability'` | `'density'` | `'probability density'`)
- `histfunc` (`'count'` | `'sum'` | `'avg'` | `'min'` | `'max'`)

In [27]:

```
df.iplot(kind='histogram', barmode='stack', bins=100, histnorm='probability'
, filename='cufflinks/customized-histogram')
```

Out[27]:



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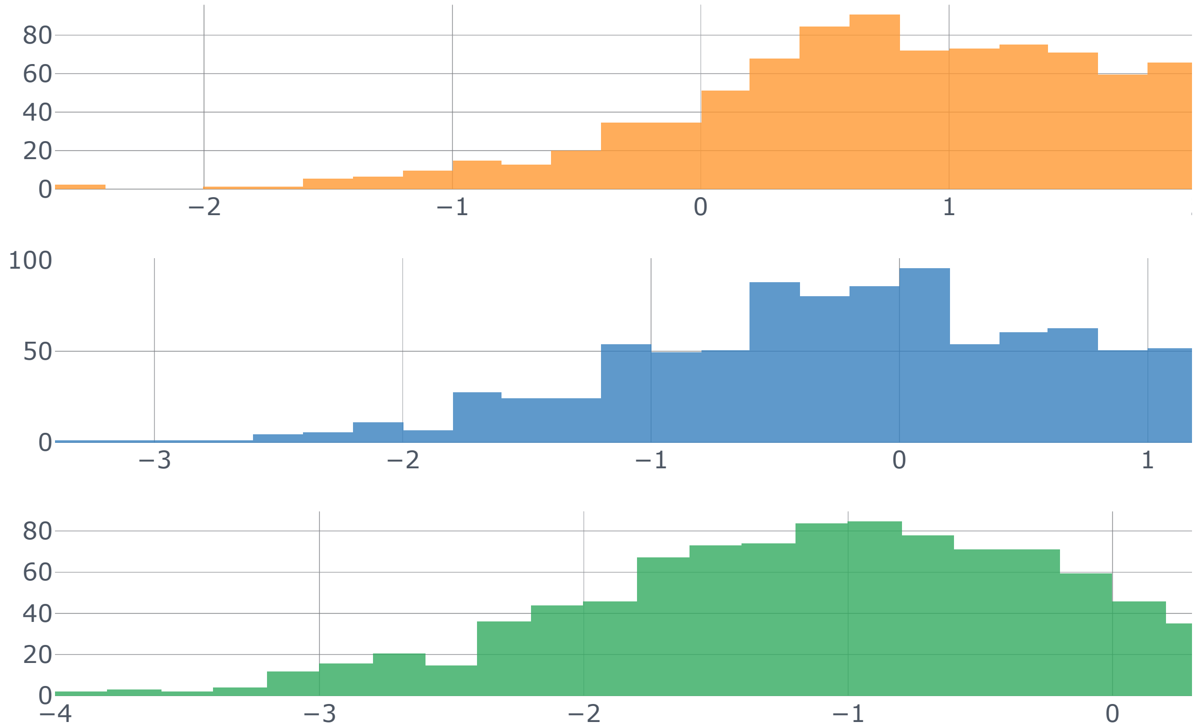
In [28]:

```
df.iplot(kind='histogram', subplots=True, shape=(3, 1), filename='cufflinks/
histogram-subplots')
```

Out[28]:



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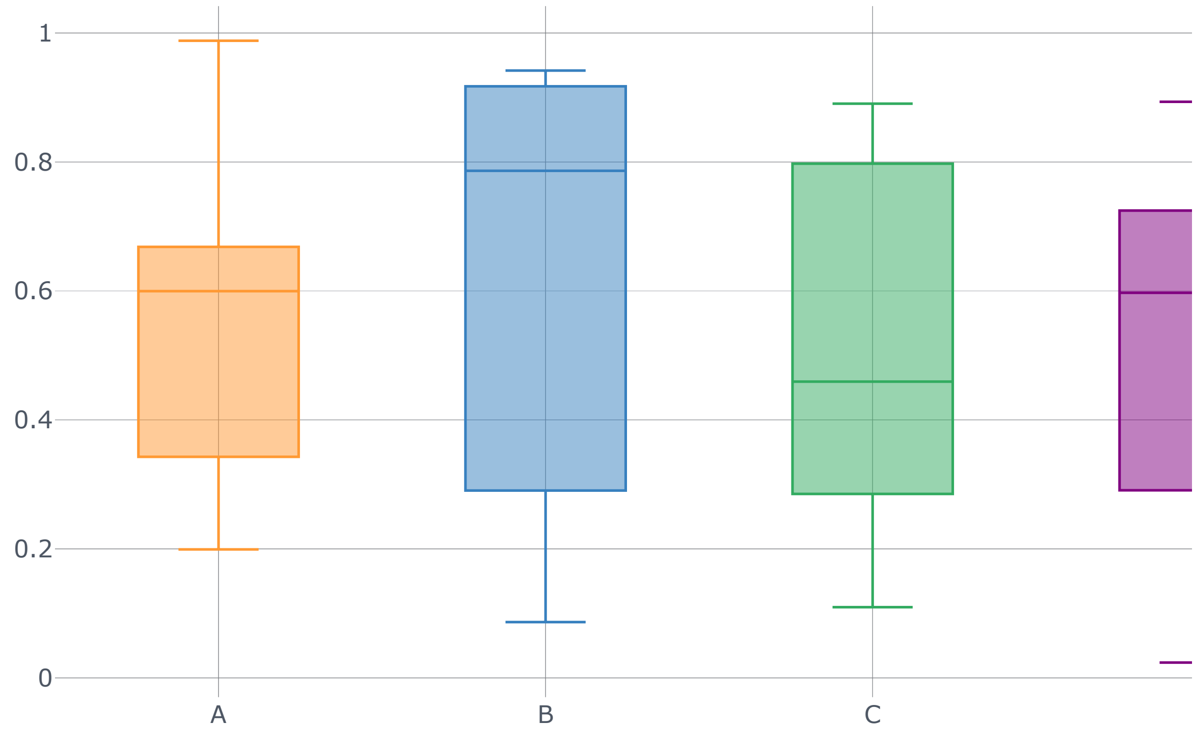
Box Plots

```
Out[29]:
```



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Area Charts

To produce stacked area plot, each column must be either all positive or all negative values.

When input data contains `NaN`, it will be automatically filled by 0. If you want to drop or fill by different values, use `dataframe.dropna()` or `dataframe.fillna()` before calling plot.

