

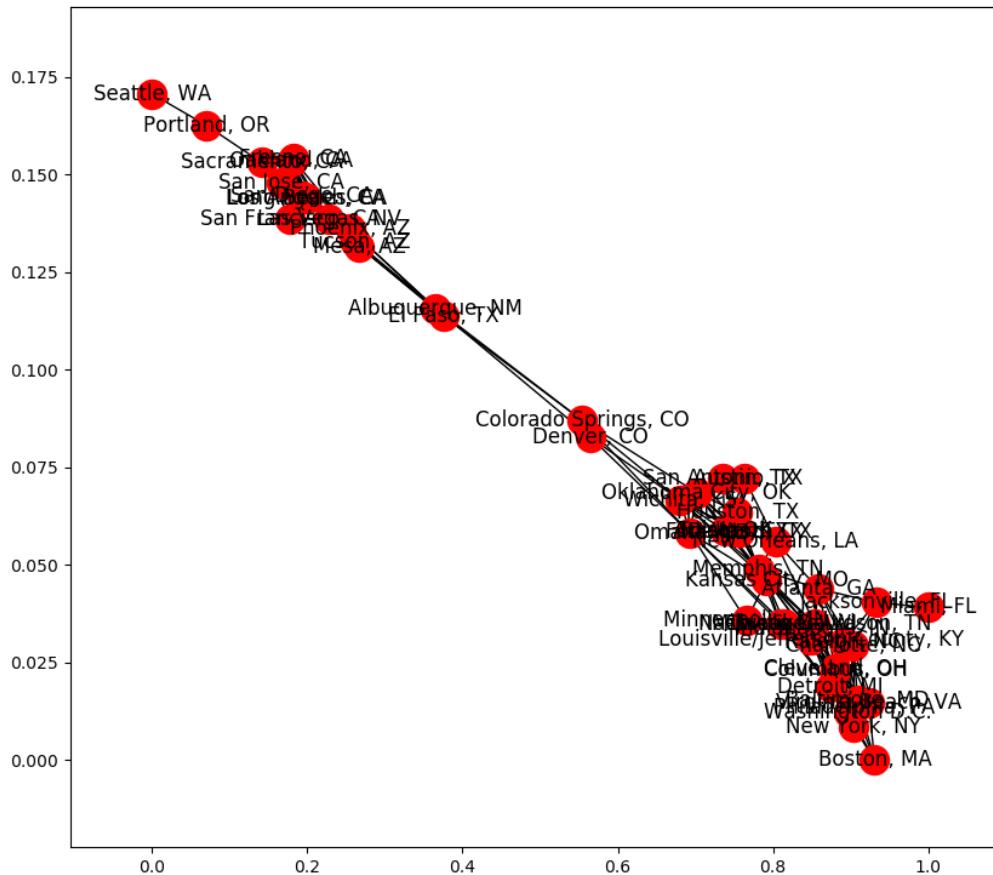
# Visualizing Networks

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In [1]: %matplotlib notebook
```

