Installing Jupyter Notebook for Spark

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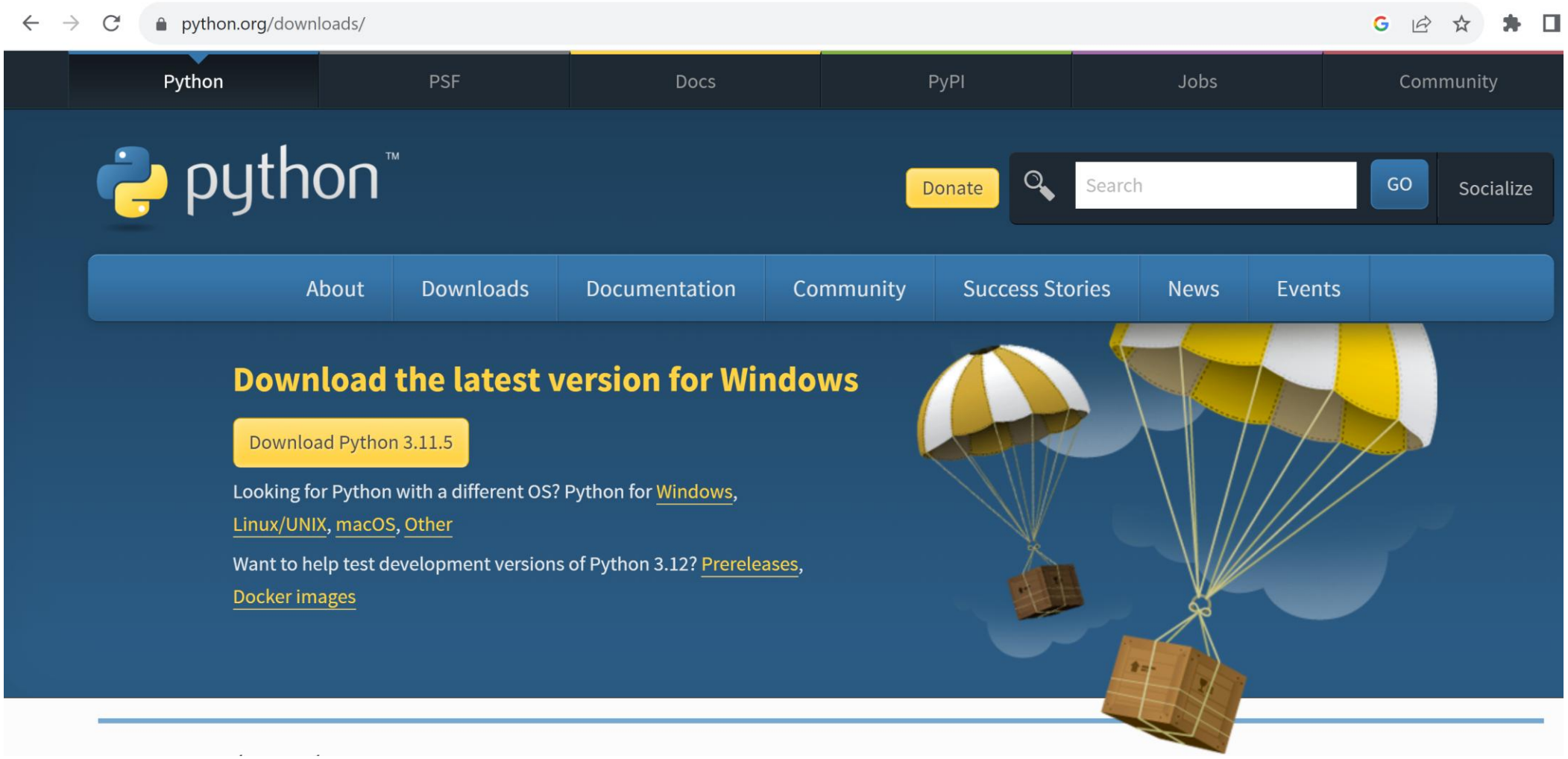
Step 1 : install python (simplest method, not using AnaConda)



Step 2 : install jupyter

Choose class Jupyter Notebook… OK

JupyterLab

Install JupyterLab with `pip`:

```
pip install jupyterlab
```

Note: If you install JupyterLab with conda or mamba, we recommend using the conda-forge channel.