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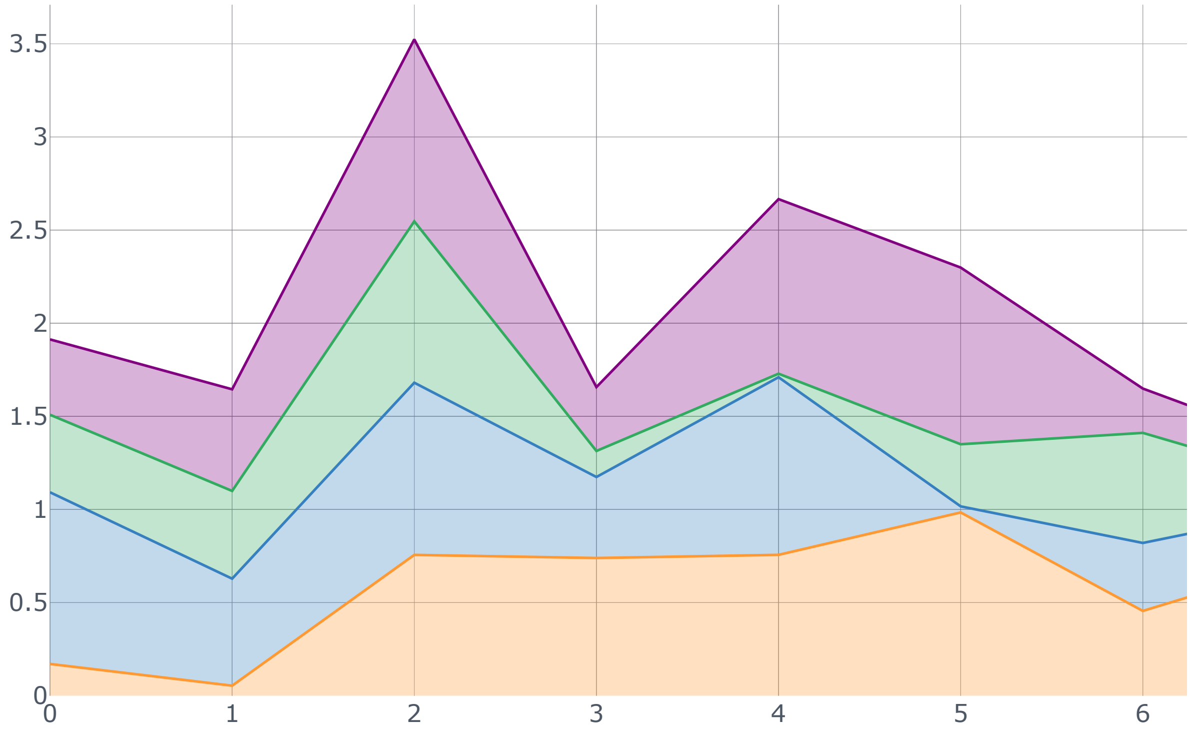
In [31]:

```
df.iplot(kind='area', fill=True, filename='cuflinks/stacked-area')
```

Out[31]:



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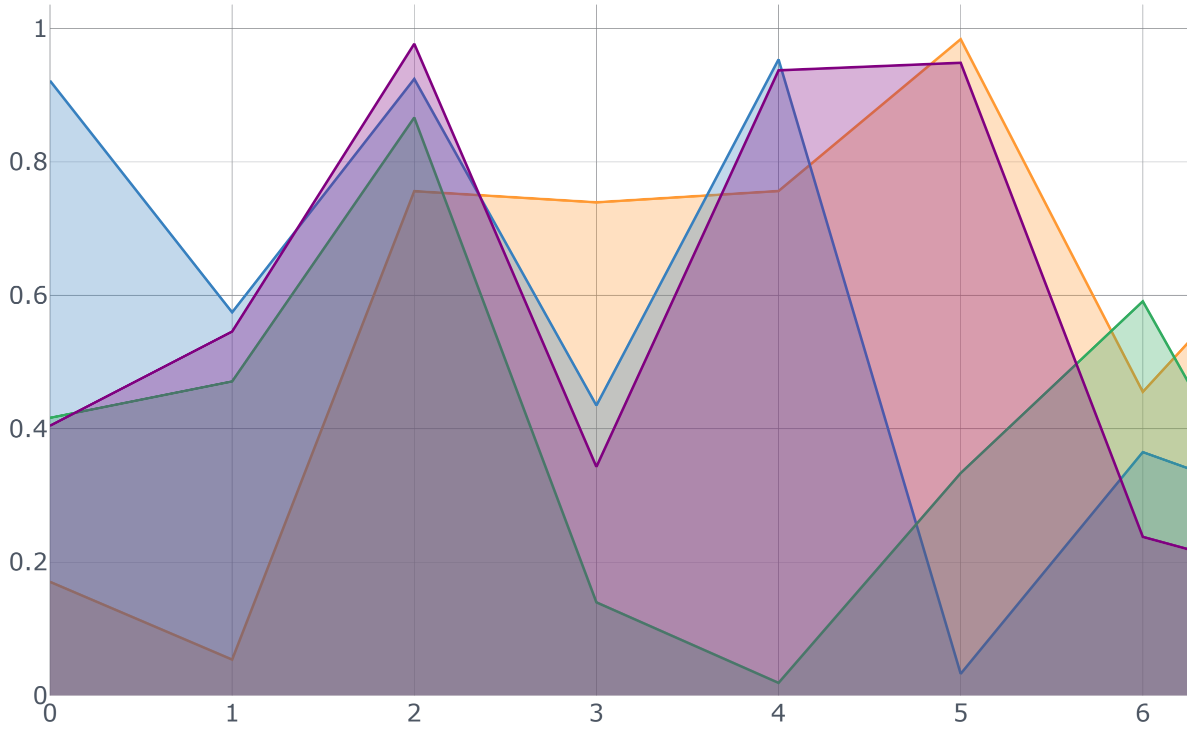
For non-stacked area charts, set `kind=scatter` with `fill=True`



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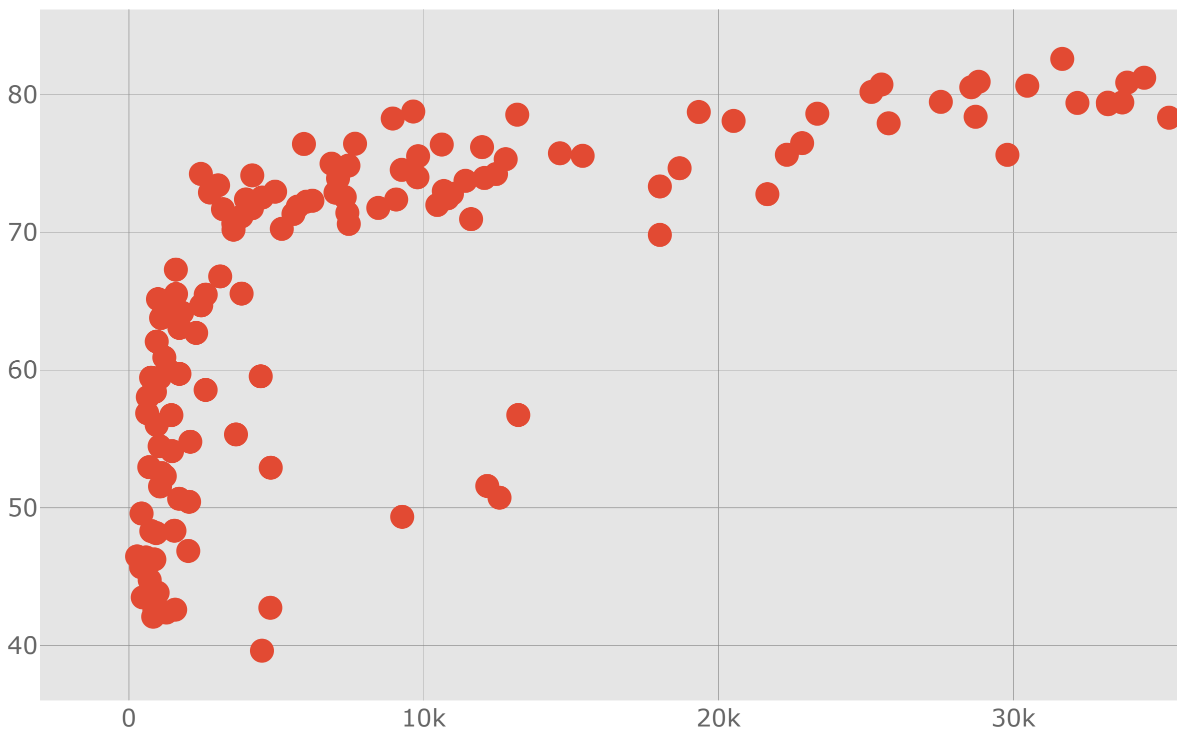
Scatter Plot

