4th  2017/18 GouTP @ SCEE

• About: Introduction to Jupyter notebooks
• Date: 8th of March 2018
• Who: Lilian Besson

Open source content 📐❓

Note: slides are online: [github.com/Naereen/slides/tree/master/2018_03__Jupyter_notebooks_are_awesome__GouTP_at_Supelec](https://github.com/Naereen/slides/tree/master/2018_03__Jupyter_notebooks_are_awesome__GouTP_at_Supelec)
What's a "GouTP"?

- Internal monthly technical training session
- Usually: on Thursday, at 3pm - 3:30pm
- With coffee, tea and sweets: we relax while training!

Initiative of Quentin and Vincent in January 2017...
Continued by Rémi, Muhammad, Rami and Lilian!

Not only @ SCEE?

- Currently open to the FAST and AUT teams
Agenda for today 🕒

1. Quick presentation of internal tools @ SCEE [5 min]
2. What are the Jupyter notebook tools? [10 min]
3. Demo time [10 min]
4. Sharing your notebooks online or as PDF [5 min]

Please 🙏

Ask questions and interrupt me if you want!
1. Presentation of internal tools @ SCEE

- Welcome to our new PhD student and interns 👋 !
- You met (almost) everybody this week !
- You will become familiar with the research themes of our team…

← Let see a few 🛠️ tools that can make your life easier!
Website

- www-scee.rennes.supelec.fr was created by Rémi and Aymeric
- It is maintained mainly by Rémi: we need help!

New comers, please 🙏

- send a short summary of your research interest with links to your LinkedIn, Google Scholar profile (or other sites). Picture: if you want
- to Rémi and I so we add you on the website
Internal Wiki 📋

- We have a MediaWiki running locally on [http://172.16.6.219/](http://172.16.6.219/)
- Anyone can edit, it is maintained by Rémi and I
- Participate if you have anything to change (create an account, edit!)
Workstations 🖥️ (Windows & GNU/Linux)

- 2 Windows 7 workstations, with MATLAB
  - WS1: 172.16.6.211
  - WS2: 172.16.6.212
- 1 GNU/Linux (Ubuntu) workstation, with Python, GNU Radio…
  - WS3: 172.16.6.213
- Powerful machines: 12 cores, 32 Gb of RAM, lots of storage…
- Monitoring 🔄: http://172.16.6.219:8000 (ask us for [id/password](#))
  (please check for use load, before launching heavy simulations)

👍 Ask for an account if you need

- To run computations, or to use the TestBed
- Ask to Muhammad for Windows, to me for GNU/Linux
Introduction to Jupyter notebooks

+ Browse to http://172.16.6.219:8000/ for a live view
+ Browse to http://172.16.6.213/ for Munin Monitoring
Help? If needed: @admin on https://SCEETeam.Slack.com/
Or talk directly to: Lilian or Rami
USRP TestBeds 📞

- We have 8 USRP cards that can be used from GNU Radio Companion on the WS3
- See more on http://172.16.6.219/mediawiki/index.php/Main_Page#Hardware

Monitoring🔍

- http://172.16.6.213:8000 (made by Quentin)
- let you see the IP of each USRP card
- and who uses what in real time

💰 Advice

- If you need to use the USRP, *discuss with Rémi and Lilian before*
## SCEETestbed Monitor

<table>
<thead>
<tr>
<th>Kit N°1</th>
<th>Kit N°2</th>
<th>Kit N°3</th>
<th>Kit N°4</th>
<th>Kit N°5</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.101</td>
<td>192.168.10.102</td>
<td>192.168.10.103</td>
<td>192.168.10.104</td>
<td>192.168.10.105</td>
</tr>
<tr>
<td>Disconnected</td>
<td>Disconnected</td>
<td>Free to use</td>
<td>Free to use</td>
<td>Free to use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kit N°6</th>
<th>Kit N°7</th>
<th>Kit N°8</th>
<th>Kit N°9</th>
<th>Kit N°10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free to use</td>
<td>Free to use</td>
<td>Free to use</td>
<td>Disconnected</td>
<td>Free to use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kit N°11</th>
<th>Kit N°12</th>
<th>Kit N°13</th>
<th>Kit N°14</th>
<th>Kit N°15</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.111</td>
<td>192.168.10.112</td>
<td>192.168.10.113</td>
<td>192.168.10.114</td>
<td>192.168.10.115</td>
</tr>
<tr>
<td>Free to use</td>
<td>Disconnected</td>
<td>Disconnected</td>
<td>Disconnected</td>
<td>Disconnected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kit N°16</th>
<th>Kit N°17</th>
<th>Kit N°18</th>
<th>Kit N°19</th>
<th>Kit N°20</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.10.116</td>
<td>192.168.10.117</td>
<td>192.168.10.118</td>
<td>192.168.10.119</td>
<td>192.168.10.120</td>
</tr>
<tr>
<td>Disconnected</td>
<td>Disconnected</td>
<td>Disconnected</td>
<td>Disconnected</td>
<td>Disconnected</td>
</tr>
</tbody>
</table>
Project Jupyter exists to develop open-source software, open-standards, and services for interactive computing across dozens of programming languages.
2. What are Jupyter notebooks?