Once installed, launch JupyterLab with:

```
jupyter lab
```

Jupyter Notebook

Install the classic Jupyter Notebook with:

```
pip install notebook
```

To run the notebook:

```
jupyter notebook
```

Star Jupyter Notebook

jupyter notebook

```
C:\Users\arnaud>jupyter notebook
[I 2023-09-06 23:09:00.357 ServerApp] Package notebook took 0.0000s to import
[I 2023-09-06 23:09:00.482 ServerApp] Package jupyter_lsp took 0.1187s to import
[W 2023-09-06 23:09:00.482 ServerApp] A `_jupyter_server_extension_points` function was not found in jupyter_lsp.
Instead, a `_jupyter_server_extension_paths` function was found and will be used for now. This function name will
be deprecated in future releases of Jupyter Server.
[I 2023-09-06 23:09:00.544 ServerApp] Package jupyter_server_terminals took 0.0598s to import
[I 2023-09-06 23:09:00.544 ServerApp] Package jupyterlab took 0.0000s to import
```

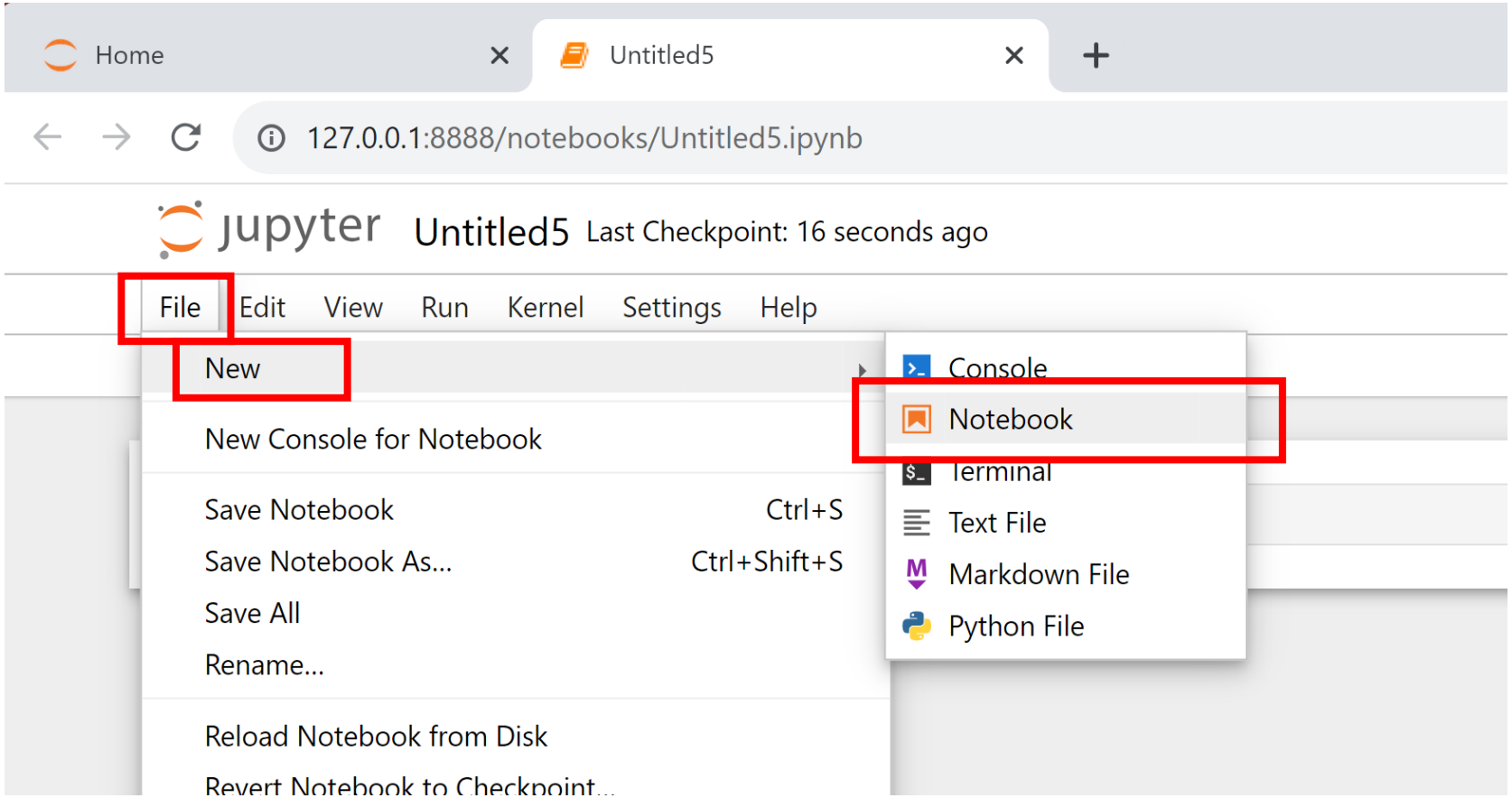
[[truncated logs …. Also contains errors??]]

