Introducing the Bokeh Server

INTERACTIVE DATA VISUALIZATION WITH BOKEH

Bryan Van de Ven
Core Developer of Bokeh

datacamp


mean: 0
stddev: 0.04
12-tick Moving Avg
160
140
120
100
80
60
5
0
-5
-10
1380
1400
1420
1440
1460


Google Chrome (beta)
Bokeh Applicati
localhost:8787/workers
Dask -- Documentation -- Scheduler Docs -- Tasks -- Workers
DASK
Processing and Pending
Memory Usage (%)
host cores processes memory cpu memory %
0 127.0.0.1 4 1 16 GiB 48.7 % 28.2 %
1 127.0.0.2 4 1 16 GiB 37.9 % 28.2 %
2 127.0.0.3 4 1 16 GiB 43.9 % 28.1 %
3 127.0.0.4 4 1 16 GiB 40.7 % 28.2 %
Bokeh Applicati
localhost:8787/status
Dask -- Documentation -- Scheduler Docs -- Tasks -- Workers
DASK
Memory
CPU
Network Send
Network Recv
MB/s
Time
Memory Use: 0.00 MB
Task Stream
Worker Core
Time
Progress -- total: 802, in-memory: 148, processing: 16, ready: 19, waiting: 481, failed: 0
compare 67 / 470
load 89 / 110
process 85 / 110
roll 43 / 106
finalize 1 / 2
load_from_sql 2 / 2
reduction 1 / 2

Basic app outline

`outline.py`

```
from bokeh.io import curdoc

# Create plots and widgets

# Add callbacks

# Arrange plots and widgets in layouts

curdoc().add_root(layout)
```

Running Bokeh applications

Running single module apps at the shell or Windows command prompt:

```
bokeh serve --show myapp.py
```

"Directory" style apps run similarly:

```
bokeh serve --show myappdir/
```

Let's practice!

