

IPython

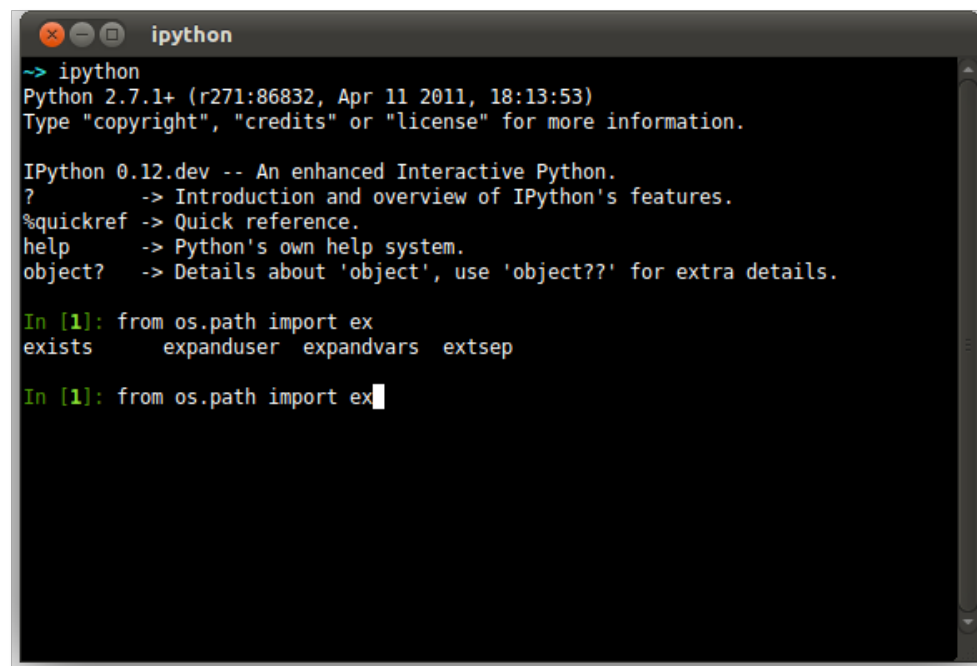
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<http://twitter.com/ogrisel>

PyCon France – 2011

What is IPython?

- A better python shell
 - tab-completion
 - Introspection
 - Debugging
 - Profiling



```
ipython
-> ipython
Python 2.7.1+ (r271:86832, Apr 11 2011, 18:13:53)
Type "copyright", "credits" or "license" for more information.

IPython 0.12.dev -- An enhanced Interactive Python.
?          -> Introduction and overview of IPython's features.
%quickref  -> Quick reference.
help       -> Python's own help system.
object?    -> Details about 'object', use 'object??' for extra details.

In [1]: from os.path import ex
exists      expanduser  expandvars  extsep

In [1]: from os.path import ex
```