Jupyter Notebook ..

```
[I 2023-09-06 23:09:01.879 ServerApp] jupyterlab | extension was successfully loaded.
[I 2023-09-06 23:09:01.879 ServerApp] notebook | extension was successfully loaded.
[I 2023-09-06 23:09:01.895 ServerApp] Serving notebooks from local directory: C:\Users\arnaud
[I 2023-09-06 23:09:01.895 ServerApp] Jupyter Server 2.7.3 is running at:
[I 2023-09-06 23:09:01.895 ServerApp] http://localhost:8888/tree?token=a9195d7e950f42e4e26a7b93bbebf3664d1794b9495
9c5e3
[I 2023-09-06 23:09:01.911 ServerApp]     http://127.0.0.1:8888/tree?token=a9195d7e950f42e4e26a7b93bbebf3664d1794b
94959c5e3
[I 2023-09-06 23:09:01.911 ServerApp] Use Control-C to stop this server and shut down all kernels (twice to skip c
onfirmation).
[C 2023-09-06 23:09:01.974 ServerApp]

    To access the server, open this file in a browser:
        file:///C:/Users/arnaud/AppData/Roaming/jupyter/runtime/jpserver-636-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/tree?token=a9195d7e950f42e4e26a7b93bbebf3664d1794b94959c5e3
        http://127.0.0.1:8888/tree?token=a9195d7e950f42e4e26a7b93bbebf3664d1794b94959c5e3
```

Creating a new notebook



Step 3: jupyter needs kernels

docs.jupyter.org/en/stable/projects/kernels.html

jupyter

Try Jupyter | Usage | Projects | Community | Contributing | More

Section Navigation

Projects > Kernels...

Kernels (Programming Languages)

The Jupyter team maintains the IPython project which is shipped as a default kernel (as ipykernel) in a number of Jupyter clients. Many other languages, in addition to Python, may be used in the notebook.

The community maintains many other language kernels, and new kernels become available often. Please see the list of available kernels for additional languages and kernel installation instructions to begin using these language kernels.

Kernels

Kernels are *programming language specific* processes that run independently and interact with the Jupyter Applications and their user interfaces. ipykernel is the reference Jupyter kernel built on top of IPython, providing a powerful environment for interactive computing in Python.

Step 3: list of community jupyter-kernels

github.com/jupyter/jupyter/wiki/Jupyter-kernels

jupyter / jupyter

Type / to search

Code | Issues 39 | Pull requests 2 | Discussions | Actions | Projects | Wiki | Security | Insights

Jupyter kernels

Edit | New page

Carsten Allefeld edited this page on Sep 11 · 192 revisions

Jupyter kernels

Kernel Zero is IPython, which you can get through ipykernel, and is still a dependency of jupyter. The IPython kernel can be thought of as a reference implementation, as CPython is for Python.

Here is a list of available Jupyter kernels. If you are writing your own kernel, feel free to add it to the table!

Language(s) Version	Name	Jupyter/IPython Version	3rd party dependencies	Example Notebooks
	LFortran			Binder demo
	JupyterQ (KX Official Kernel)	Jupyter	kdb+ ≥ v3.5 64-bit, Python ≥ 3.6, embedPy	Notebook Examples
	Calysto LC3			
	elm-kernel	Jupyter		Examples
	BeakerX		Groovy, Java, Scala, Clojure, Kotlin, SQL	example
multiple	ICalico	IPython >= 2		Index

