plotly | Graphing Libraries (https://plotly.com/)(/graphing-libraries/)

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Python (/python) > Scientific Charts (/python/scientific-charts) > Network Graphs

Suggest an edit to this page (https://github.com/plotly/plotly.py/edit/doc-prod/doc/python/network-graphs.md)

Network Graphs in Python

How to make Network Graphs in Python with Plotly. One examples of a network graph with NetworkX

In this example we show how to visualize a network graph created using networkx.

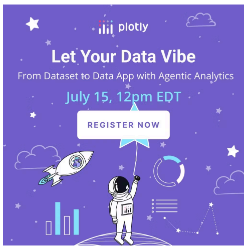
Install the Python library networkx with pip install networkx.

Create random graph

```
import plotly.graph_objects as go

import networkx as nx

G = nx.random_geometric_graph(200, 0.125)
```

Create Edges

Add edges as disconnected lines in a single trace and nodes as a scatter trace



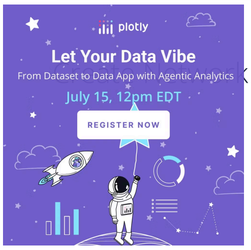
```
edge_x = []
edge_y = []
for edge in G.edges():
    x0, y0 = G.nodes[edge[0]]['pos']
    x1, y1 = G.nodes[edge[1]]['pos']
    edge_x.append(x0)
    edge_x.append(x1)
    edge_x.append(None)
    edge_y.append(y0)
    edge_y.append(y1)
    edge_y.append(None)

edge_trace = go.Scatter(
    x=edge_x, y=edge_y,
    line=dict(width=0.5, color='#888'),
    hoverinfo='none',
    mode='lines')

node_x = []
node_y = []
for node in G.nodes():
    x, y = G.nodes[node]['pos']
    node_x.append(x)
    node_y.append(y)

node_trace = go.Scatter(
    x=node_x, y=node_y,
    mode='markers',
    hoverinfo='text',
    marker=dict(
        showscale=True,
        # colorscale options
        #'Greys' | 'YlGnBu' | 'Greens' | 'YlOrRd' | 'Bluered' | 'RdBu' |
        #'Reds' | 'Blues' | 'Picnic' | 'Rainbow' | 'Portland' | 'Jet' |
        #'Hot' | 'Blackbody' | 'Earth' | 'Electric' | 'Viridis' |
        colorscale='YlGnBu',
        reversescale=True,
        color=[],
        size=10,
        colorbar=dict(
            thickness=15,
            title=dict(
              text='Node Connections',
              side='right'
            ),
            xanchor='left',
        ),
        line_width=2))
```

Color Node Points

Color node points by the number of connections.

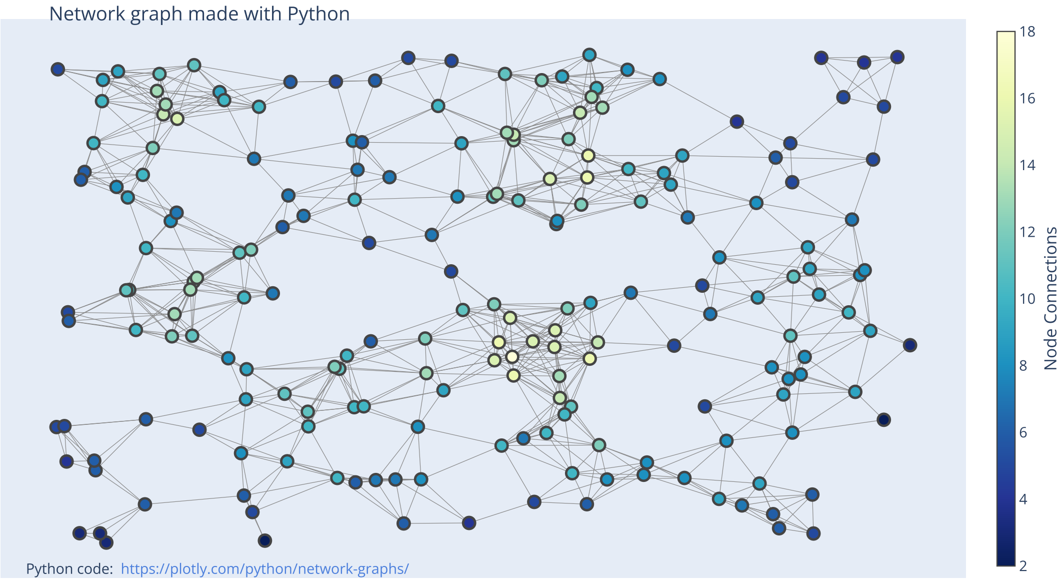
Another option would be to size points by the number of connections i.e. `node_trace.marker.size = node_adjacencies`

```
node_adjacencies = []
node_text = []
for node, adjacencies in enumerate(G.adjacency()):
    node_adjacencies.append(len(adjacencies[1]))
    node_text.append('# of connections: '+str(len(adjacencies[1])))

node_trace.marker.color = node_adjacencies
node_trace.text = node_text
```