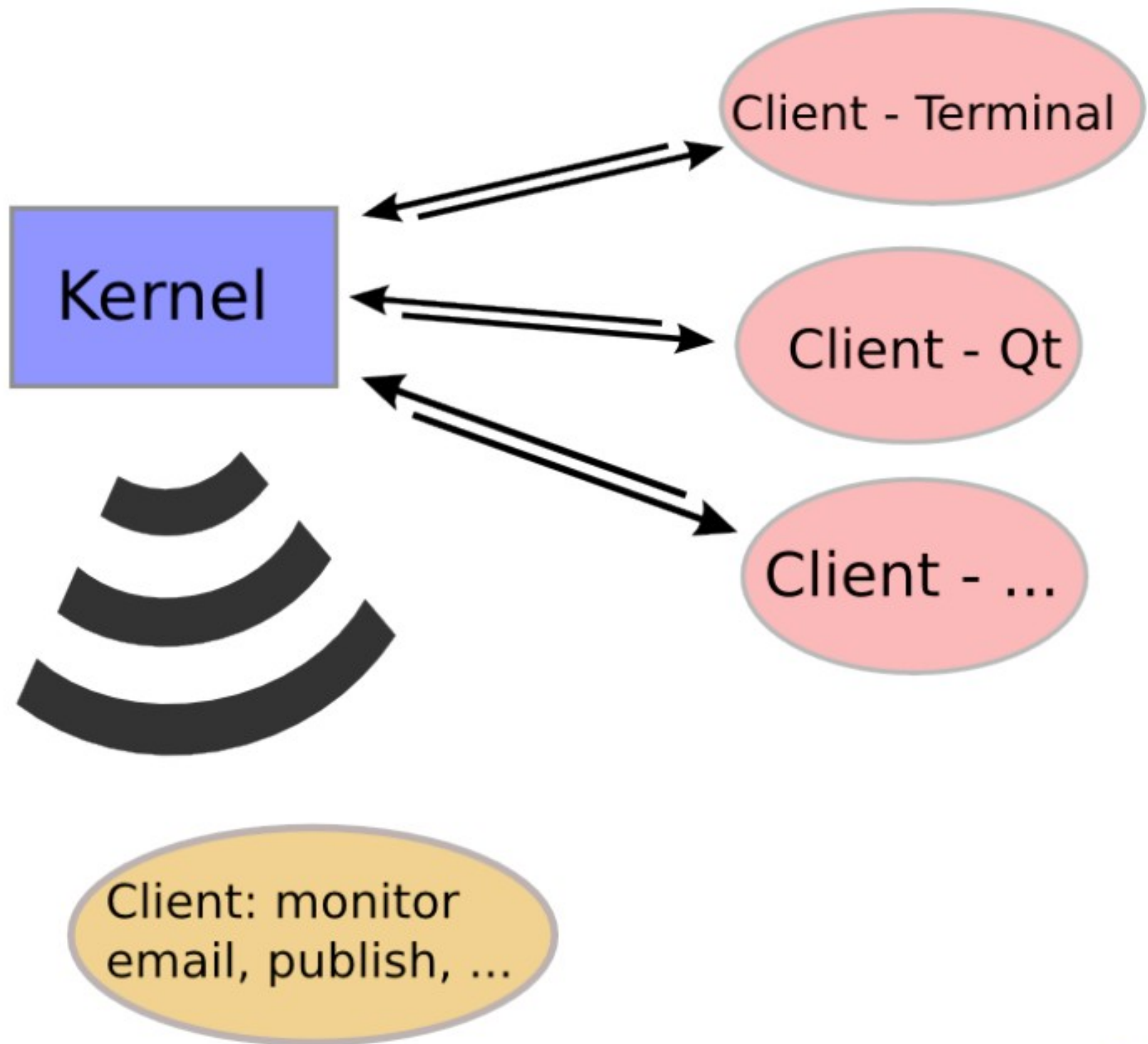
- UI frontends (Terminal, QT, HTML / JS)
- High Level Parallel Computing Interface