Pages 10

https://github.com/jupyter/jupyter.wiki.git

Clone this wiki locally

https://github.com/jupyter/jupyter.w

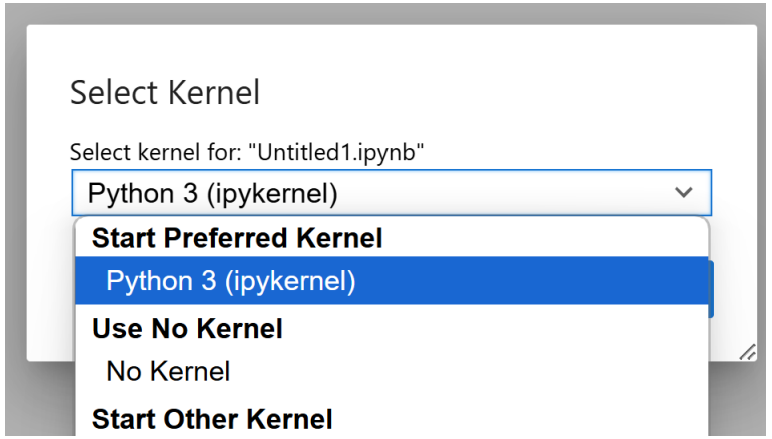
Jupyter Kernels "*spark*"

Java 11+, Groovy, Javascript, Kotlin, Scala, Apache Spark, and more	Ganymede	Jupyter >= 4.0	JShell, Apache Maven Resolver	Examples
Pyspark (Python 2 & 3), Spark (Scala), SparkR (R)	sparkmagic	Jupyter >=4.0	Livy	Notebooks, Docker Images
Scala, Python, R	Apache Toree (formerly Spark Kernel)	Jupyter	Spark >= 1.5	Example
Scala>=2.10	almond (old name: Jupyter-scala)	IPython>=3.0		examples
Python >= 3.5, scala >= 2.11	spylon-kernel	ipykernel >=4.5	Apache Spark >=2.0	Example

Jupyter Kernel(s)

to execute
python
>>> 1+1

ipykernel (built-in)



to execute
spark python code
>>> spark.sql("...")

pyspark ...

to execute
spark scala code
scala> spark.sql("...")

spylon kernel
(deprecated?)

to execute
scala (no spark)
scala> 1+1

almond kernel

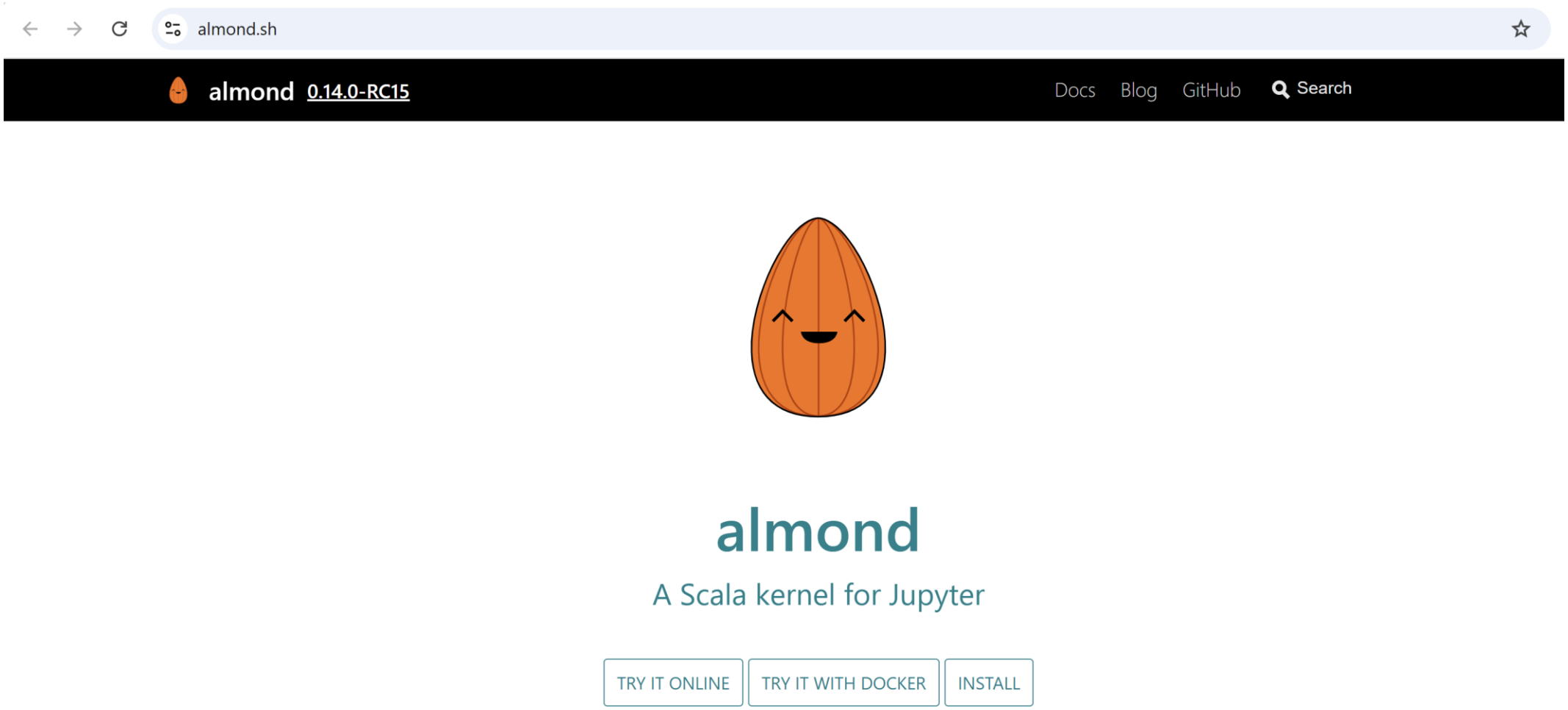
to execute
spark scala code
scala> spark.sql("...")