```
import networkx as nx
import matplotlib.pyplot as plt

# read in the graph
G = nx.read_gpickle('major_us_cities')
```

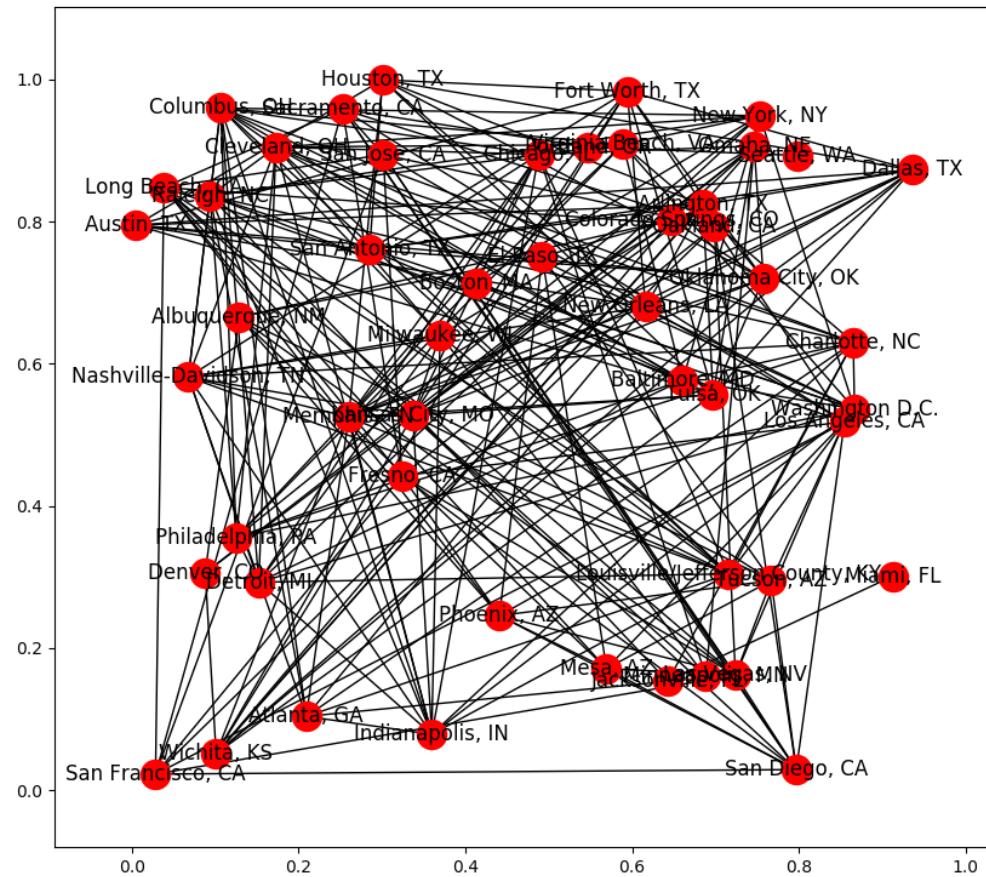
```
In [2]: # draw the graph using the default spring layout
plt.figure(figsize=(10,9))
nx.draw_networkx(G)
```



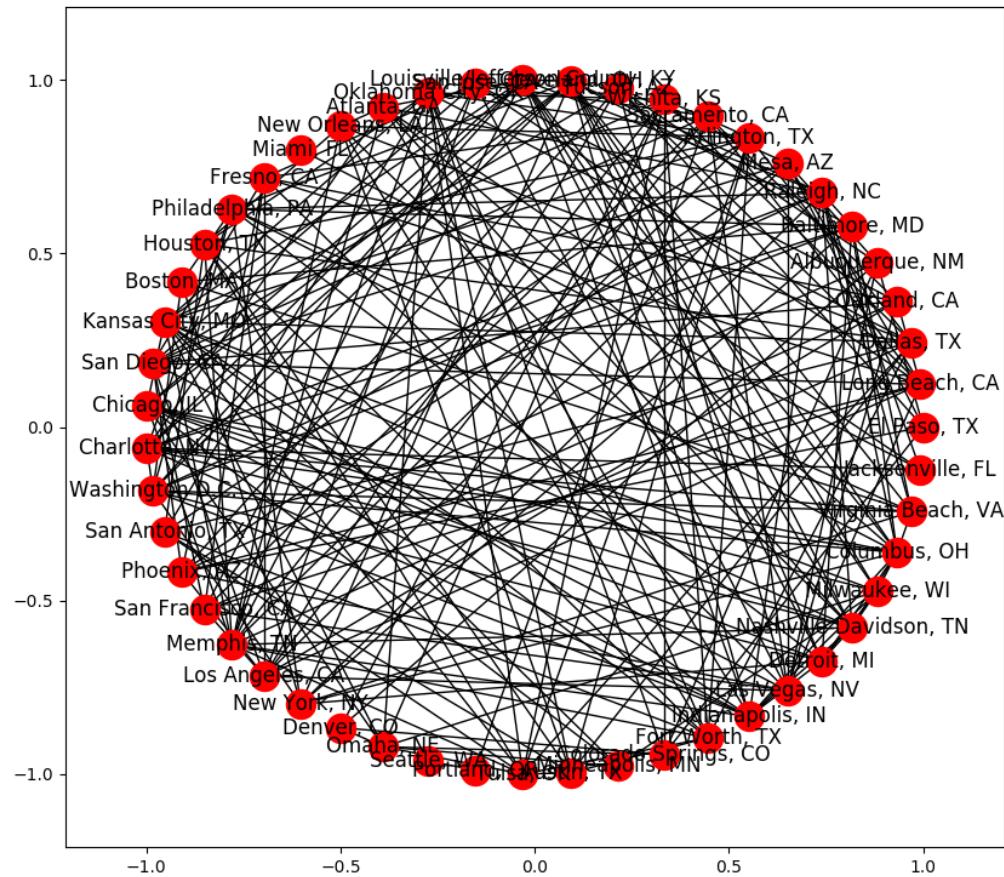
```
In [3]: # See what Layouts are available in networkX
[x for x in nx.__dir__() if x.endswith('_layout')]
```