k Graph

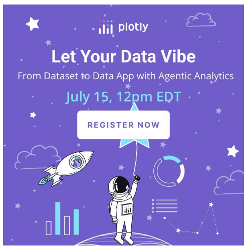
```
fig = go.Figure(data=[edge_trace, node_trace],
             layout=go.Layout(
                title=dict(
                    text="<br>Network graph made with Python",
                    font=dict(
                        size=16
                    )
                ),
                showlegend=False,
                hovermode='closest',
                margin=dict(b=20,l=5,r=5,t=40),
                annotations=[ dict(
                    text="Python code: <a href='https://plotly.com/python/network-graphs/'> https://plotly.com/python/network-graphs/</a>",
                    showarrow=False,
                    xref="paper", yref="paper",
                    x=0.005, y=-0.002 ) ],
                xaxis=dict(showgrid=False, zeroline=False, showticklabels=False),
                yaxis=dict(showgrid=False, zeroline=False, showticklabels=False))
                )
fig.show()
```



Network graphs in Dash

Dash (https://plotly.com/dash/) is the best way to build analytical apps in Python using Plotly figures. To run the app below, run pip install dash dash-cytoscape, click "Download" to get the code and run python app.py.

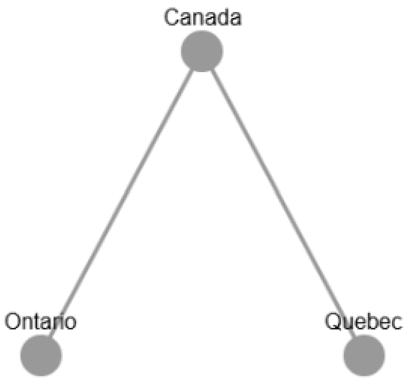
Get started with the official Dash docs (https://dash.plotly.com/installation) and **learn how to effortlessly** style (https://plotly.com/dash/design-kit/) **&** deploy (https://plotly.com/dash/app-manager/) **apps like this with** Dash Enterprise (https://plotly.com/dash/)**.**



```python
from dash import Dash, html
import dash_cytoscape as cyto

app = Dash(__name__)

app.layout = html.Div([
    html.P("Dash Cytoscape:"),
    cyto.Cytoscape(
        id='cytoscape',
        elements=[
            {'data': {'id': 'ca', 'label': 'Canada'}},
            {'data': {'id': 'on', 'label': 'Ontario'}},
            {'data': {'id': 'qc', 'label': 'Quebec'}},
            {'data': {'source': 'ca', 'target': 'on'}},
            {'data': {'source': 'ca', 'target': 'qc'}}
        ],
        layout={'name': 'breadthfirst'},
        style={'width': '400px', 'height': '500px'}
    )
])


app.run(debug=True)
```

DOWNLOAD

Dash Cytoscape:



Sign up for Dash Club → Free cheat sheets plus updates from Chris Parmer and Adam Schroeder delivered to your inbox every two months. Includes tips and tricks, community apps, and deep dives into the Dash architecture. Join now (https://go.plotly.com/dash-club?utm_source=Dash+Club+2022&utm_medium=graphing_libraries&utm_content=inline).