almond kernel
+ module "**almound-spark**"

Step 3 alternative : almond kernel
+ "almound-spark" module

for using spark with scala langage

http://almond.sh



TODO … WORK IN PROGRESS

Step 3 alternative : spylon kernel for spark + scala

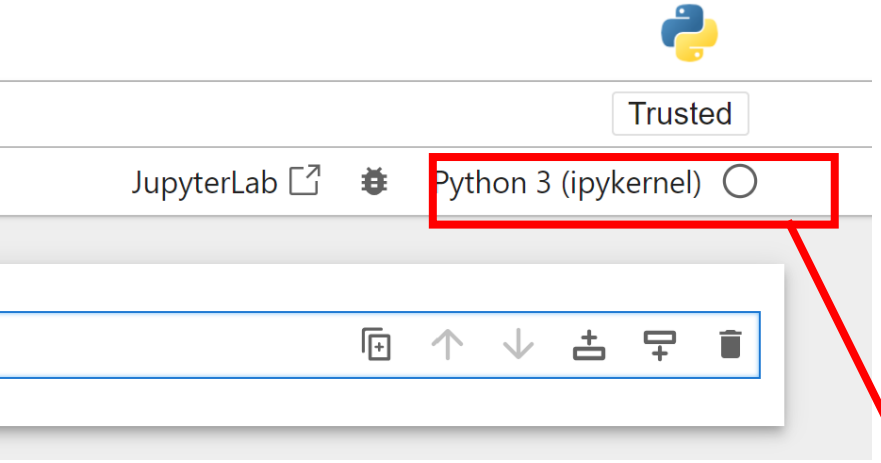
Step 3 alternative : install jupyter spylon_kernel (for using Spark with Scala langage)