```
Out[3]: ['circular_layout',
 'random_layout',
 'shell_layout',
 'spring_layout',
 'spectral_layout',
 'fruchterman_reingold_layout']
```

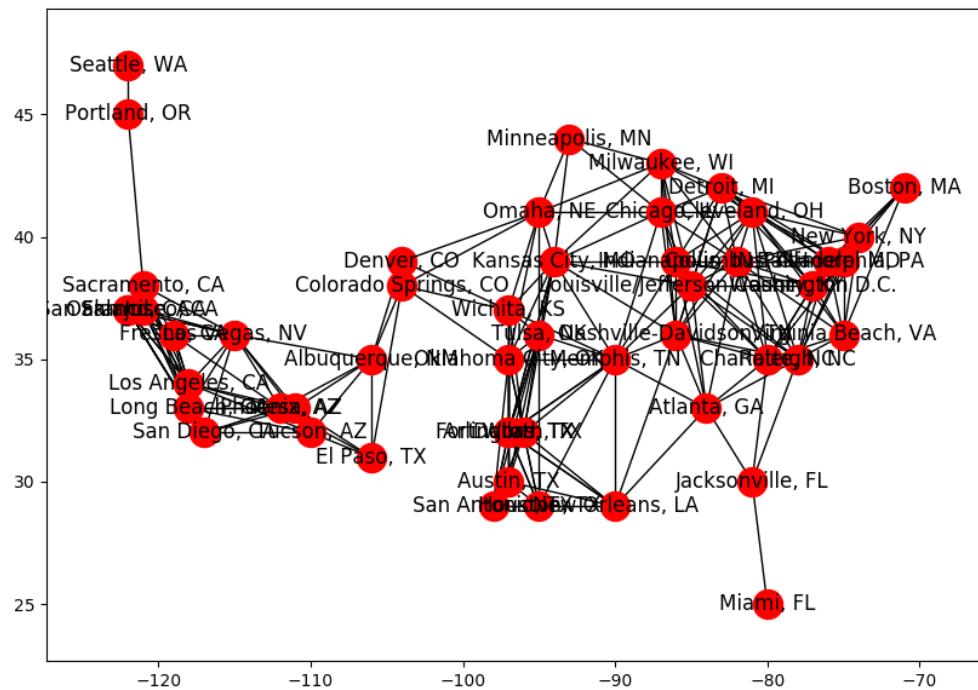
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In [4]: # Draw the graph using the random Layout  
plt.figure(figsize=(10,9))  
pos = nx.random_layout(G)  
nx.draw_networkx(G, pos)
```



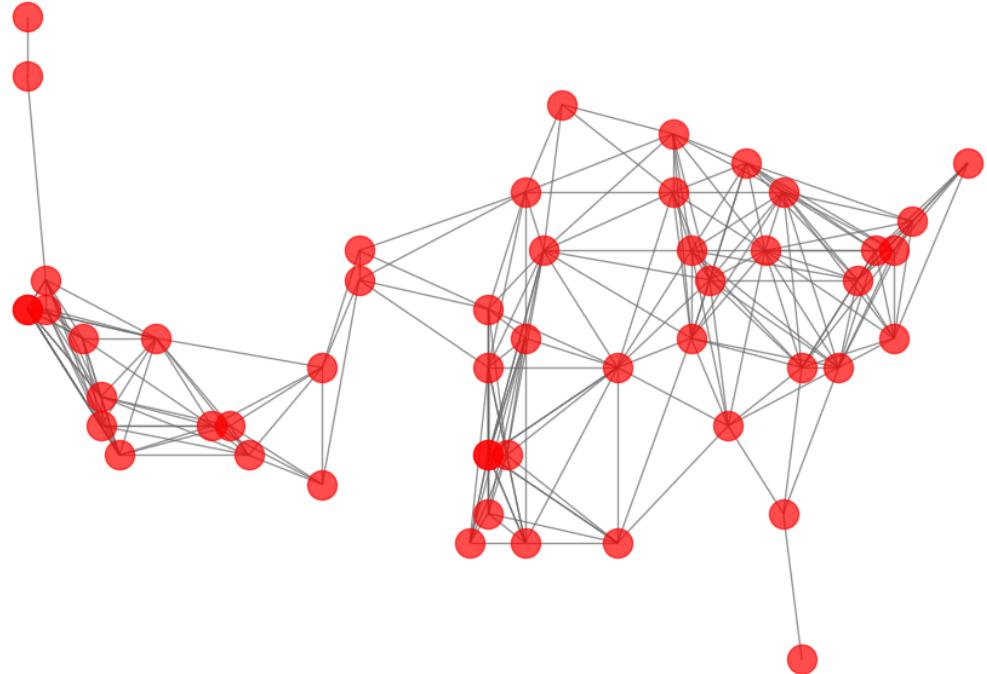
```
In [5]: # Draw the graph using the circular layout
plt.figure(figsize=(10,9))
pos = nx.circular_layout(G)
nx.draw_networkx(G, pos)
```



```
In [6]: # Draw the graph using custom node positions  
plt.figure(figsize=(10,7))  
  
pos = nx.get_node_attributes(G, 'location')  
nx.draw_networkx(G, pos)
```



```
In [7]: # Draw the graph adding alpha, removing labels, and softening edge color  
plt.figure(figsize=(10,7))  
  
nx.draw_networkx(G, pos, alpha=0.7, with_labels=False, edge_color='.4')  
  
plt.axis('off')  
plt.tight_layout();
```

