



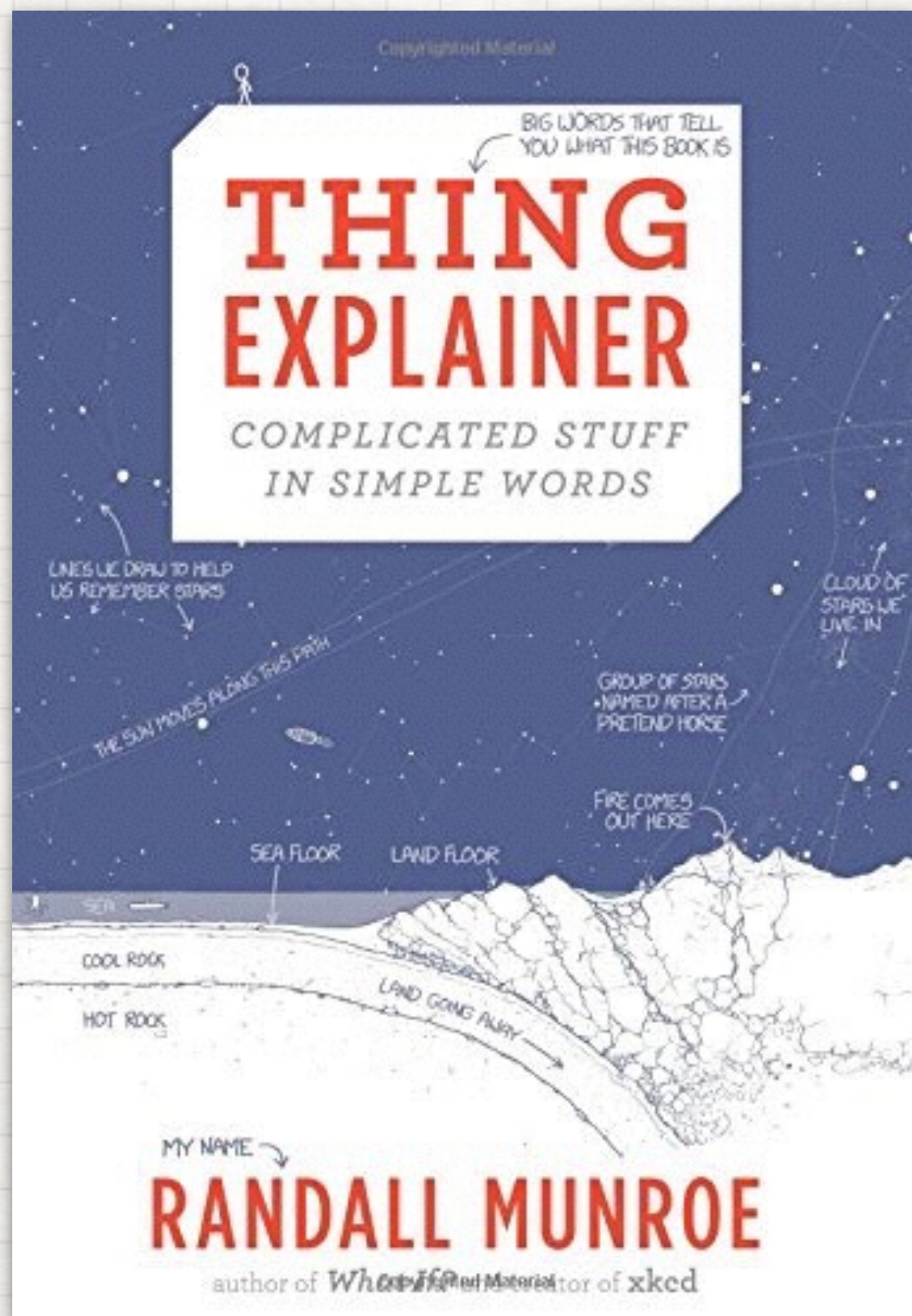
# A "THING EXPLAINER" OVERVIEW

JupyterDay Atlanta  
August 13, 2016

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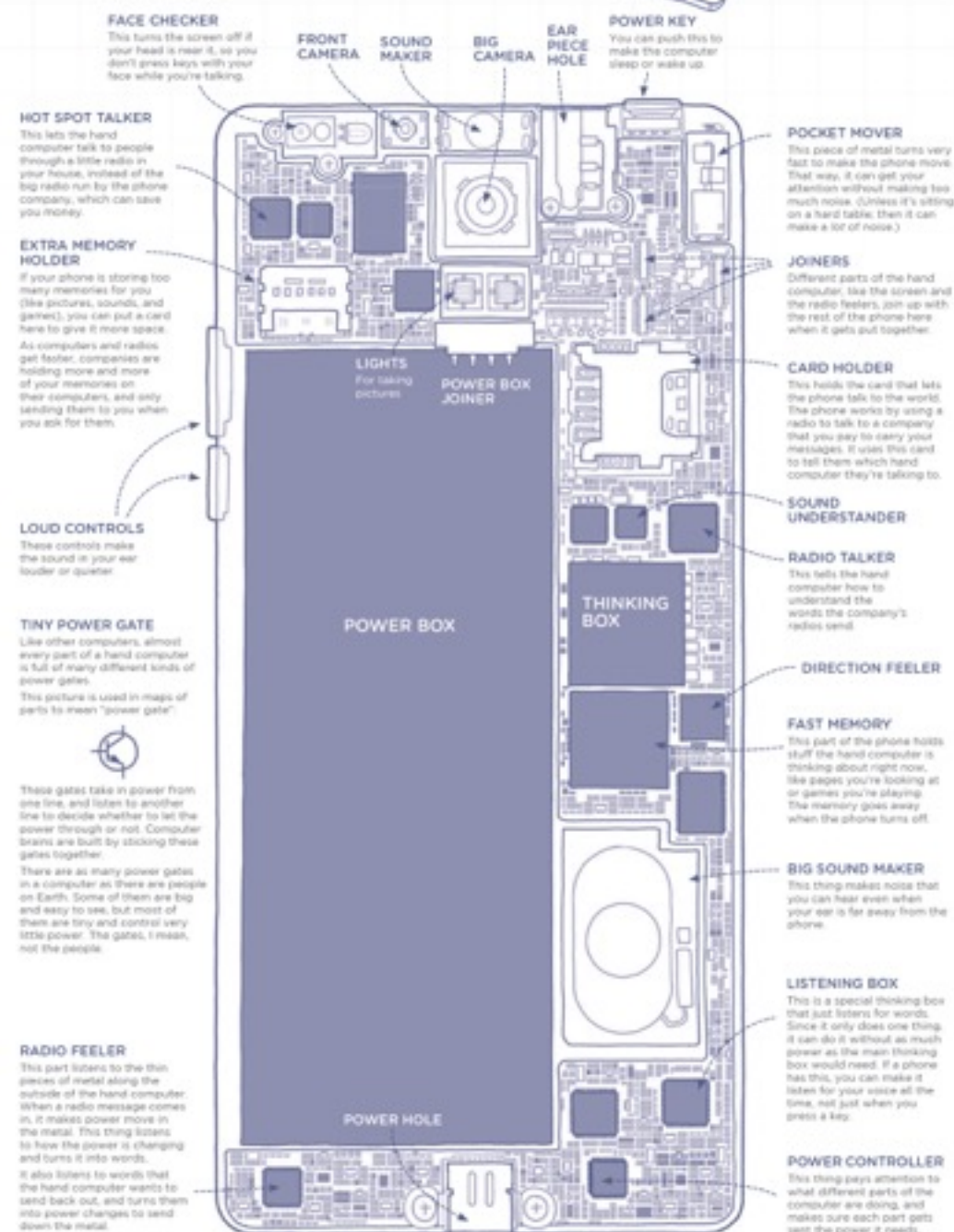




## HAND COMPUTER

These machines began as radios for talking out loud to people who were far away. Over the years, they slowly became more and more like computers.