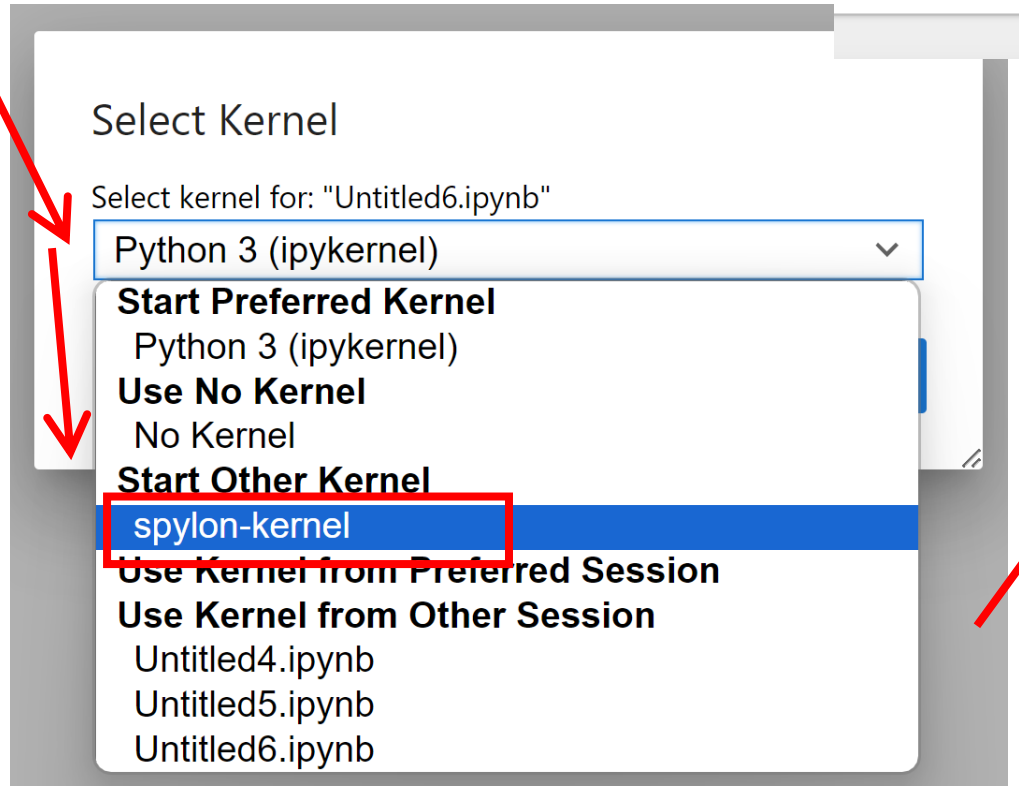
python –m spylon_kernel install --user

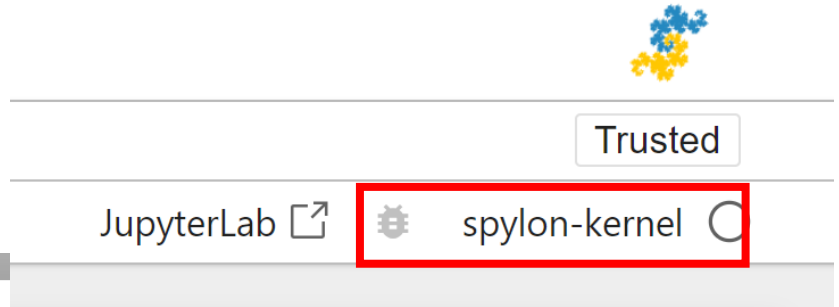
(or pip install spylon_kernel –user)

```
C:\Users\arnaud>python -m spylon_kernel install --user
0.00s - Debugger warning: It seems that frozen modules are being used, which may
0.00s - make the debugger miss breakpoints. Please pass -Xfrozen_modules=off
0.00s - to python to disable frozen modules.
0.00s - Note: Debugging will proceed. Set PYDEVD_DISABLE_FILE_VALIDATION=1 to disable this validation.
[InstallKernelSpec] Installed kernelspec spylon-kernel in C:\Users\arnaud\AppData\Roaming\jupyter\kernels\spylon-k
ernel
```

Step 3 … testing spylon







Step 3 … Testing Spylon .. Write Scala

```
[ ]: for(i <- 0 to 5) println(s"Scala code.. ${i}")

Intitializing Scala interpreter ...

[ ]:
```

Code

Run this cell and advance (Shift+Enter)

Type SCALA code
… Shift+Enter

Get Spark process
(Scala interpreter)

```
[1]: for(i <- 0 to 5) println(s"Scala code.. ${i}")

Intitializing Scala interpreter ...
Spark Web UI available at http://DesktopArnaud:4041
SparkContext available as 'sc' (version = 3.4.1, master = local[*], app id = local-1694035899154)
SparkSession available as 'spark'
Scala code.. 0
Scala code.. 1
Scala code.. 2
Scala code.. 3
Scala code.. 4
Scala code.. 5

[ ]:
```

Step 3 … Testing Spylon .. Write Scala

127.0.0.1:8888/notebooks/Untitled4.ipynb

jupyter Untitled4 Last Checkpoint: 1 minute ago

File Edit View Run Kernel Settings Help Trusted

Code JupyterLab spylon-kernel

[1]:
```
val ls = Seq( (1, true, "Hey") )
```

```
Intitializing Scala interpreter ...
Spark Web UI available at http://DesktopArnaud:4040
SparkContext available as 'sc' (version = 3.4.1, master = local[*], app id = local-1694034599241)
SparkSession available as 'spark'
```

