SPADE Bokeh Server Plugin Documentation

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CHAPTER 1

SPADE Bokeh Server Plugin

Bokeh server Plugin for SPADE agents that integrates with agents web service. Allows to render dynamic bokeh plots inside the agent templates in a very easy way.

- Free software: MIT license
- Documentation: https://spade-bokeh.readthedocs.io.

1.1 Features

- Plot interactive bokeh plots inside the agent templates

1.2 Credits

This package was created with Cookiecutter and the audreyr/cookiecutter-pypackage project template.

CHAPTER 2

Installation

2.1 Stable release

To install SPADE Bokeh Server, run this command in your terminal:

```
$ pip install spade_bokeh
```

This is the preferred method to install SPADE Bokeh Server, as it will always install the most recent stable release.

If you don't have pip installed, this Python installation guide can guide you through the process.

2.2 From sources

The sources for SPADE Bokeh Server can be downloaded from the Github repo.

You can either clone the public repository:

```
$ git clone git://github.com/javipalanca/spade_bokeh
```

Or download the tarball:

```
$ curl  -OL https://github.com/javipalanca/spade_bokeh/tarball/master
```

Once you have a copy of the source, you can install it with:

```
$ python setup.py install
```

CHAPTER 3

Usage

Note: This is a plugin for the SPADE agent platform. Please visit the SPADE's documentation to know more about this platform.

Plotting figures in html usually involves too much javascript code. To solve this there is a great python library called Bokeh that helps us to plot our own figures with python code and dinamycally thanks to a server embedded with bokeh.

This plugin provides a **mixin** to include a bokeh server in an agent and to register plots to be then rendered in your jinja2 templates of your agent's web interface.

To use SPADE Bokeh Server in a project:

```
import getpass

import spade
from bokeh.layouts import column
from bokeh.models import ColumnDataSource, Slider
from bokeh.plotting import figure
from bokeh.sampledata.sea_surface_temperature import sea_surface_temperature

import spade_bokeh


class MyBokehAgent(spade_bokeh.BokehServerMixin, spade.agent.Agent):

    async def controller(self, request):
        script = self.bokeh_server.get_plot_script("/my_plot")

        return {"script": script}

    async def setup(self):

        self.web.add_get("/plot", self.controller, "plot.html")
```

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```
        self.web.start(port=10000)
        self.bokeh_server.start()

        self.bokeh_server.add_plot("/my_plot", self.modify_doc)

    def modify_doc(self, doc):
        df = sea_surface_temperature.copy()
        source = ColumnDataSource(data=df)

        plot = figure(x_axis_type='datetime', y_range=(0, 25), y_axis_label=
↪'Temperature (Celsius)',
                      title="Sea Surface Temperature at 43.18, -70.43")
        plot.line('time', 'temperature', source=source)

        def callback(attr, old, new):
            if new == 0:
                data = df
            else:
                data = df.rolling('{0}D'.format(new)).mean()
            source.data = data

        slider = Slider(start=0, end=30, value=0, step=1, title="Smoothing by N Days")
        slider.on_change('value', callback)

        doc.add_root(column(slider, plot))


async def main(jid, passwd):
    a = MyBokehAgent(jid, passwd)
    await a.start()

    await spade.wait_until_finished(a)

if __name__ == "__main__":

    jid = input("Agent JID> ")
    passwd = getpass.getpass()
    spade.run(main(jid, passwd))
```

In the example below there are 3 different blocks: the agent setup, the web controller and the bokeh plot creation.

3.1 Agent setup

To activate the *spade_bokeh* plugin in your agent you must follow some steps:

- First of all your agent needs to inherit from *spade_bokeh.BokehServerMixin*.

> **Warning:** **All the mixins** MUST be included **before** the *spade.agent.Agent class*, to respect the method resolution order (e.g. `class MyAgent(MyMixin1, MyMixin2, ..., Agent)`).

- Next you need to start your bokeh_server with the following order: `self.bokeh_server.start()`. This method may accept two arguments: the hostname and the port of the bokeh_server. By default they are "localhost" and 5006.

> **Warning:** Two agents can not share a same bokeh_server, so they must use different ports!

- Finally, you can add new plots to your server using the `add_plot` function of bokeh_server. It accepts two arguments: the *path* for the plot in the bokeh server and the *callback* to build the plot.

> **Note:** You can add as many plots as you need.

3.2 Bokeh plot creation

The method that you give to the `add_plot` call is the callback that will create the plot when the url path is queried. Inside this method you can create your plot following the *Bokeh* guidelines. As in the example, the method receives a `doc` argument, where the plots of your application will be rendered.

> **Hint:** To learn more about how to create *Bokeh* plots please visit the Bokeh User Guide

3.3 Web controller

The final step to render your bokeh plots inside an agent view is to render the plot in a template managed by the SPADE's web interface system.

> **Hint:** Please, visit the SPADE's documentation to know more about how to create a SPADE web interface for your agents.

The *spade_bokeh* plugin provides you a helper function to easily render your plots inside a jinja2 template. As in the example below, you can use the `get_plot_script` method with the path of the plot you want to render and it will return you the necessary javascript to render the plot (this javascript contains the URL and necessary code to connect to the bokeh server dinamycally).

Then you only need to render that script in your template as in the example:

```
<html lang="en">
    <head>
        <title>Bokeh Example</title>
    </head>

    <body>
        {{ script | safe}}
    </body>
</html>
```

> **Note:** Note that you must *safe escape* the script with the `safe` jinja2 filter to avoid escaping the html tags.

CHAPTER 4

spade_bokeh

4.1 spade_bokeh package

4.1.1 Submodules

4.1.2 spade_bokeh.spade_bokeh module

class `spade_bokeh.spade_bokeh.`**`BokehServerMixin`**(**args*, ***kwargs*)

Bases: `object`

This is the Mixin to inherit from when you create your agent.

class `spade_bokeh.spade_bokeh.`**`BokekServer`**(*agent*)

Bases: `object`

`add_plot`(*path*, *func*)

Registers a new plot in the bokeh server. Args:

path: path where the plot will respond to queries func: the function that renders the plot.

`bokeh_worker`()

`get_plot_script`(*path*)

Returns the necessary javascript to render a plot Args:

path (str): the path with which the plot was registered in the server.

Returns: A string with the javascript code to render the plot.

`start`(*hostname='localhost'*, *port=5006*)

Starts the bokeh server. Args:

hostname (str): hostname of the server. Must be the same where the agent is running. Defaults to "localhost" port (int): port of the server. Defaults to 5006.

stop()
Stops the Bokeh server.

4.1.3 Module contents

Top-level package for SPADE Bokeh Server.

CHAPTER 5

Contributing

Contributions are welcome, and they are greatly appreciated! Every little bit helps, and credit will always be given.

You can contribute in many ways:

5.1 Types of Contributions

5.1.1 Report Bugs

Report bugs at https://github.com/javipalanca/spade_bokeh/issues.

If you are reporting a bug, please include:

- Your operating system name and version.
- Any details about your local setup that might be helpful in troubleshooting.
- Detailed steps to reproduce the bug.

5.1.2 Fix Bugs

Look through the GitHub issues for bugs. Anything tagged with "bug" and "help wanted" is open to whoever wants to implement it.

5.1.3 Implement Features

Look through the GitHub issues for features. Anything tagged with "enhancement" and "help wanted" is open to whoever wants to implement it.

5.1.4 Write Documentation

SPADE Bokeh Server could always use more documentation, whether as part of the official SPADE Bokeh Server docs, in docstrings, or even on the web in blog posts, articles, and such.

5.1.5 Submit Feedback

The best way to send feedback is to file an issue at https://github.com/javipalanca/spade_bokeh/issues.

If you are proposing a feature:

- Explain in detail how it would work.
- Keep the scope as narrow as possible, to make it easier to implement.
- Remember that this is a volunteer-driven project, and that contributions are welcome :)

5.2 Get Started!

Ready to contribute? Here's how to set up *spade_bokeh* for local development.

1. Fork the *spade_bokeh* repo on GitHub.
2. Clone your fork locally:

```
$ git clone git@github.com:your_name_here/spade_bokeh.git
```

3. Install your local copy into a virtualenv. Assuming you have virtualenvwrapper installed, this is how you set up your fork for local development:

```
$ mkvirtualenv spade_bokeh
$ cd spade_bokeh/
$ python setup.py develop
```

4. Create a branch for local development:

```
$ git checkout -b name-of-your-bugfix-or-feature
```

   Now you can make your changes locally.

5. When you're done making changes, check that your changes pass flake8 and the tests, including testing other Python versions with tox:

```
$ flake8 spade_bokeh tests
$ python setup.py test or py.test
$ tox
```

   To get flake8 and tox, just pip install them into your virtualenv.

6. Commit your changes and push your branch to GitHub:

```
$ git add .
$ git commit -m "Your detailed description of your changes."
$ git push origin name-of-your-bugfix-or-feature
```

7. Submit a pull request through the GitHub website.

5.3 Pull Request Guidelines

Before you submit a pull request, check that it meets these guidelines:

1. The pull request should include tests.
2. If the pull request adds functionality, the docs should be updated. Put your new functionality into a function with a docstring, and add the feature to the list in README.rst.
3. The pull request should work for Python 2.7, 3.4, 3.5 and 3.6, and for PyPy. Check https://travis-ci.org/javipalanca/spade_bokeh/pull_requests and make sure that the tests pass for all supported Python versions.

5.4 Tips

To run a subset of tests:

```
$ py.test tests.test_spade_bokeh
```

5.5 Deploying

A reminder for the maintainers on how to deploy. Make sure all your changes are committed (including an entry in HISTORY.rst). Then run:

```
$ bumpversion patch # possible: major / minor / patch
$ git push
$ git push --tags
```

Travis will then deploy to PyPI if tests pass.

CHAPTER 6

Credits

6.1 Development Lead

- Javi Palanca <jpalanca@gmail.com>

6.2 Contributors

None yet. Why not be the first?

CHAPTER 7

History

7.1 0.2.1 (2023-06-14)

- Fixed documentation.

7.2 0.2.0 (2023-06-14)

- Upgraded to SPADE>=3.3 (older versions are deprecated).
- Upgraded to Python>=3.8 (older versions are deprecated).

7.3 0.1.2 (2018-09-17)

- Added requirements file.
- Fixed tox configuration for CI.
- Fixed readthedocs configuration.

7.4 0.1.0 (2018-09-17)

- First release on PyPI.

CHAPTER 8

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