As these machines turned into computers, they started taking the place of a lot of things we used to carry around—like picture takers, music players, and even books.





# UNDERSTANDING JUPYTERHUB

IN 1,000 (AND MAYBE A FEW MORE) COMMON WORDS



**SIMPLE WRITER**

WRITE LIKE *UP GOER FIVE* AND *THING EXPLAINER*

PUT WORDS HERE

<https://xkcd.com/simplewriter/>

“  
THE NOBLEST PLEASURE IS  
THE JOY OF  
UNDERSTANDING.”

— *Leonardo da Vinci*

”



# UNDERSTANDING JUPYTERHUB

## LEONARDO MEETS THING EXPLAINER

- **WHAT** A user friendly JupyterHub overview
- **WHAT IT IS NOT** A deep dive technical architecture talk or a “hands on” workshop (though I will give you resources to these things)
- **WHO** Scientists, researchers, engineers, managers, teachers, you
- **WHY** Understanding the major parts that make up JupyterHub to help with planning, trial, and deployment

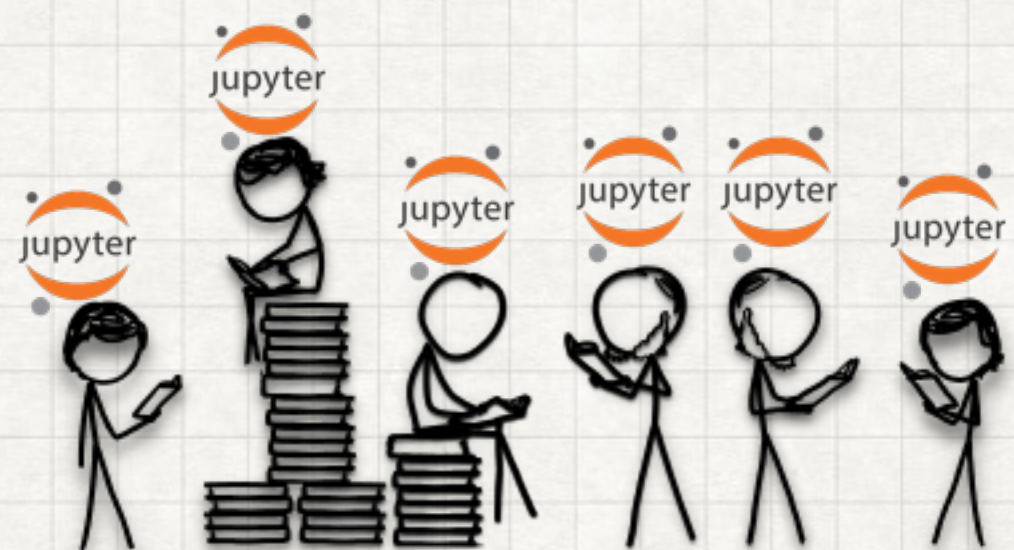


# BASICS



# jupyterhub

A THING TO GIVE A  
JUPYTER NOTEBOOK  
SERVER TO EACH  
PERSON IN A GROUP  
OF PEOPLE.