Technical aspect

1. A file format, .ipynb (just JSON with constraints)
2. An editor in your browser (see it during demo time)
3. Tools to convert .ipynb files to scripts, HTML, slides, PDF etc.

Practical aspect

4. A very good way to interact with your code
5. Create smart document with text, maths, code, output and figures, all included in one file
6. Easy and perfect to share online and with colleagues!
How to learn 🎓?

Online 🌐

- Try without installing anything? → At try.jupyter.org

On your laptop 🖥

1. Install it 🧠
2. Then start:

```bash
# from your console
$ jupyter notebook
```

3. Then experiment, practice and learn

If you installed Python with Anaconda, it should be in your system menu by default (along Spyder, IPython and IPython QT Console)…
How to install it 🌟?

Install it (you need 🐍 Python) from https://jupyter.org/install.html.

```bash
$ conda install jupyter  # if you use Anaconda/conda
$ pip install jupyter    # for the system-wide Python & pip
```

How to start it?

```bash
$ jupyter notebook  # from your console
...
```

Copy/paste this URL into your browser when you connect for the first time, to login with a token:

http://localhost:8888/?token=44450cacadbe3ecddc21e02e66a6b5162c01f2

- It should open http://localhost:8888/notebooks/ in your browser
- Or open the link in your terminal
Only for Python 😞 ??

• No: supports natively Julia, Python and R (Ju + Py + R = Jupyter)
• Dozens of "kernels" allow you to use Jupyter with almost any language! (for free). Installation is usually simple & fast.

Partial list 📔

• Interpreted languages: 🐳 Bash, 🐐 Caml/OCaml, Lua etc
• 😊 and of course Wolfram Mathematica and MATLAB even if they have their own notebook tools now.
• 😟 But also compiled languages: C++, C, Go, Java!

Complete list of "kernels"

See github.com/jupyter/jupyter/wiki/Jupyter-kernels
3. **Demo time**

- I will show you quickly all this…
- With an example of coding in Python.
- Reference documentation is: [jupyter.readthedocs.io/en/latest/content-quickstart.html](jupyter.readthedocs.io/en/latest/content-quickstart.html)
Internally, it's quite complicated, just don't care
Conclusion (1/3)

Sum-up

- I hope you got a good introduction to Jupyter
  - Official documentation: at jupyter.rtfd.io
- Also datacamp.com/community/tutorials/tutorial-jupyter-notebook

Pointers

1. ♥ use it and fall in love with it!

2. Use Jupyter-themes (github.com/dunovank/jupyter-themes) to customize the UI as you wish (dark themes, custom fonts etc)

3. Use extensions if you want more features,
   See jupyter-contrib-nbextensions.rtfd.io
Conclusion (2/3)

Next GouTP @ SCEE

• Any request or suggestion?

GouTP @ FAST or AUT?

By Pierre Haessig?

• Julia programming language (~ between Python and Matlab)
  ↦ see julialang.org if you are curious

We need participants!

👉 By you? Any idea is welcome! 😊
Conclusion (3/3)

Thanks for joining 👋 !

Contact us if you want to do a GouTP !

Your mission, if you accept it… ⚡

1. Padawan level : next time you program in 🐍 Python (or other language), think about Jupyter. Can it help you being more efficient?

2. Jedi level : Try to use Jupyter when you will have to share or show some piece of code?

3. Master level : From now on, try to use (only?) open-source tools for your research (Python and others)…