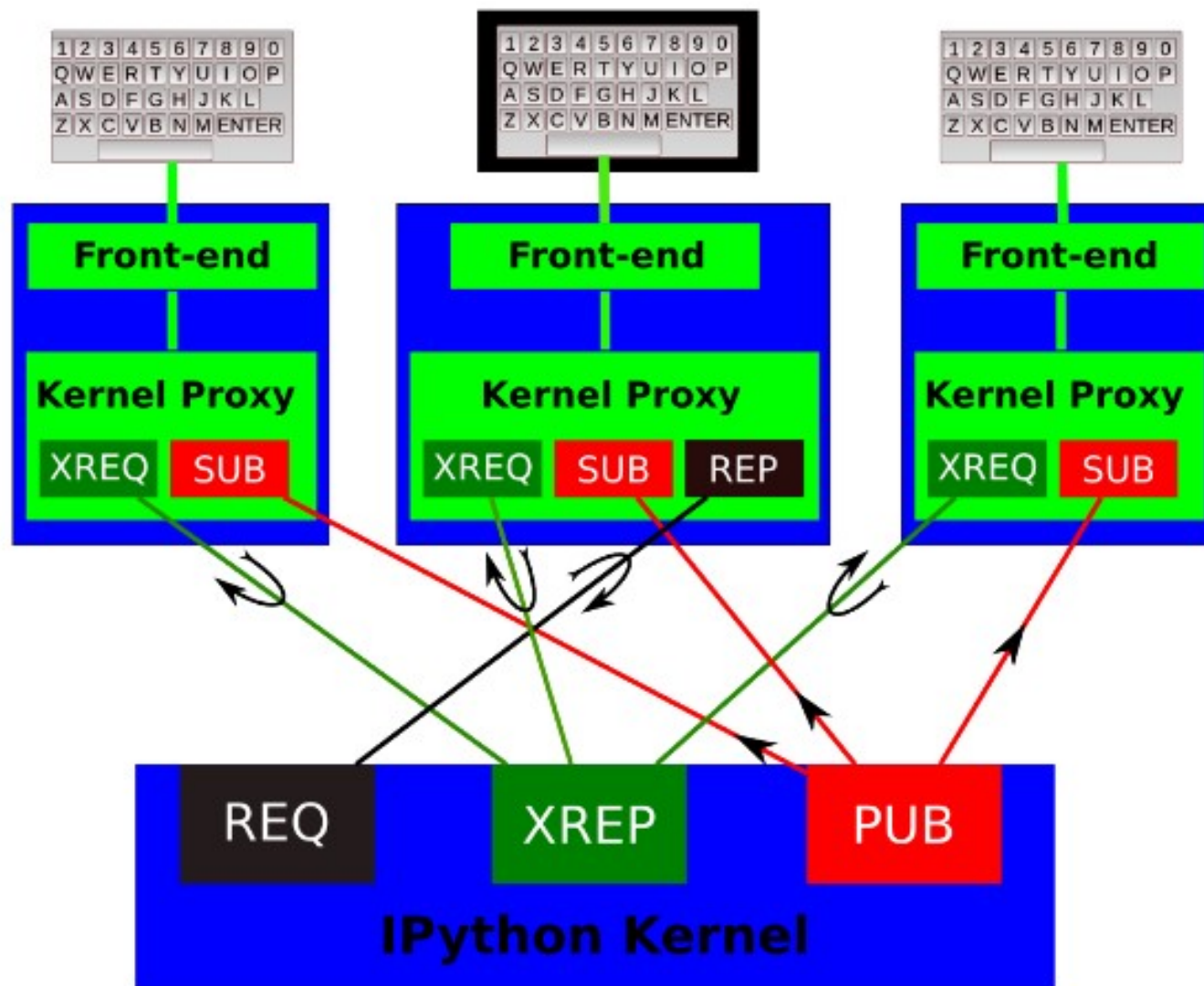
IPython magic

- `%run` – load a python script
- `%debug` – post mortem debugger
- `%time` / `%timeit` – quick timing of expr
- `%prun` – profile execution of expr
- `%lprun` – (extension) line by line profiler
- `%loadpy` – load expr from local file / URL

0.11: the big refactoring

- 2 years long refactoring – 300k lines diff
- Migration to git / github
 - 200 pull requests merged last year
- Python 3 port
- QT Console
- New cleaner configuration + extensions sys
- SQLite sessions history
- Frontend / Kernel separation – 0mq network