Set x and y as column names. If x isn't supplied, `df.index` will be used.

```
df2007 = df[df.year==2007]
df1952 = df[df.year==1952]

df2007.iplot(kind='scatter', mode='markers', x='gdpPercap', y='lifeExp', filename='cufflinks/simple-scatter')
```

Out[5]:



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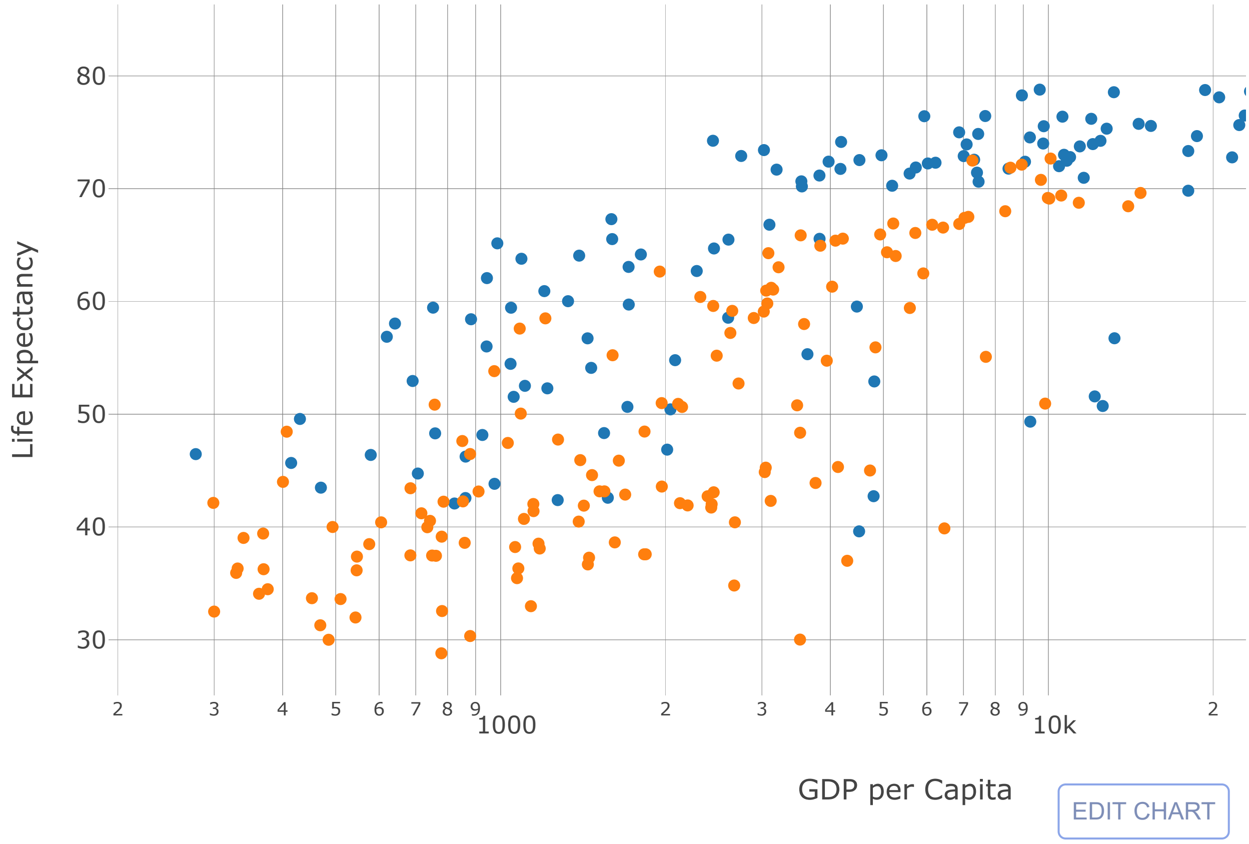
Plotting multiple column scatter plots isn't as easy with cufflinks. Here is an example with Plotly's native syntax

```
 'mode': 'markers', 'name': '2007'},
        {'x': df1952.gdpPercap, 'y': df1952.lifeExp, 'text': df1952.country,
 'mode': 'markers', 'name': '1952'}
    ],
    'layout': {
        'xaxis': {'title': 'GDP per Capita', 'type': 'log'},
        'yaxis': {'title': "Life Expectancy"}
    }
}
py.iplot(fig, filename='cufflinks/multiple-scatter')
```

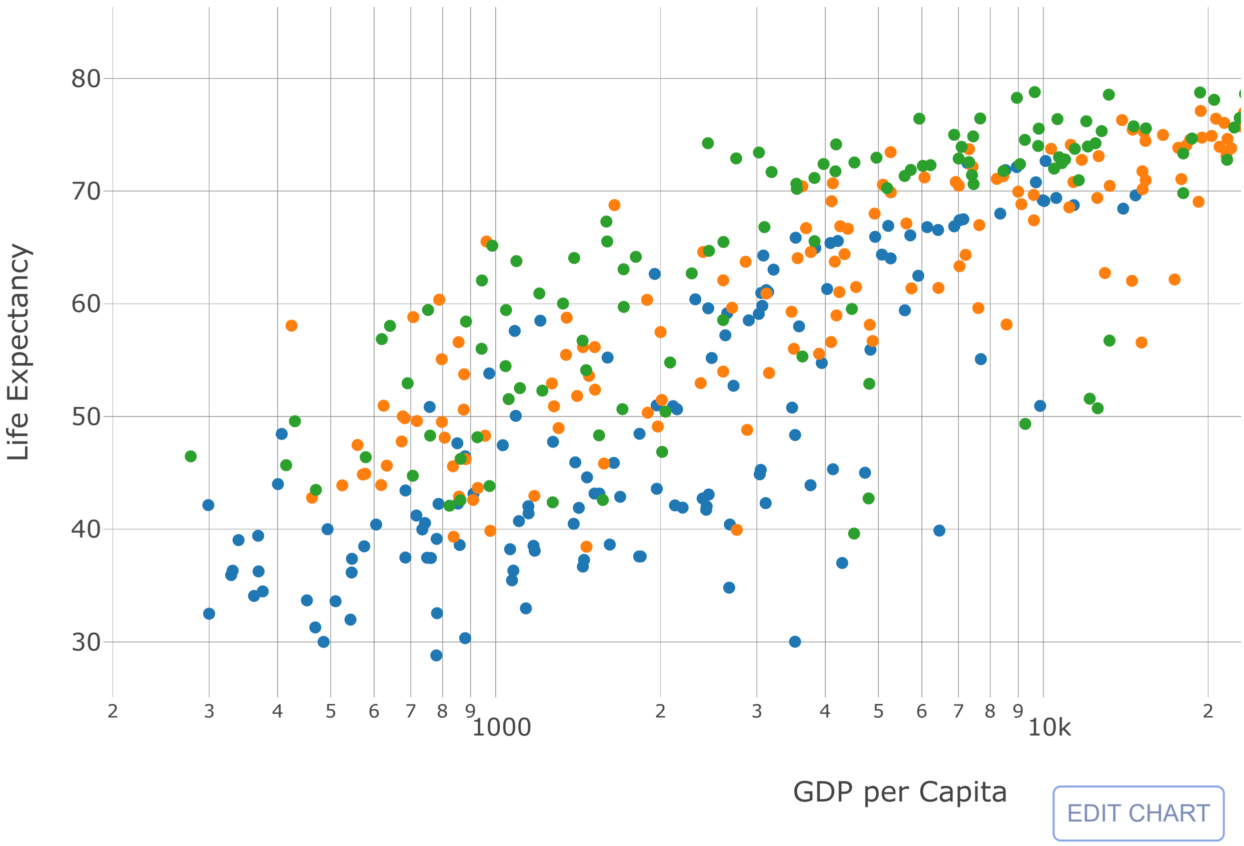
Out[35]:



Grouping isn't as easy either. But, with Plotly's native syntax:

```
            {
                'x': df[df['year']==year]['gdpPercap'],
                'y': df[df['year']==year]['lifeExp'],
                'name': year, 'mode': 'markers',
            } for year in [1952, 1982, 2007]
        ],
        'layout': {
            'xaxis': {'title': 'GDP per Capita', 'type': 'log'},
            'yaxis': {'title': "Life Expectancy"}
        }
    }, filename='cufflinks/scatter-group-by')
```

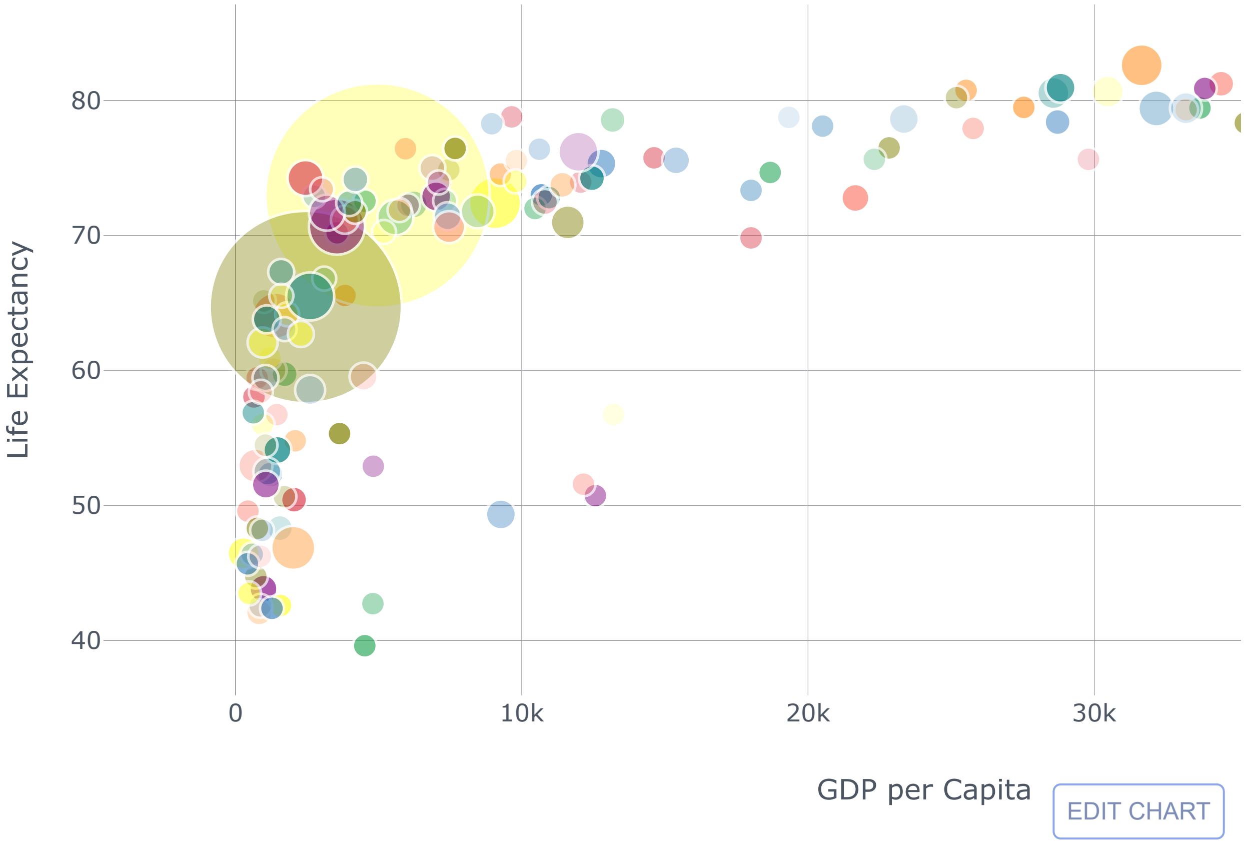
Out[36]:



In [37]:

```
df2007.iplot(kind='bubble', x='gdpPercap', y='lifeExp', size='pop', text='country',
             xTitle='GDP per Capita', yTitle='Life Expectancy',
             filename='cufflinks/simple-bubble-chart')
```

Out[37]:

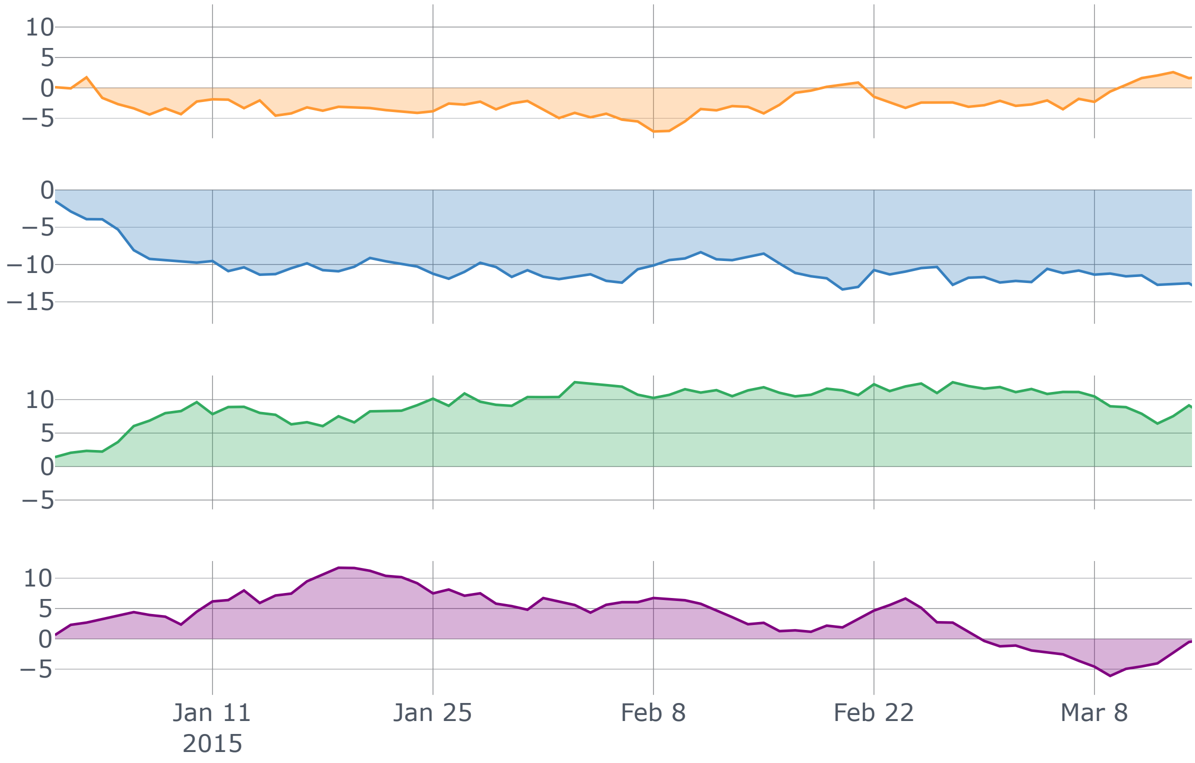


Subplots

In [38]:

```
df=cf.datagen.lines(4)
df.iplot(subplots=True, shape=(4,1), shared_xaxes=True, fill=True, filename=
'cufflinks/simple-subplots')
```