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Connecting sliders to plots

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A slider example

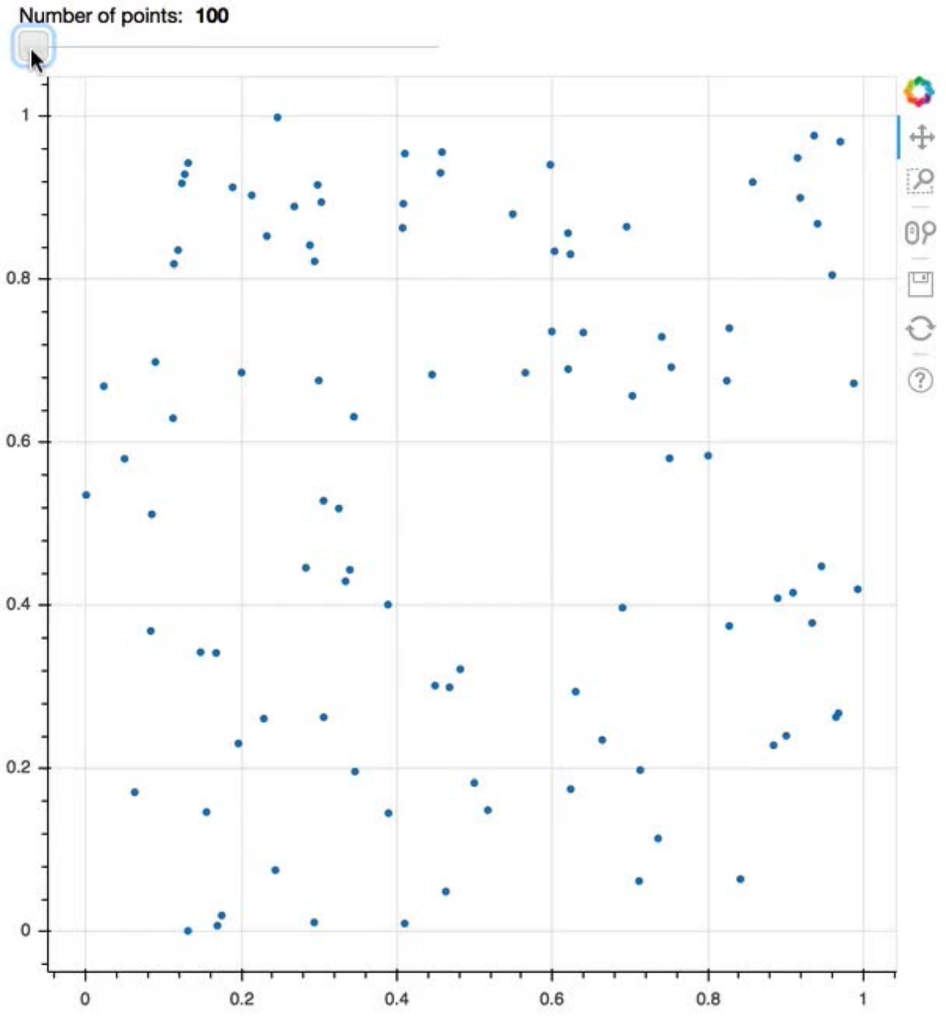
slider.py

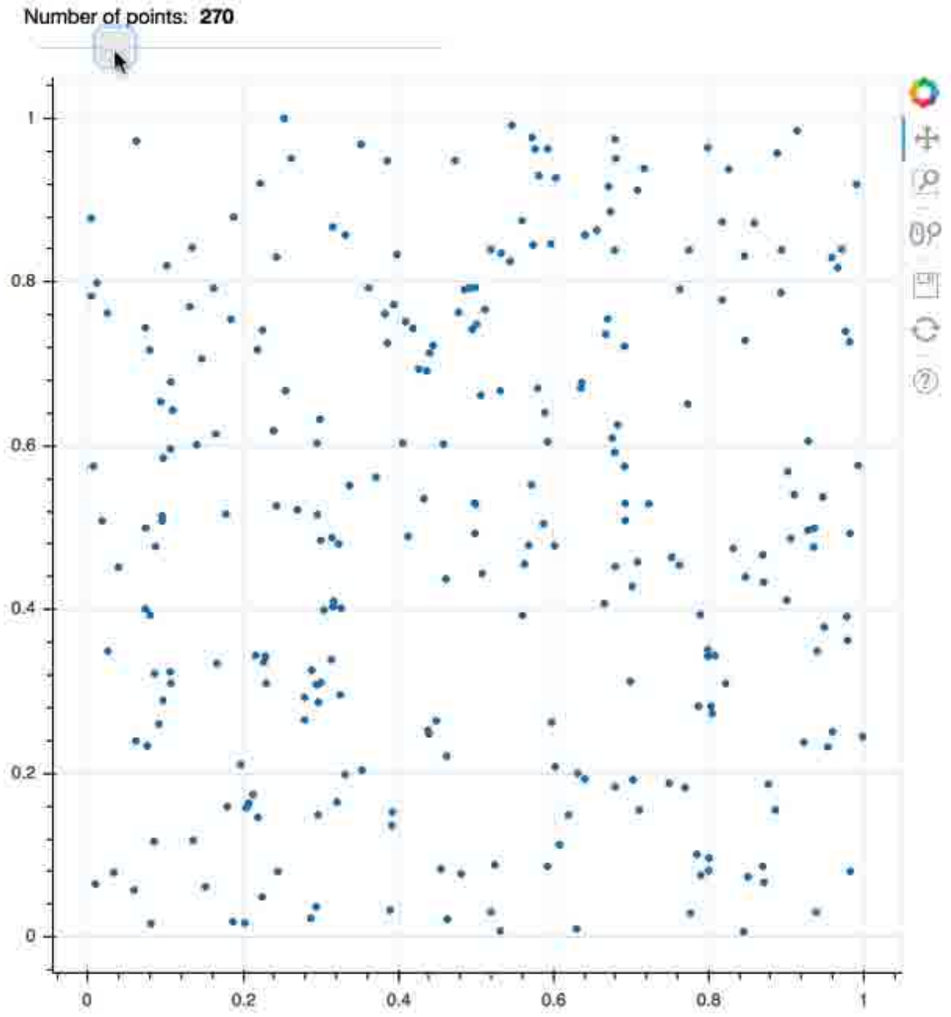
```
from bokeh.io import curdoc
from bokeh.layouts import column
from bokeh. models import ColumnDataSource, Slider
from bokeh.plotting import figure
from numpy.random import random

N = 300
source = ColumnDataSource(data={'x': random(N), 'y': random(N)})

# Create plots and widgets
plot = figure()
plot.circle(x='x', y='y', source=source)

slider = Slider(start=100, end=1000, value=N,
            step=10, title='Number of points')
```