# WHAT IS A NOTEBOOK?

- Document
- Environment
- **Web app**

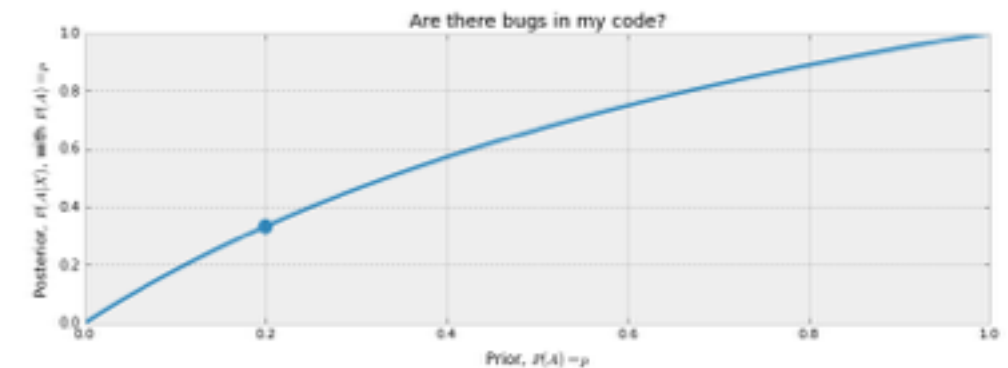
We have already computed  $P(X|A)$  above. On the other hand,  $P(X| \sim A)$  is subjective: our code can pass tests but still have a bug in it, though the probability there is a bug present is reduced. Note this is dependent on the number of tests performed, the degree of complication in the tests, etc. Let's be conservative and assign  $P(X| \sim A) = 0.5$ . Then

$$P(A|X) = \frac{1 \cdot p}{1 \cdot p + 0.5(1 - p)}$$
$$= \frac{2p}{1 + p}$$

This is the posterior probability. What does it look like as a function of our prior,  $p \in [0, 1]$ ?

```
figsize(12.5, 4)
p = np.linspace(0, 1, 50)
plt.plot(p, 2 * p / (1 + p), color="#348ABD", lw=3)
# plt.fill_between(p, 2*p/(1+p), alpha=.5, facecolor="#A6D628")
plt.scatter(0.2, 2 * (0.2) / 1.2, s=140, c="#348ABD")
plt.xlim(0, 1)
plt.ylim(0, 1)
plt.xlabel("Prior, $P(A) = p$")
plt.ylabel("Posterior, $P(A|X)$, with $P(A) = p$")
plt.title("Are there bugs in my code?")
```