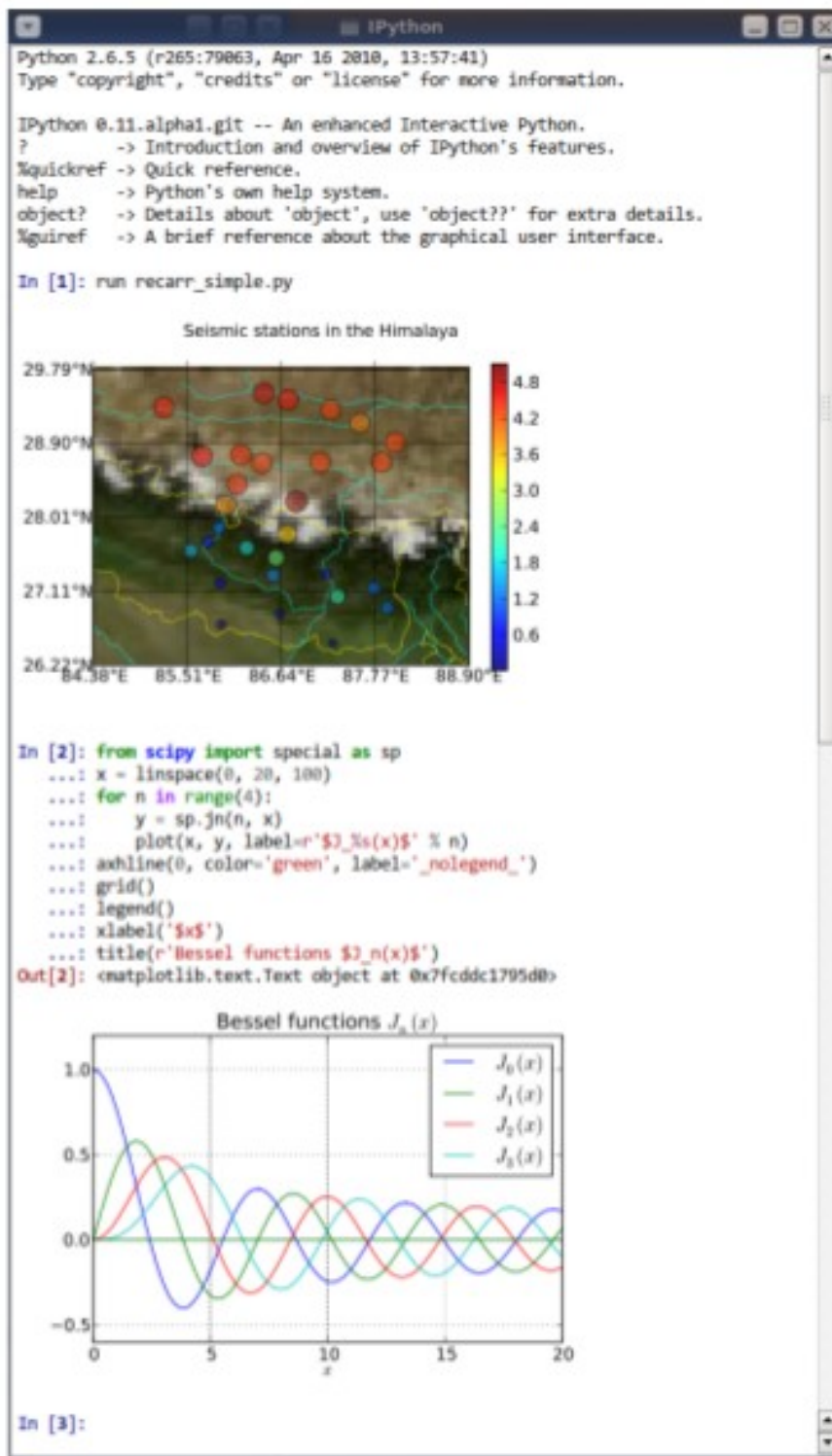




- Kernel raw_input
- Requests to kernel
- Kernel output broadcast
- Request/Reply direction

New in 0.11: The QT Console

Sponsored by Enthought



- Better tab completion UI
- Better introspection UI
- Split panel for doc
- Syntax highlighting
- Better code block editing
- Interrupt / Restart kernel
- In-line plots

*Development sponsored by
Enthought*

Now in master: the Notebook

HTML / JS client with riched display

IPy: consensus_digits

localhost:8888/c4cb46b4-6d50-4834-a74e-d23e0e9a1f2a

☆

IPython Notebook

consensus_digits

Save

Idle

Notebook

Actions

New

Open

Download

ipy nb ▾

Print

Cell

Actions

Delete

Format

Code

Markdown

Output

Toggle

ClearAll

Insert

Above

Below

Move

Up

Down

Run

Selected

All

Autoindent: ☒

Kernel

Actions

Interrupt

Restart

Kill kernel upon exit: ☐

Help

Links

Python

IPython

NumPy

SciPy

MPL

SymPy

Shift-Enter : run selected cell

Ctrl-Enter : run in terminal mode

Ctrl-m h : show keyboard shortcuts

Intrinsic structure of the Western-Arabic numerals scriptures

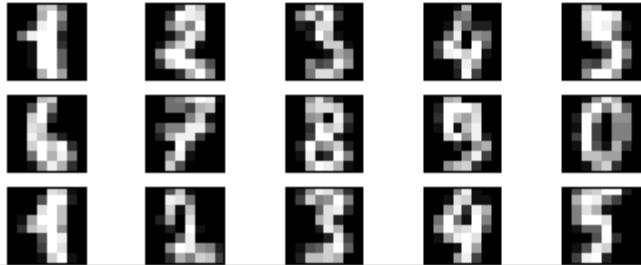
Using scikit-learn Spectral clustering and unsupervised model selection for the optimum number of clusters.
Let us start with a small utility function to display a gallery of images:

```
In [2]: import pylab as pl
def plot_images(images):
    pl.gray()
    for i, img in enumerate(images[:25]):
        pl.subplot(5, 5, i)
        pl.imshow(img, interpolation="nearest")
        pl.xticks(())
        pl.yticks(())
```

Load the digits dataset and plot the first elements:

```
In [3]: from sklearn import datasets

digits = datasets.load_digits()
plot_images(digits.images)
```



New in 0.11: IPython Parallel

a high level interface for parallel computing on
multi-core / multi-machines hardware

```
In [1]: from IPython.parallel import Client
```

```
In [2]: c = Client()
```

```
In [3]: c.ids
```

```
Out[3]: [0, 1, 2, 3]
```

```
In [4]: lview = c.load_balanced_view()
```

```
In [5]: lview.map_sync(lambda x: x ** 10, range(10))
```

```
Out[5]:
```

```
[0,  
 1,  
1024,  
59049,  
1048576,  
9765625,  
60466176,  
282475249,  
1073741824,  
3486784401]
```

```
In [6]:
```

Demo time!

Credits

- Many stuff stolen from Fernando's SciPy slides
- Thanks to the IPython core devs:
 - Fernando Pérez
 - Brian Granger
 - Min Ragan-Kelley
 - Thomas Kluyver
 - Evan Patterson

... and contributors

- You can now be one of them too!
 - Now that the codebase is clean :P