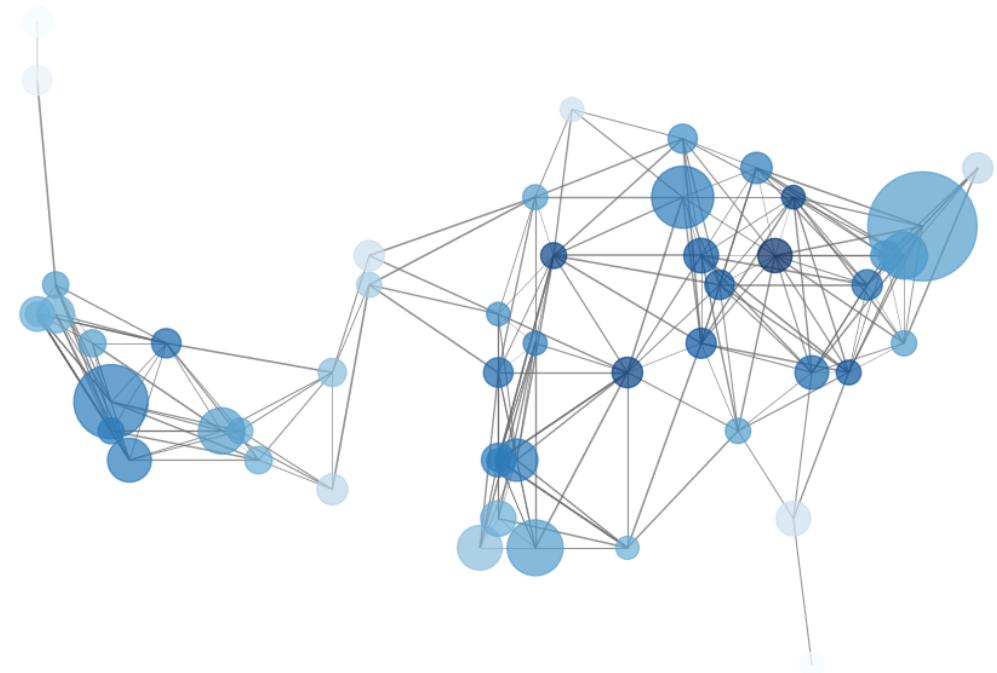


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In [8]: # Draw graph with varying node color, node size, and edge width
plt.figure(figsize=(10,7))

node_color = [G.degree(v) for v in G]
node_size = [0.0005*nx.get_node_attributes(G, 'population')[v] for v in G]
edge_width = [0.0015*G[u][v]['weight'] for u,v in G.edges()]

nx.draw_networkx(G, pos, node_size=node_size,
                  node_color=node_color, alpha=0.7, with_labels=False,
                  width=edge_width, edge_color='4', cmap=plt.cm.Blues)

plt.axis('off')
plt.tight_layout();
```



```
In [9]: # Draw specific edges and add labels to specific nodes
plt.figure(figsize=(10,7))

node_color = [G.degree(v) for v in G]
node_size = [0.0005*nx.get_node_attributes(G, 'population')[v] for v in G]
edge_width = [0.0015*G[u][v]['weight'] for u,v in G.edges()]

nx.draw_networkx(G, pos, node_size=node_size,
                  node_color=node_color, alpha=0.7, with_labels=False,
                  width=edge_width, edge_color='.4', cmap=plt.cm.Blues)

greater_than_770 = [x for x in G.edges(data=True) if x[2]['weight']>770]
nx.draw_networkx_edges(G, pos, edgelist=greater_than_770, edge_color='r', alpha=0.4, width=2)

nx.draw_networkx_labels(G, pos, labels={'Los Angeles, CA': 'LA', 'New York, NY': 'NYC'},
                       font_size=12)
plt.axis('off')
plt.tight_layout();
```