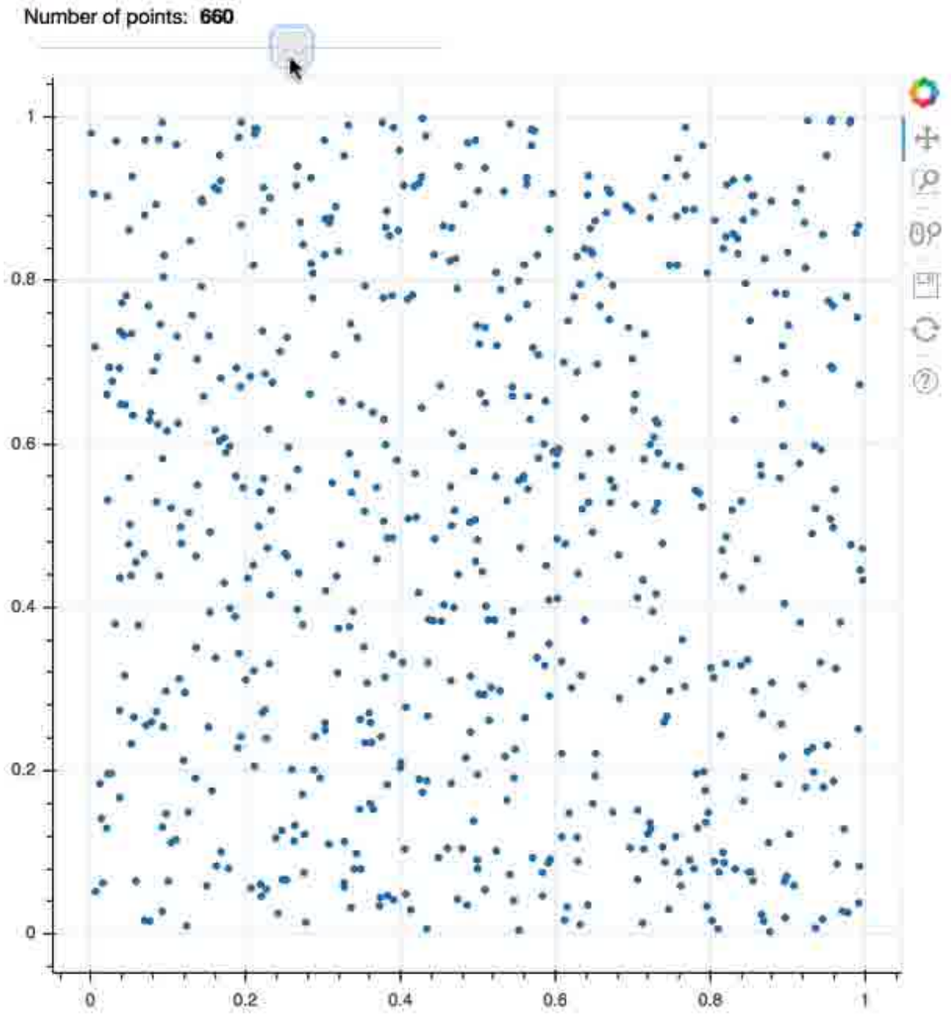
A slider example

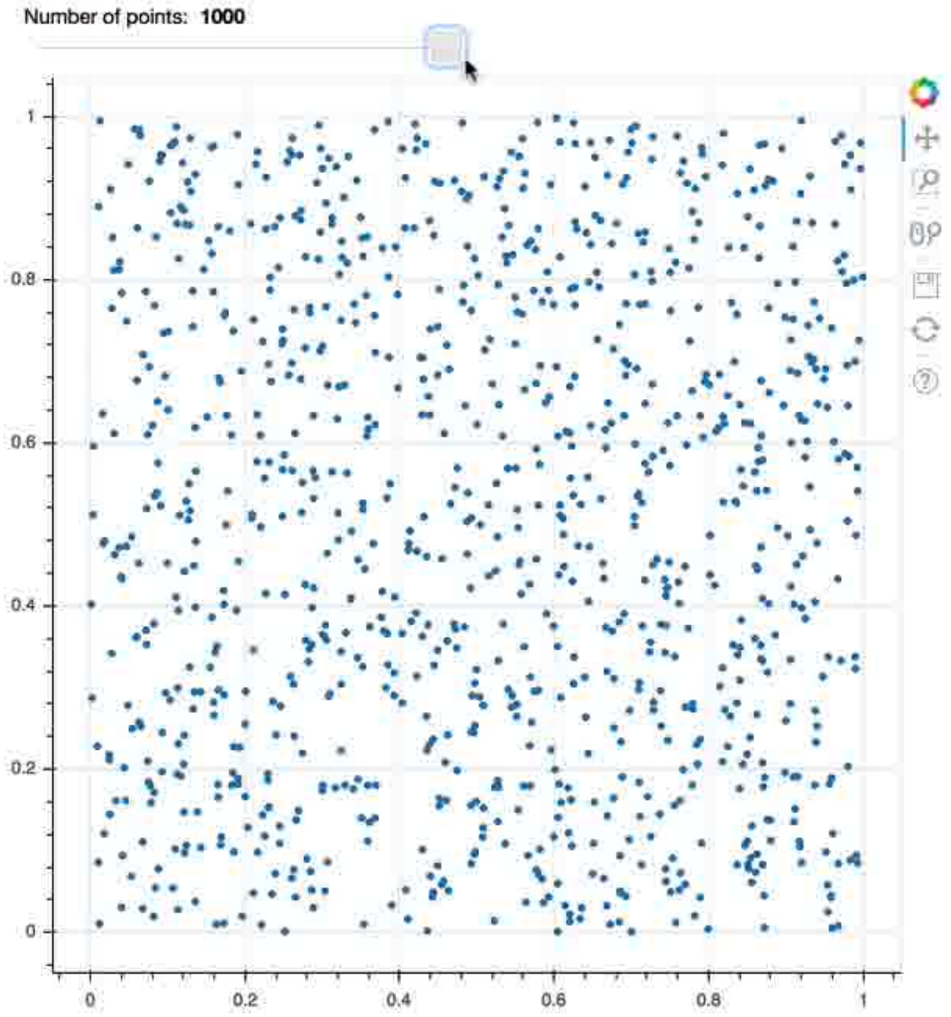
slider.py

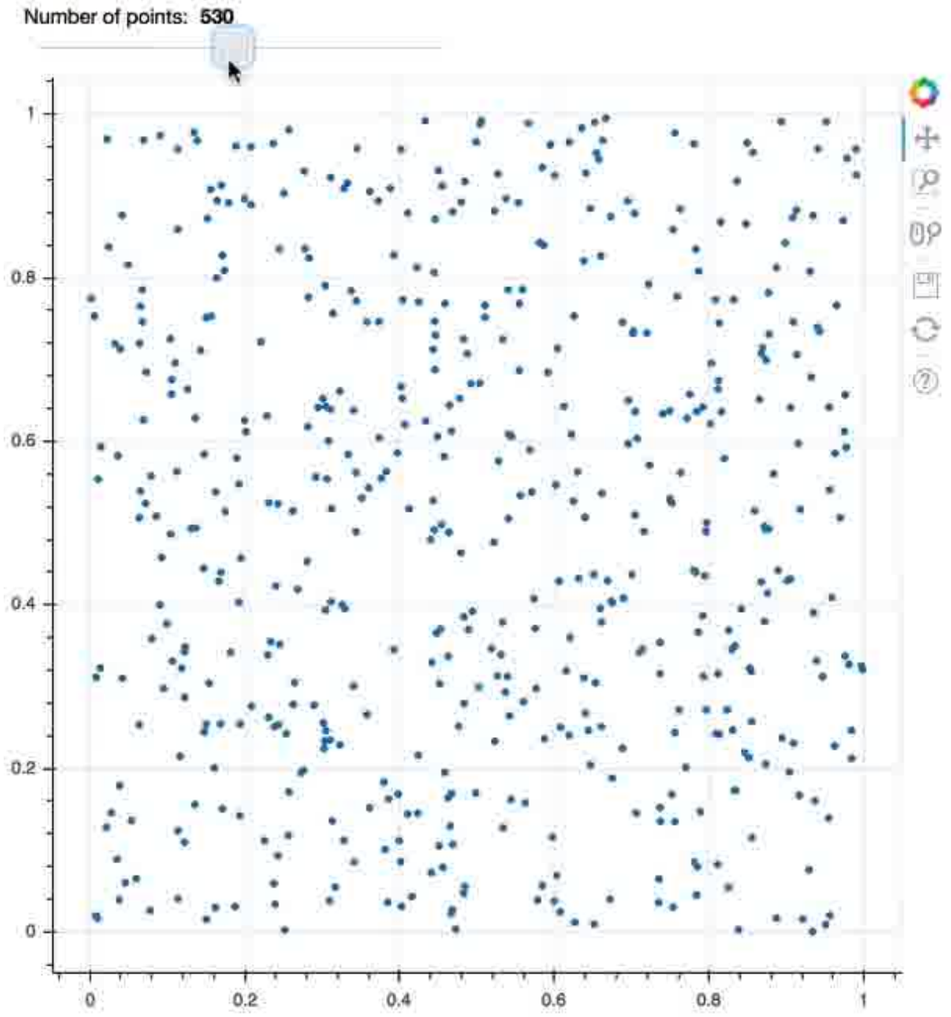
```
# (continued)

# Add callback to widgets
def callback(attr, old, new):
    N = slider.value
    source.data={'x': random(N), 'y': random(N)}

slider.on_change('value', callback)

# Arrange plots and widgets in layouts
layout = column(slider, plot)

curdoc().add_root(layout)
```


Number of points: 100
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


Number of points: 270
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


Number of points: 660
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


Number of points: 1000
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


Number of points: 530
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1

Let's practice!