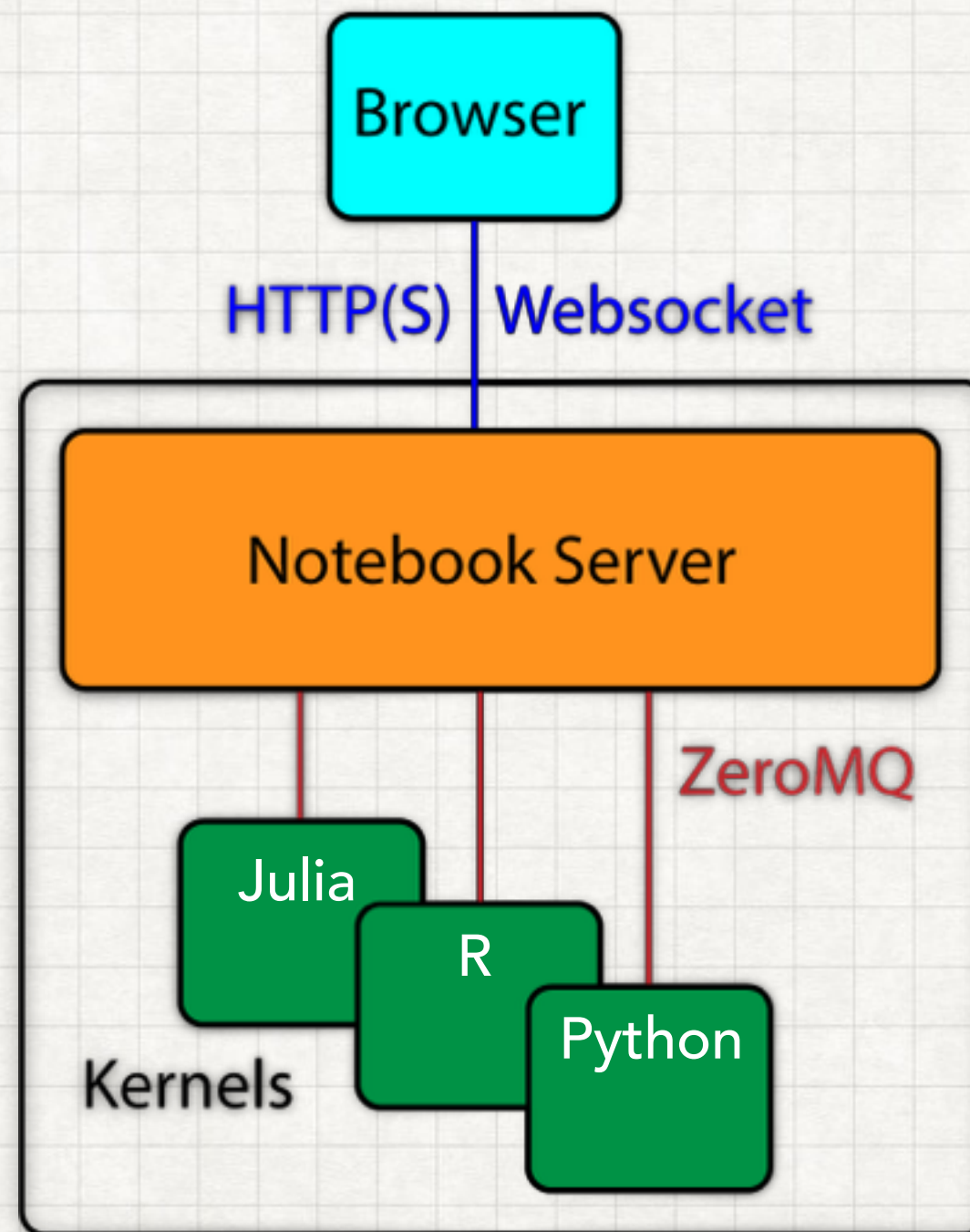
<matplotlib.text.Text at 0x1051de650>



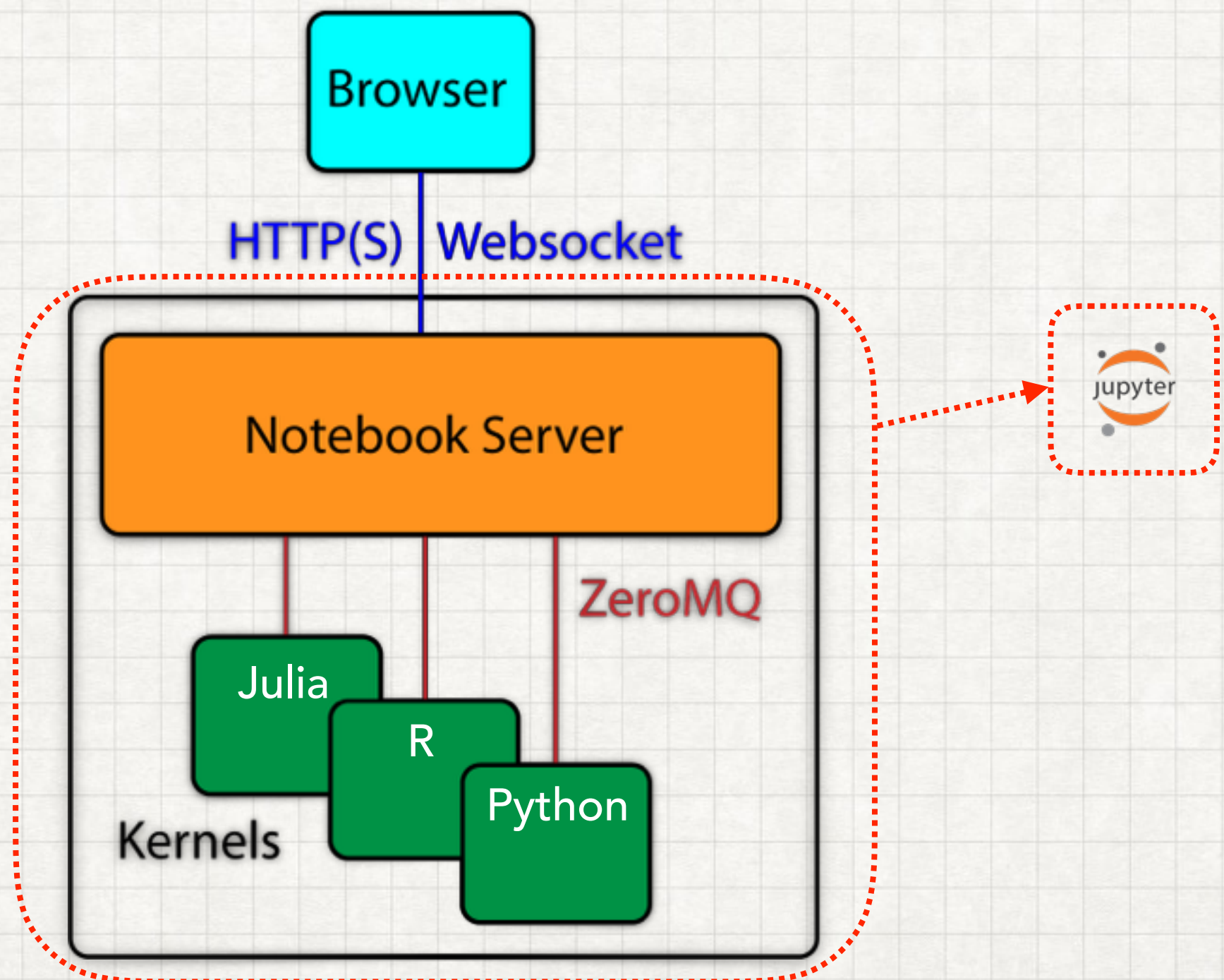
<https://github.com/CamDavidsonPilon/Probabilistic-Programming-and-Bayesian-Methods-for-Hackers>