Out[38]:



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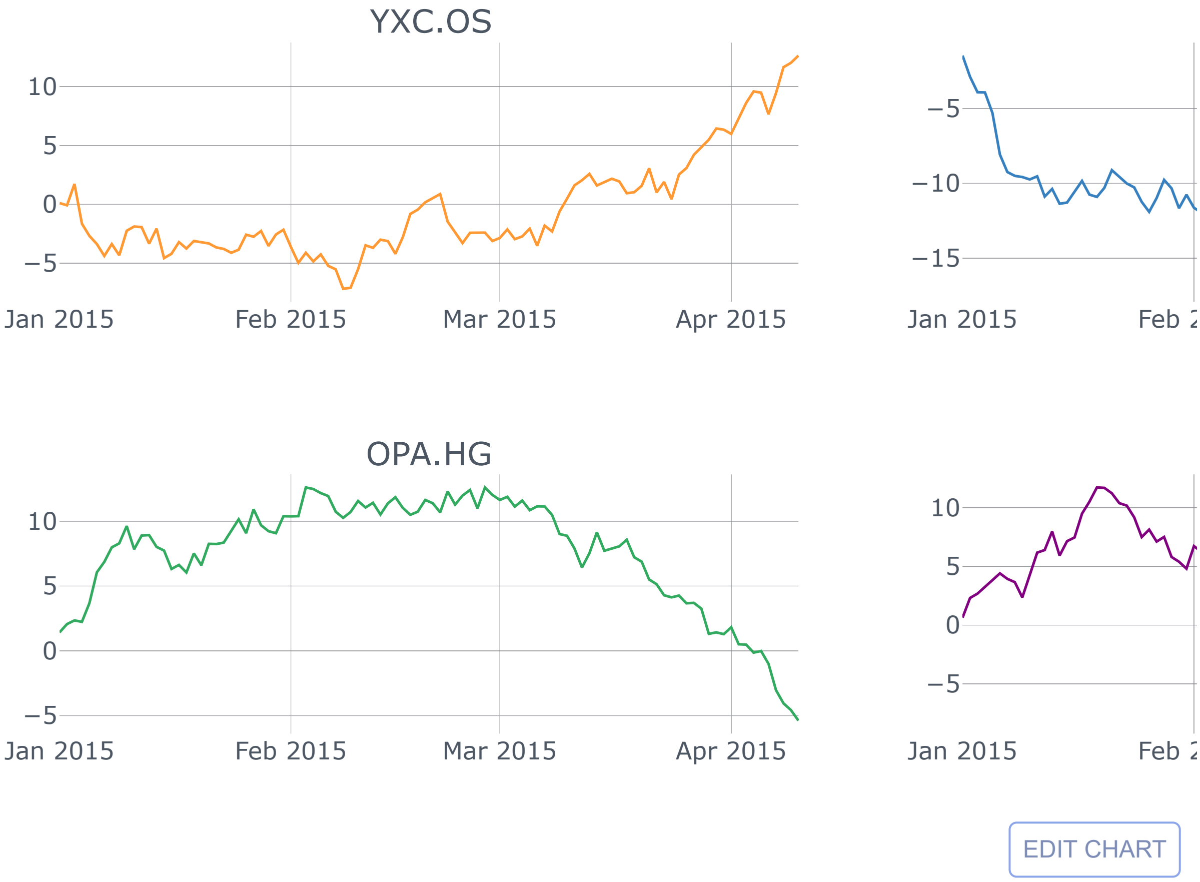
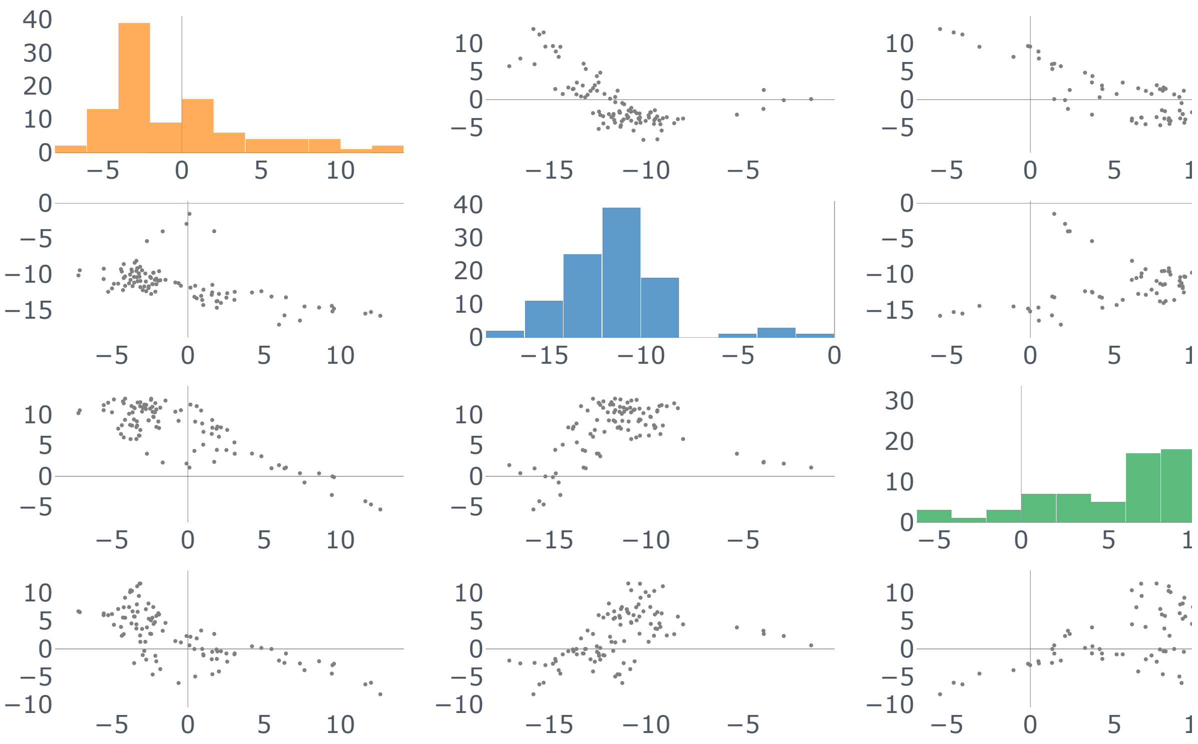
Add subplot titles with `subplot_titles` as a list of titles or `True` to use column names.



Scatter matrix

Out[40]:



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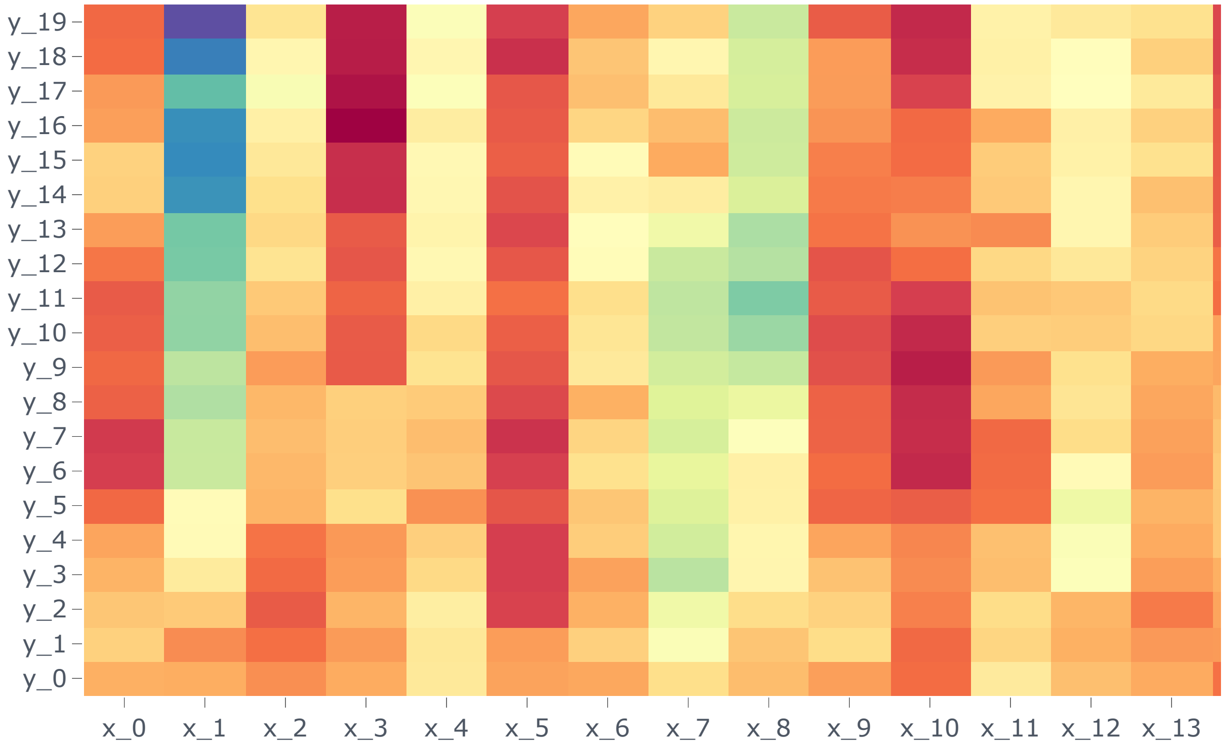
Heatmaps

Out[41]:



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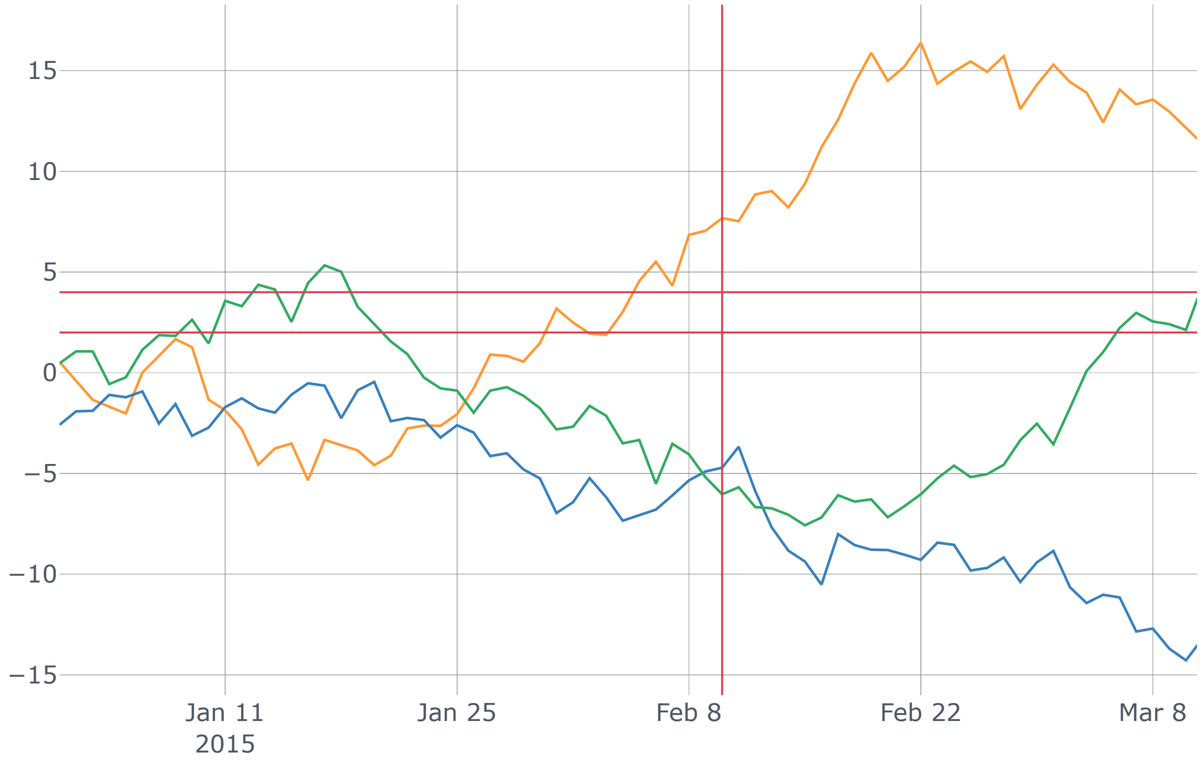
Lines and Shaded Areas

Use `hline` and `vline` for horizontal and vertical lines.

In [42]:

```
df=cf.datagen.lines(3,columns=['a','b','c'])
```

Out[45]:



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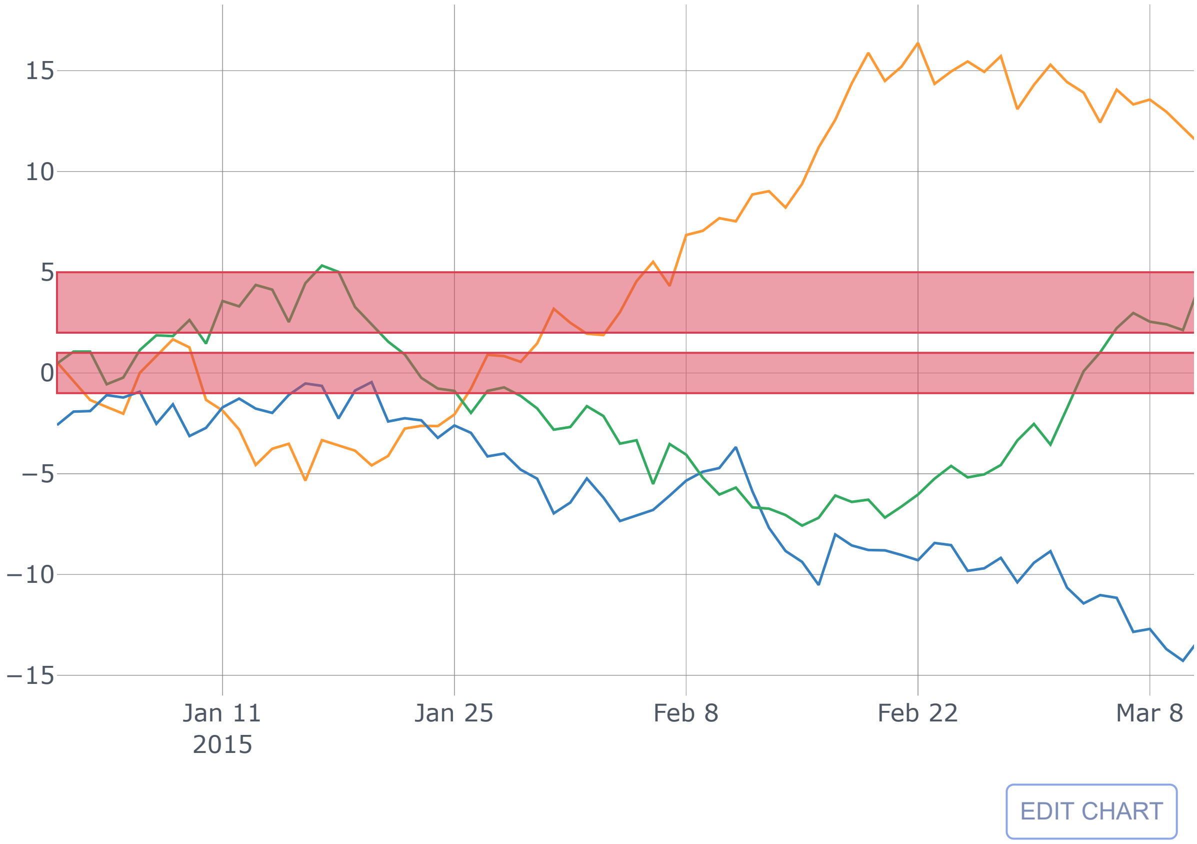
Draw shaded regions with hspan