Reference

See https://plotly.com/python/reference/scatter/ (https://plotly.com/python/reference/scatter/) for more information and chart attribute options!

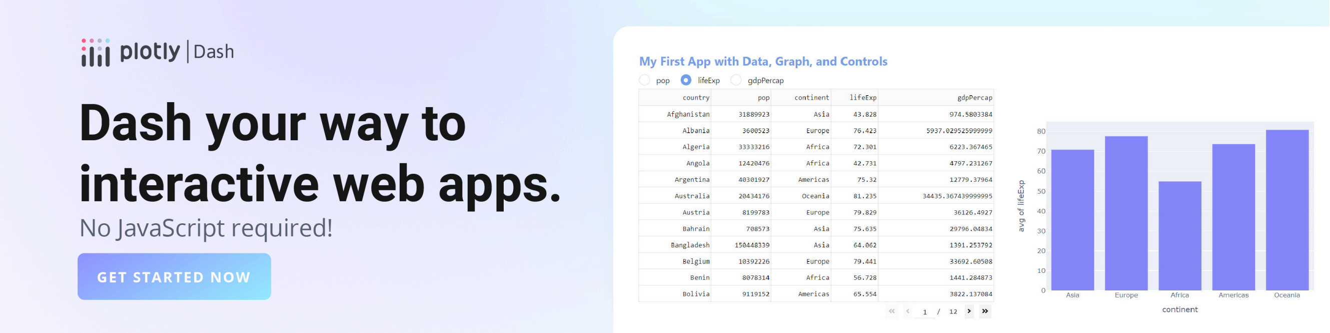
What About Dash?

Dash (https://dash.plot.ly/) is an open-source framework for building analytical applications, with no Javascript required, and it is tightly integrated with the Plotly graphing library.

Learn about how to install Dash at https://dash.plot.ly/installation (https://dash.plot.ly/installation).

Everywhere in this page that you see fig.show(), you can display the same figure in a Dash application by passing it to the figure argument of the Graph component (https://dash.plot.ly/dash-core-components/graph) from the built-in dash_core_components package like this:

```
import plotly.graph_objects as go # or plotly.express as px
fig = go.Figure() # or any Plotly Express function e.g. px.bar(...)
# fig.add_trace( ... )
# fig.update_layout( ... )

from dash import Dash, dcc, html

app = Dash()
app.layout = html.Div([
    dcc.Graph(figure=fig)
])

app.run(debug=True, use_reloader=False)  # Turn off reloader if inside Jupyter
```



My First App with Data, Graph, and Controls

country	pop	continent	lifeExp	gdpPercap
Afghanistan	31889923	Asia	43.828	974.5803384
Albania	3600523	Europe	76.423	5937.029525999999
Algeria	33333216	Africa	72.301	6223.367465
Angola	12420476	Africa	42.731	4797.231267
Argentina	40301927	Americas	75.32	12779.37964
Australia	20434176	Oceania	81.235	34435.367439999995
Austria	8199783	Europe	79.829	36126.4927
Bahrain	708573	Asia	75.635	29796.04834
Bangladesh	150448339	Asia	64.062	1391.253792
Belgium	10392226	Europe	79.441	33692.60508
Benin	8078314	Africa	56.728	1441.284873
Bolivia	9119152	Americas	65.554	3822.137084

(https://dash.plotly.com/tutorial?utm_medium=graphing_libraries&utm_content=python_footer)

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