# JUPYTER NOTEBOOK



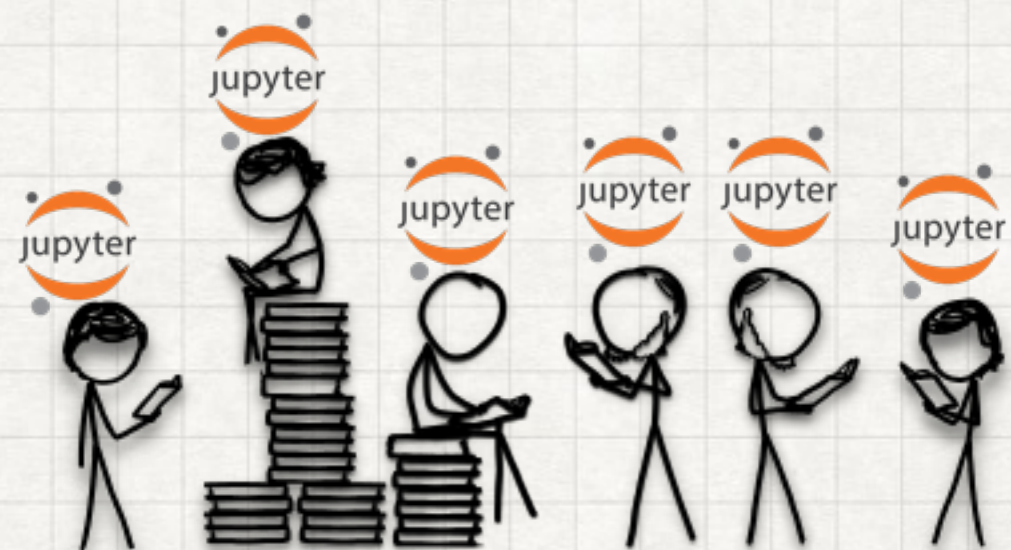
# A SINGLE USER JUPYTER NOTEBOOK SERVER





# jupyterhub

A THING TO GIVE A  
**JUPYTER NOTEBOOK  
SERVER**  
TO EACH PERSON IN  
A GROUP OF PEOPLE.