Extra parameters can be passed in the form of dictionaries, width, fill, color, fillcolor, opacity

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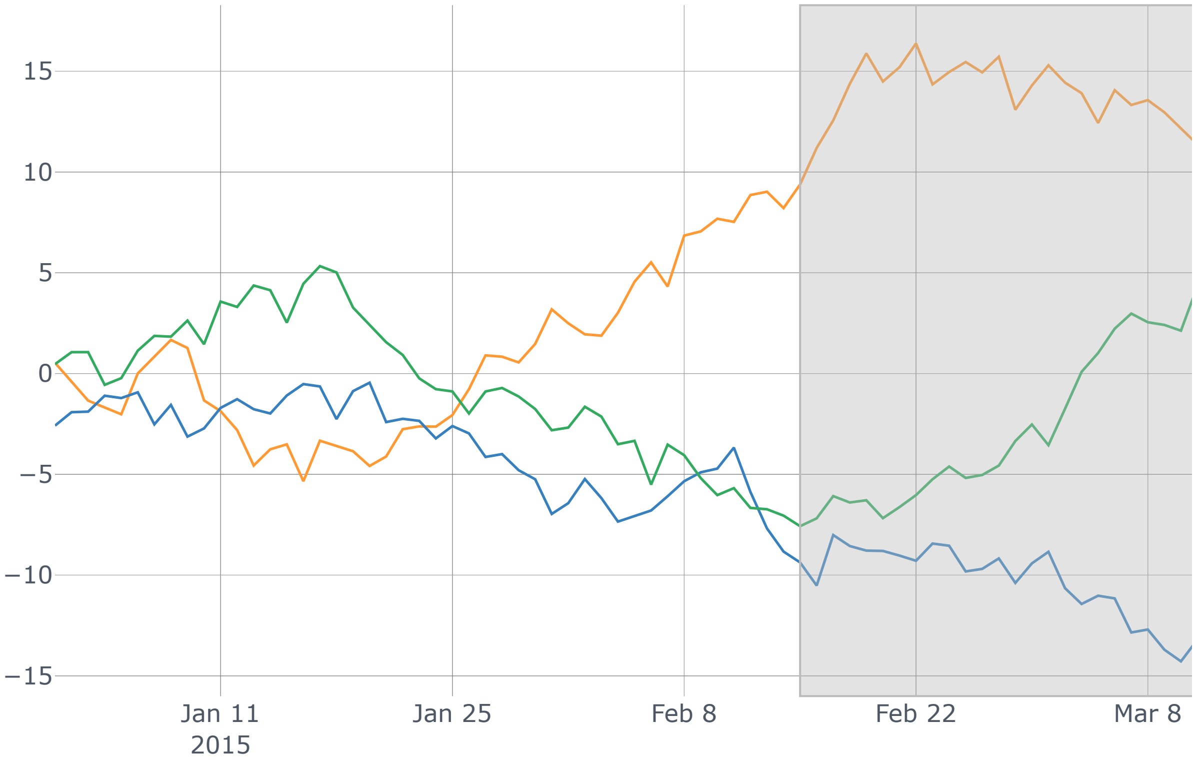
Out[45]:



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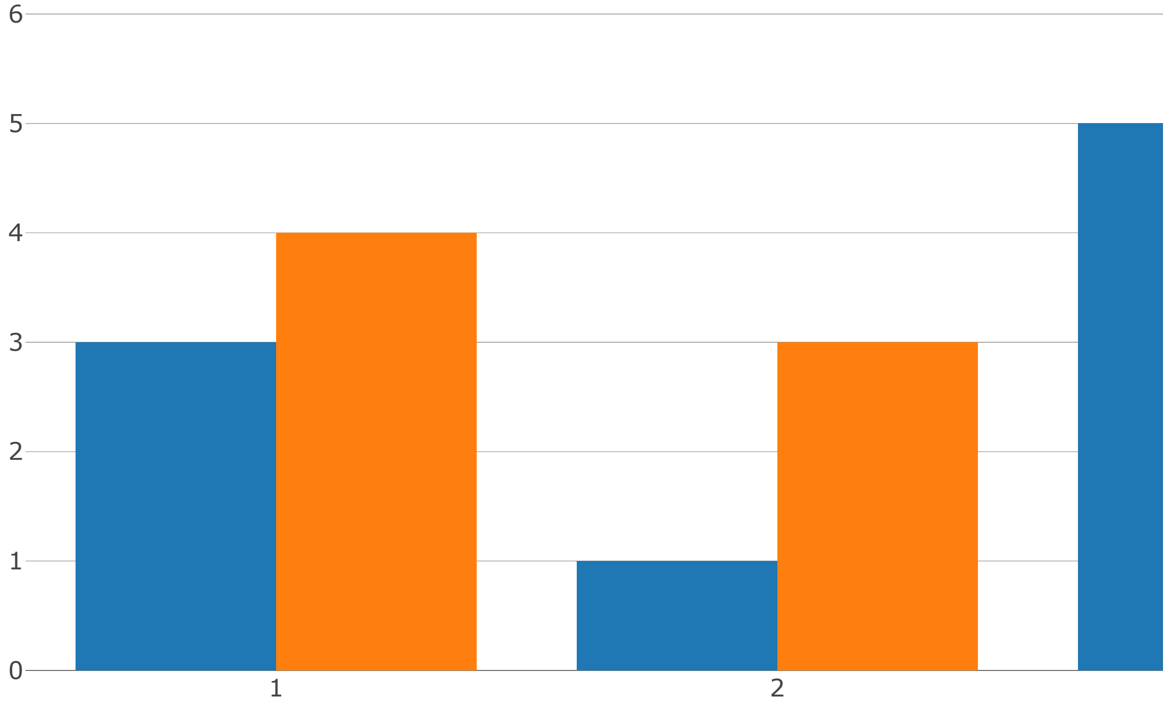
cufflinks is designed for simple one-line charting with Pandas and Plotly. All of the Plotly chart attributes are not directly assignable in the `df.iplot` call signature.

To update attributes of a `cufflinks` chart that aren't available, first convert it to a figure (`asFigure=True`), then tweak it, then plot it with `plotly.plotly.iplot`.