INTERACTIVE DATA VISUALIZATION WITH BOKEH

Updating plots from dropdowns

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A Select example

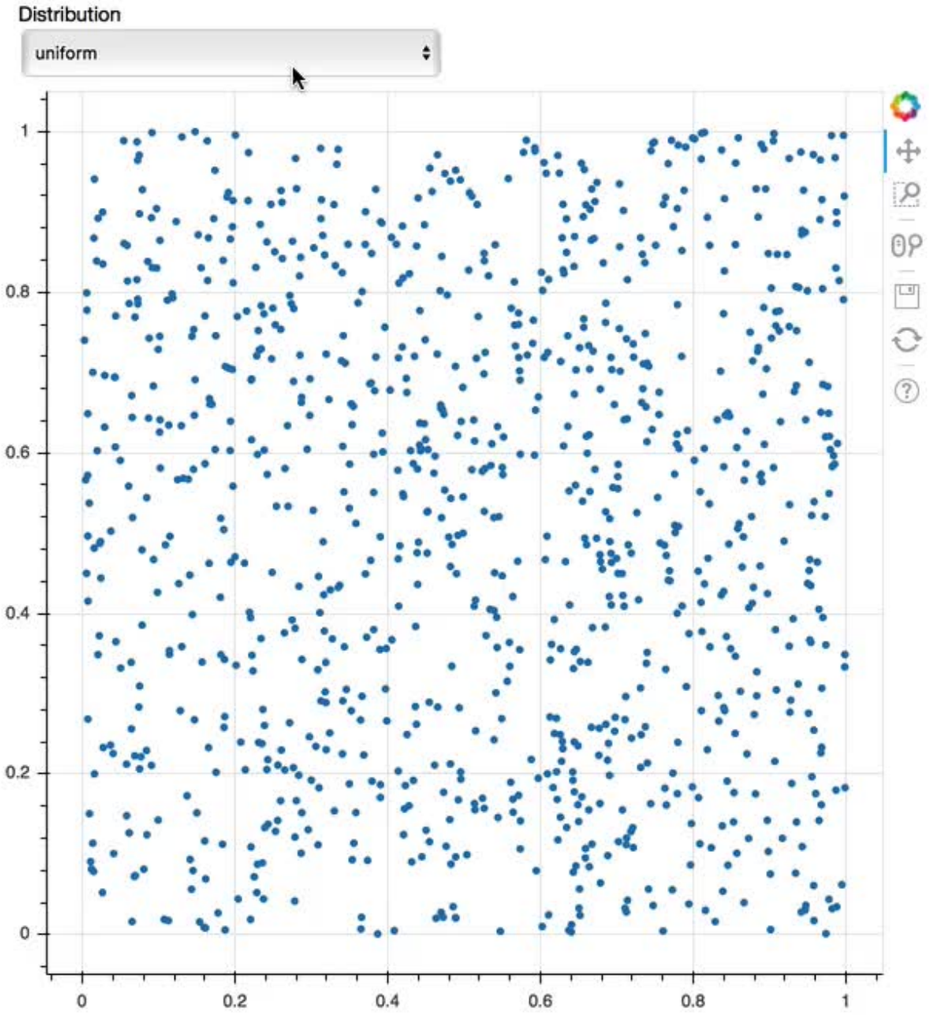
select.py

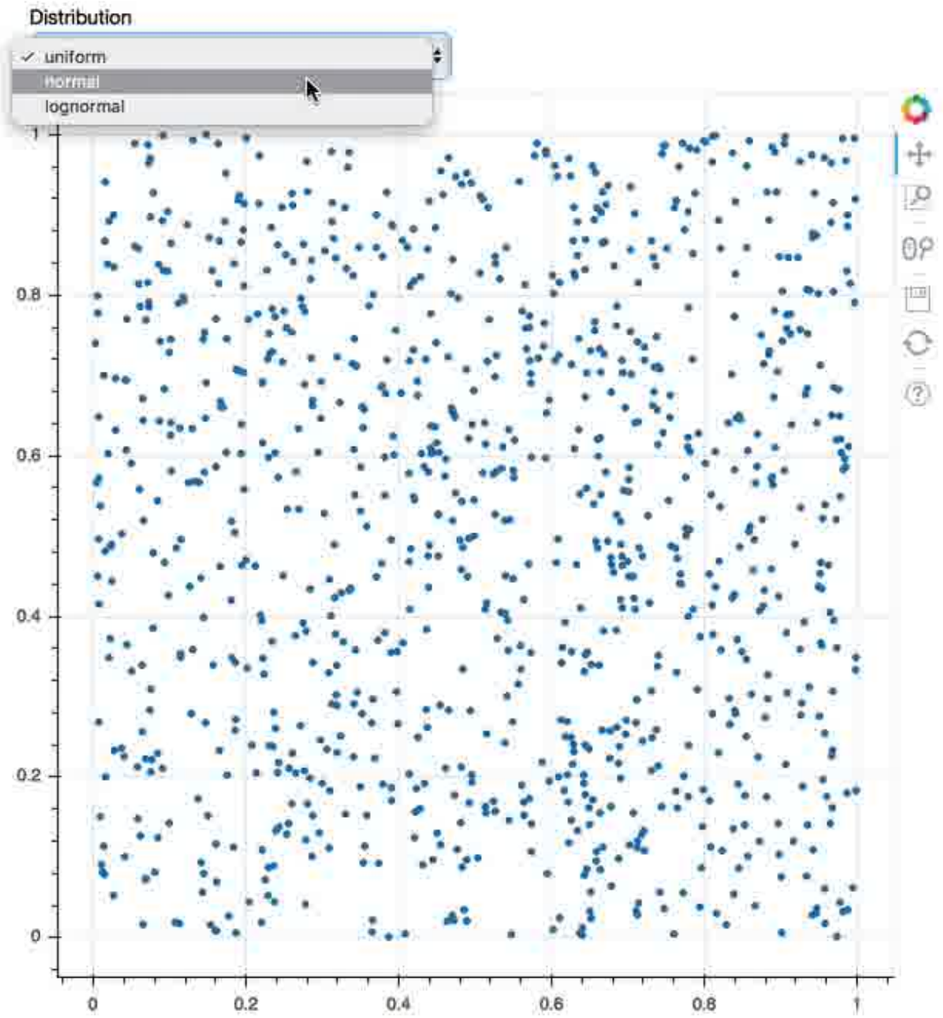
```
from bokeh.io import curdoc
from bokeh.layouts import column
from bokeh. models import ColumnDataSource, Select
from bokeh.plotting import figure
from numpy.random import random, normal, lognormal

N = 1000
source = ColumnDataSource(data={'x': random(N), 'y': random(N)})

# Create plots and widgets
plot = figure()
plot.circle(x='x', y='y', source=source)

menu = Select(options=['uniform', 'normal', 'lognormal'],
              value='uniform', title='Distribution')
```