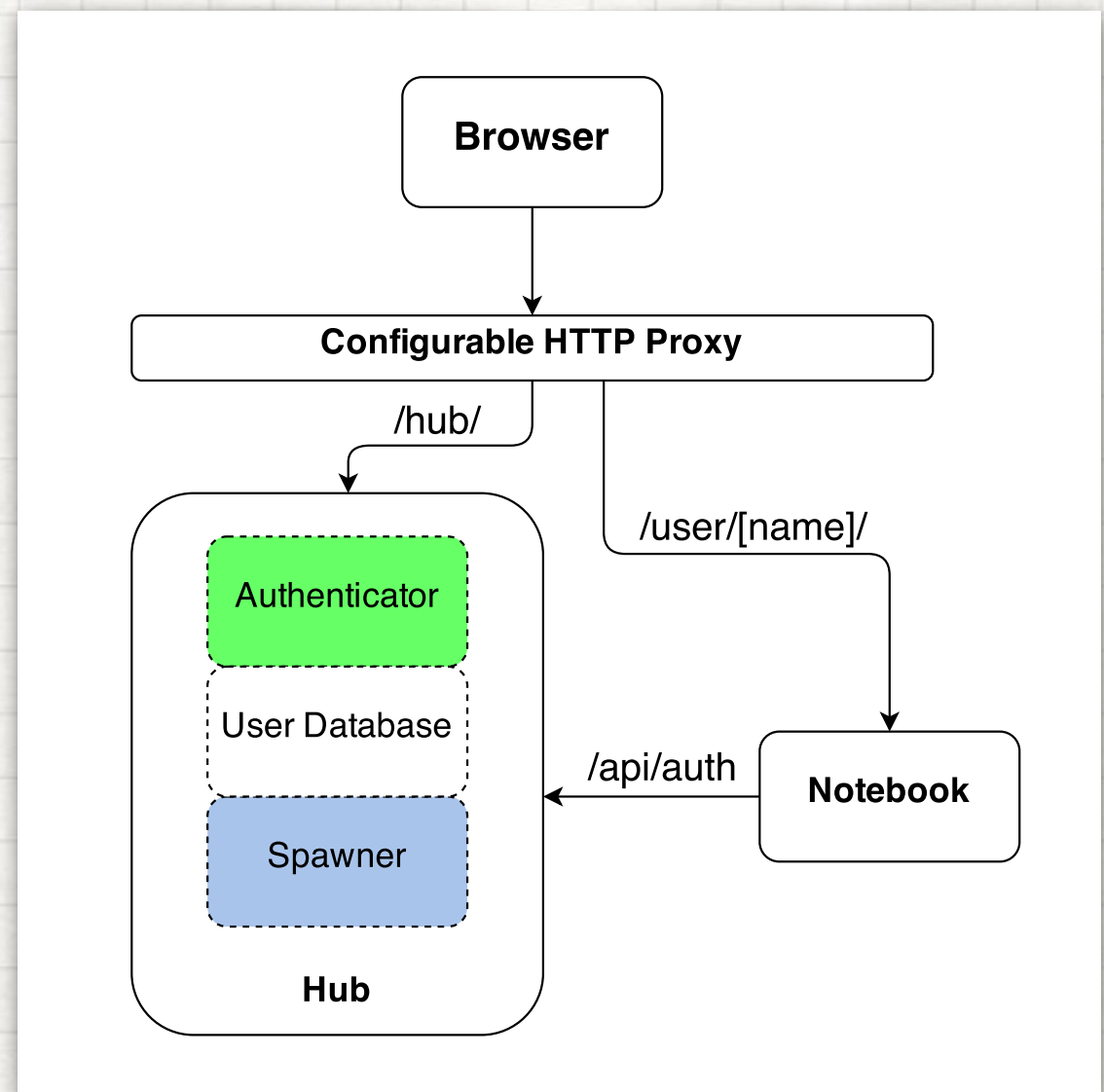


# HOW IT WORKS



## What is JupyterHub?

- Manages authentication
- Spawns single-user servers on-demand
- Each user gets a complete notebook server



# USER DATABASE

A PLACE TO KEEP INFORMATION ABOUT  
PEOPLE USING JUPYTERHUB



# AUTHENTICATOR

A THING THAT CHECKS IF A PERSON  
MAY USE THE HUB

# SPAWNER

A WORKER BEE THAT MAKES  
JUPYTER NOTEBOOK SERVERS  
FOR PEOPLE





WHEN SHOULD  
I USE IT?