Here is an example of a simple plotly figure. You can find more examples in our online python documentation.

```
            Bar(**{
                'x': [1, 2, 3],
                'y': [3, 1, 5],
                'name': 'first trace',
                'type': 'bar'
            }),
            Bar(**{
                'x': [1, 2, 3],
                'y': [4, 3, 6],
                'name': 'second trace',
                'type': 'bar'
            })
        ],
        'layout': Layout(**{
            'title': 'simple example'
        })
    }, filename='cufflinks/simple-plotly-example')
```



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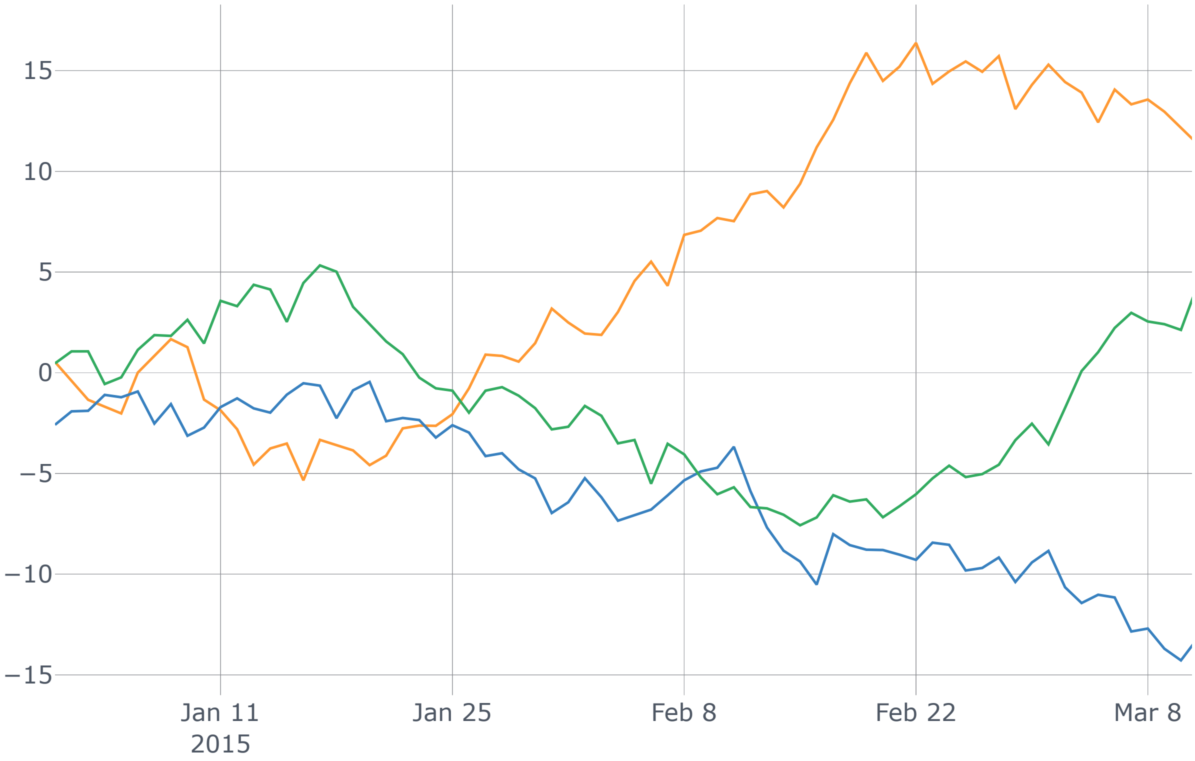
`cufflinks` generates these figure's that describe plotly graphs. For example, this graph:



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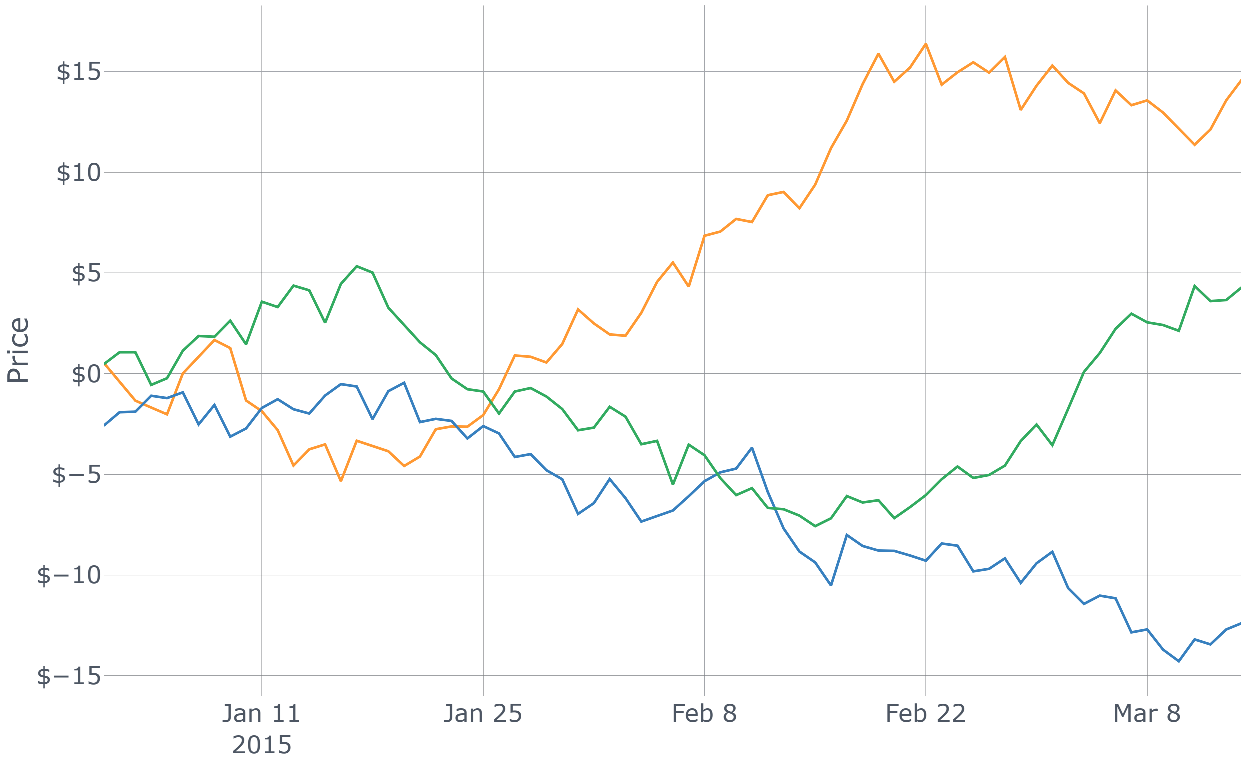
has this description:

```
Figure(
    data=Data([
        Scatter(
            x=['2015-01-01', '2015-01-02', '2015-01-03', '2015-01-04', '..'
],
            y=array([  5.35393544e-01,  -3.51020567e-01,  -1.34207933e+00,
 ..,
            mode='lines',
            name='a',
            line=Line(
                color='rgba(255, 153, 51, 1.0)',
                width='1.3'
            )
```

So, if you want to edit any attribute of a Plotly graph from cufflinks, first convert it to a figure and then edit the figure objects. Let's add a yaxis title, tick suffixes, and new legend names to this example:

```
py.iplot(figure, filename='cufflinks/customized-chart')
```

Out[50]:



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See more examples of Plotly graphs or view the entire reference of valid attributes

Cufflinks Reference

Cufflinks is open source on github!

```
Help on method _iplot in module cufflinks.plotlytools:

_iplot(self, data=None, layout=None, filename='', world_readable=None, kind
='scatter', title='', xTitle='', yTitle='', zTitle='', theme=None, colors=No
ne, colorscale=None, fill=False, width=None, mode='lines', symbol='dot', siz
e=12, barmode='', sortbars=False, bargap=None, bargroupgap=None, bins=None,
histnorm='', histfunc='count', orientation='v', boxpoints=False, annotations
=None, keys=False, bestfit=False, bestfit_colors=None, categories='', x='',
y='', z='', text='', gridcolor=None, zerolinecolor=None, margin=None, subplo
ts=False, shape=None, asFrame=False, asDates=False, asFigure=False, asImage=
False, dimensions=(1116, 587), asPlot=False, asUrl=False, online=None, **kwa
rgs) method of pandas.core.frame.DataFrame instance
       Returns a plotly chart either as inline chart, image of Figure object
```

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