[1]:
```
ls: Seq[(Int, Boolean, String)] = List((1,true,Hey))
```

[2]:
```
ls
```

[2]:
```
res0: Seq[(Int, Boolean, String)] = List((1,true,Hey))
```

[3]:
```
val ds = spark.createDataset(ls)
```

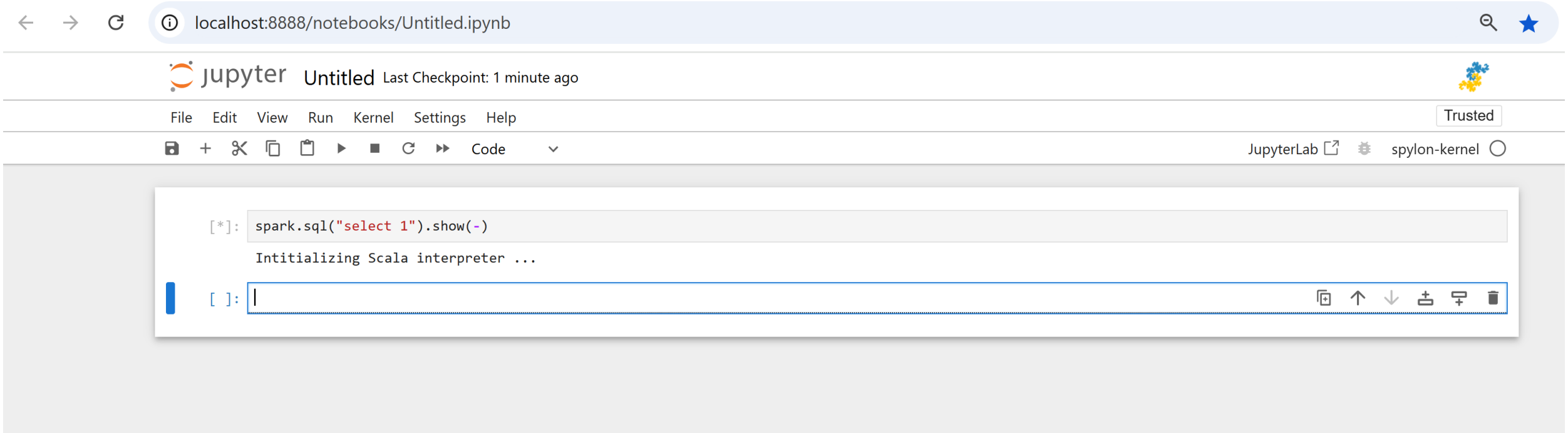
[3]:
```
ds: org.apache.spark.sql.Dataset[(Int, Boolean, String)] = [_1: int, _2: boolean ... 1 more field]
```

[4]:
```
ds.show
```

```
+---+----+---+
| _1|  _2| _3|
+---+----+---+
|  1|true|Hey|
+---+----+---+
```

[ ]:

Spark SQL "Hello World"



may take 1 minute to start ... spark is starting

TroubleShooting ???

```
Cmder
eco
    return f(*a, **kw)
           ^^^^^^^^^^^
  File "C:\apps\spark\spark-3.5.0\python\lib\py4j-0.10.9.7-src.zip\py4j\protocol.py", line 330,
 in get_return_value
    raise Py4JError(
py4j.protocol.Py4JError: An error occurred while calling None.scala.tools.nsc.interpreter.IMain
. Trace:
py4j.Py4JException: Constructor scala.tools.nsc.interpreter.IMain([class scala.tools.nsc.Settin
gs, class java.io.PrintWriter]) does not exist
        at py4j.reflection.ReflectionEngine.getConstructor(ReflectionEngine.java:180)
        at py4j.reflection.ReflectionEngine.getConstructor(ReflectionEngine.java:197)
        at py4j.Gateway.invoke(Gateway.java:237)
        at py4j.commands.ConstructorCommand.invokeConstructor(ConstructorCommand.java:80)
        at py4j.commands.ConstructorCommand.execute(ConstructorCommand.java:69)
        at py4j.ClientServerConnection.waitForCommands(ClientServerConnection.java:182)
        at py4j.ClientServerConnection.run(ClientServerConnection.java:106)
        at java.base/java.lang.Thread.run(Thread.java:1589)


[I 2024-10-26 09:35:00.917 ServerApp] Saving file at /Untitled.ipynb
```

Step 3 alternative : kernel for pyspark (for using PySpark with Python langage)