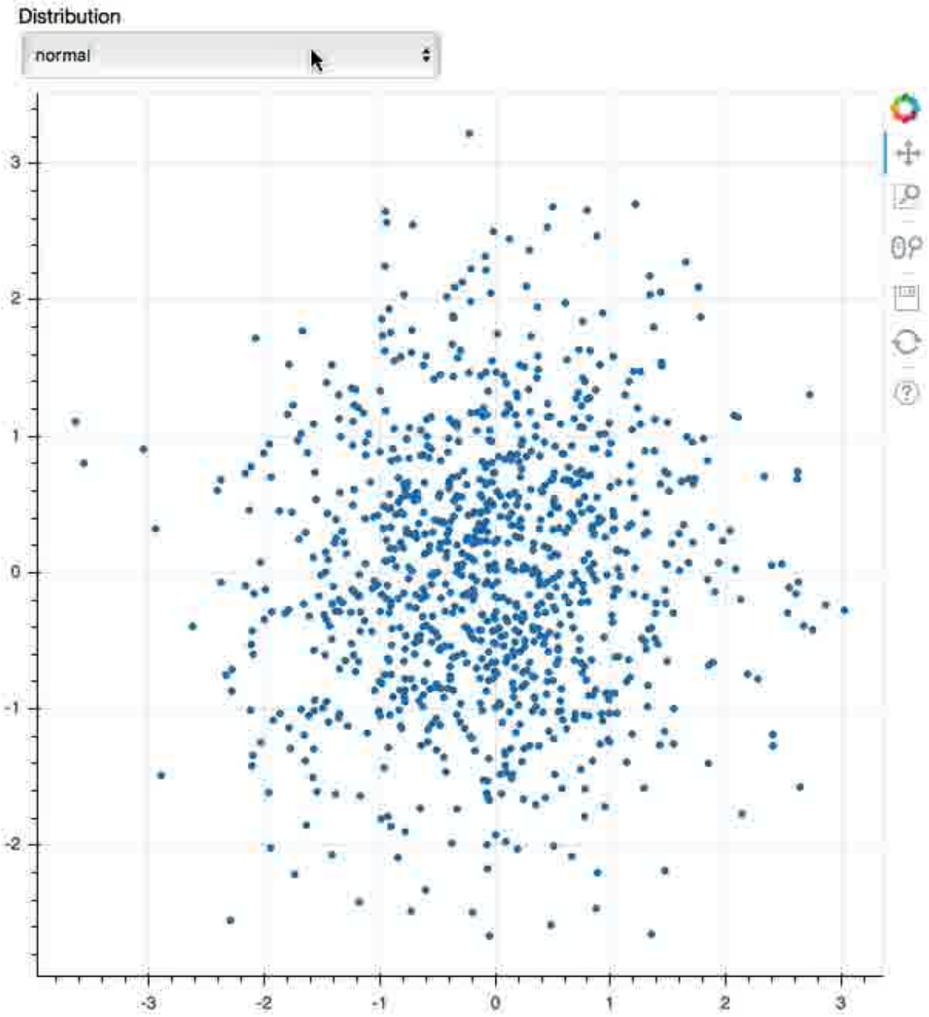
A Select example

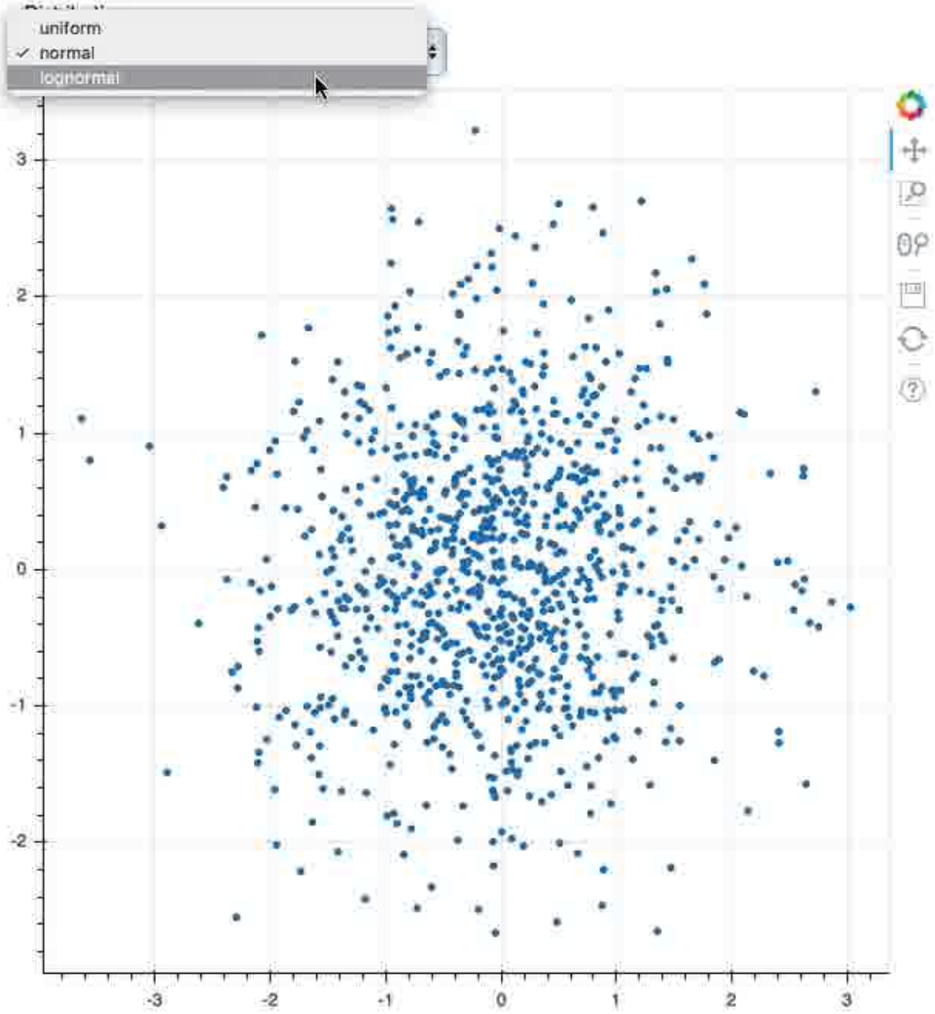
select.py

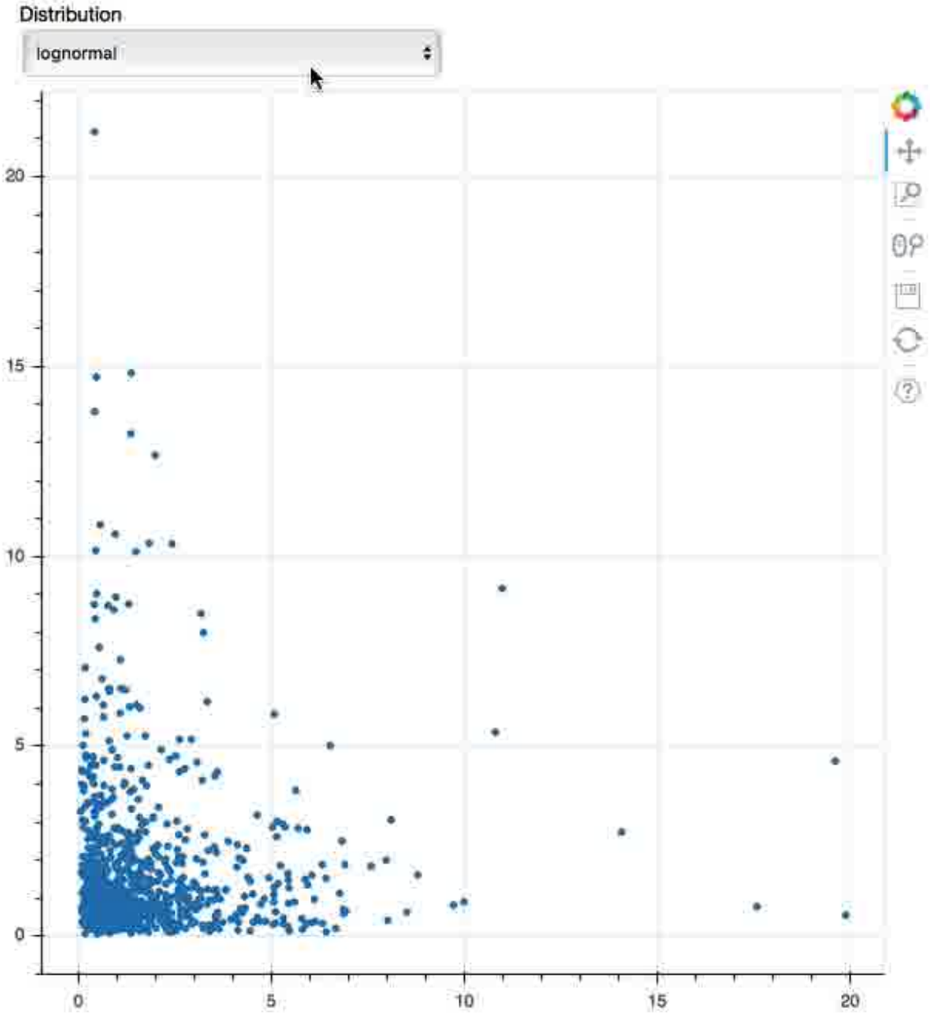
```
# (continued)

# Add callback to widgets
def callback(attr, old, new):
    if menu.value == 'uniform': f = random
    elif menu.value == 'normal': f = normal
    else: f = lognormal
    source.data={'x': f(size=N), 'y': f(size=N)}

menu.on_change('value', callback)

# Arrange plots and widgets in layouts
layout = column(menu, plot)

curdoc().add_root(layout)
```


Distribution
uniform
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


Distribution
uniform
normal
lognormal
0
0.2
0.4