# When to use JupyterHub

- A class where students can do homework (nbgrader)
- A short-lived workshop, especially if installation is hard
- A research group with a shared workstation or small cluster
- On-site computing resources for researchers and analysts at an institution



# When *not* to use JupyterHub

Remember: JupyterHub is Authenticated and Persistent.

- tmpnb: anonymous, ephemeral notebooks
- binder: tmpnb + GitHub repos
- SageMathCloud is *hosted* and provides realtime-collaboration



# RESOURCES AND HELP



# Reference Deployments

<https://github.com/jupyterhub/jupyterhub-deploy-docker>  
docker-compose, DockerSpawner, Hub in Docker

<https://github.com/jupyterhub/jupyterhub-deploy-teaching>  
ansible, no docker, nbgrader

# Tutorial and Workshop

JupyterHub tutorial

based on PyData London talk by Min Ragan-Kelley

<https://github.com/jupyterhub/jupyterhub-tutorial>

JupyterHub mini-workshop

July 2016

<https://github.com/jupyterhub/jupyterhub-2016-workshop>



# Help

JupyterHub Documentation

<http://jupyterhub.readthedocs.io/en/latest/index.html>

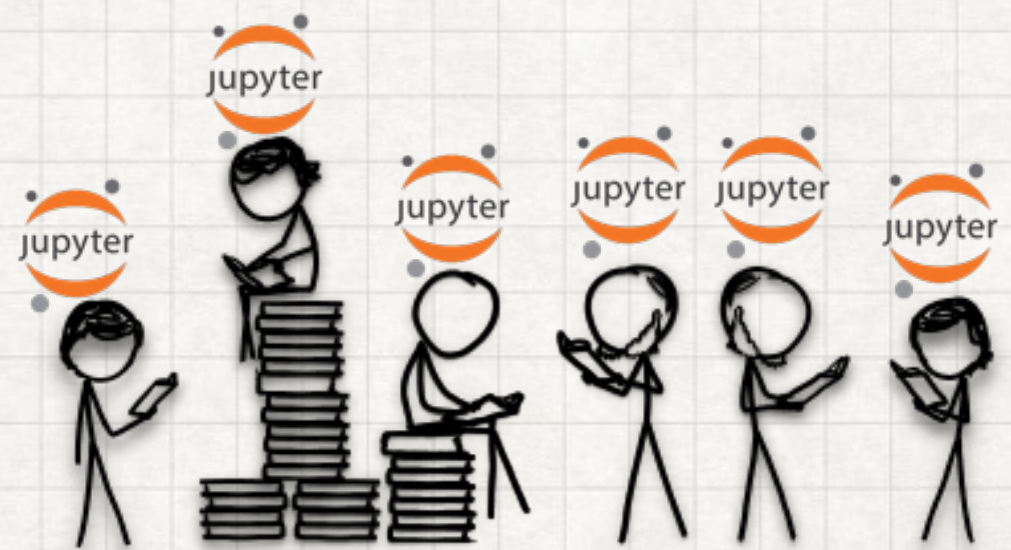
All repos in jupyterhub organization  
on GitHub

<https://github.com/jupyterhub>



THANKS!

HUB





# ATTRIBUTION

- xkcd <https://xkcd.com/license.html>
- Leonardo da Vinci. BrainyQuote.com, Xplore Inc, 2016. <http://www.brainyquote.com/quotes/quotes/l/leonardoda154285.html>, accessed August 12, 2016.
- <https://xkcd.com/simplewriter/>