0.6
0.8
1


Distribution
normal
3
2
1
0
-1
-2
-3
-2
-1
0
1
2
3


uniform
normal
lognormal
3
2
1
0
-1
-2
-3
-2
-1
0
1
2
3


Distribution
lognormal
20
15
10
5
0
0
5
10
15
20

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Buttons

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Button callbacks

select.py

```
from bokeh.models import Button

button = Button(label='press me')

def update():
    # Do something interesting

button.on_click(update)
```

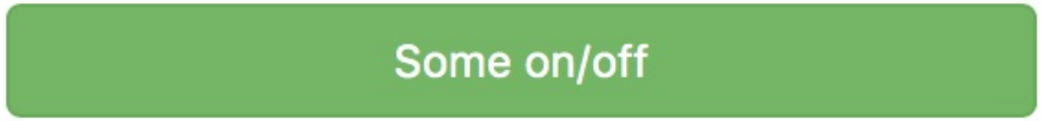
Button types

```
from bokeh.models import CheckboxGroup, RadioGroup, Toggle

toggle = Toggle(label='Some on/off', button_type='success')

checkbox = CheckboxGroup(labels=['foo', 'bar', 'baz'])

radio = RadioGroup(labels=['2000', '2010', '2020'])

def callback(active):
    # Active tells which button is active
```

Button types

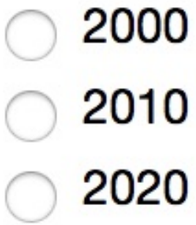
Plain button

Toggle



Radio Group

Checkbox Group



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INTERACTIVE DATA VISUALIZATION WITH BOKEH

Hosting applications for wider audiences

INTERACTIVE DATA VISUALIZATION WITH BOKEH

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datacamp

Bokeh Application Hosting

https://anaconda.org

Let's practice!

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