What are IEs?

Demo

How?

Who?

Why?

Use Cases
Teaching
Research

Available IEs
IPython
RStudio

Thanks

Q&A

Galaxy Interactive Environments

Björn Grüning and Eric Rasche

2015-07-08

Interactive Environment (IEs)

Interactive Environments
BG & ER
What are IEs?
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- New way to interact with your data, without leaving Galaxy
- Flexible, efficient, extensible, and interactive
- Full spectrum of use; Teaching, Research, and Development

Your favourite Data Science tools...

Interactive Environments

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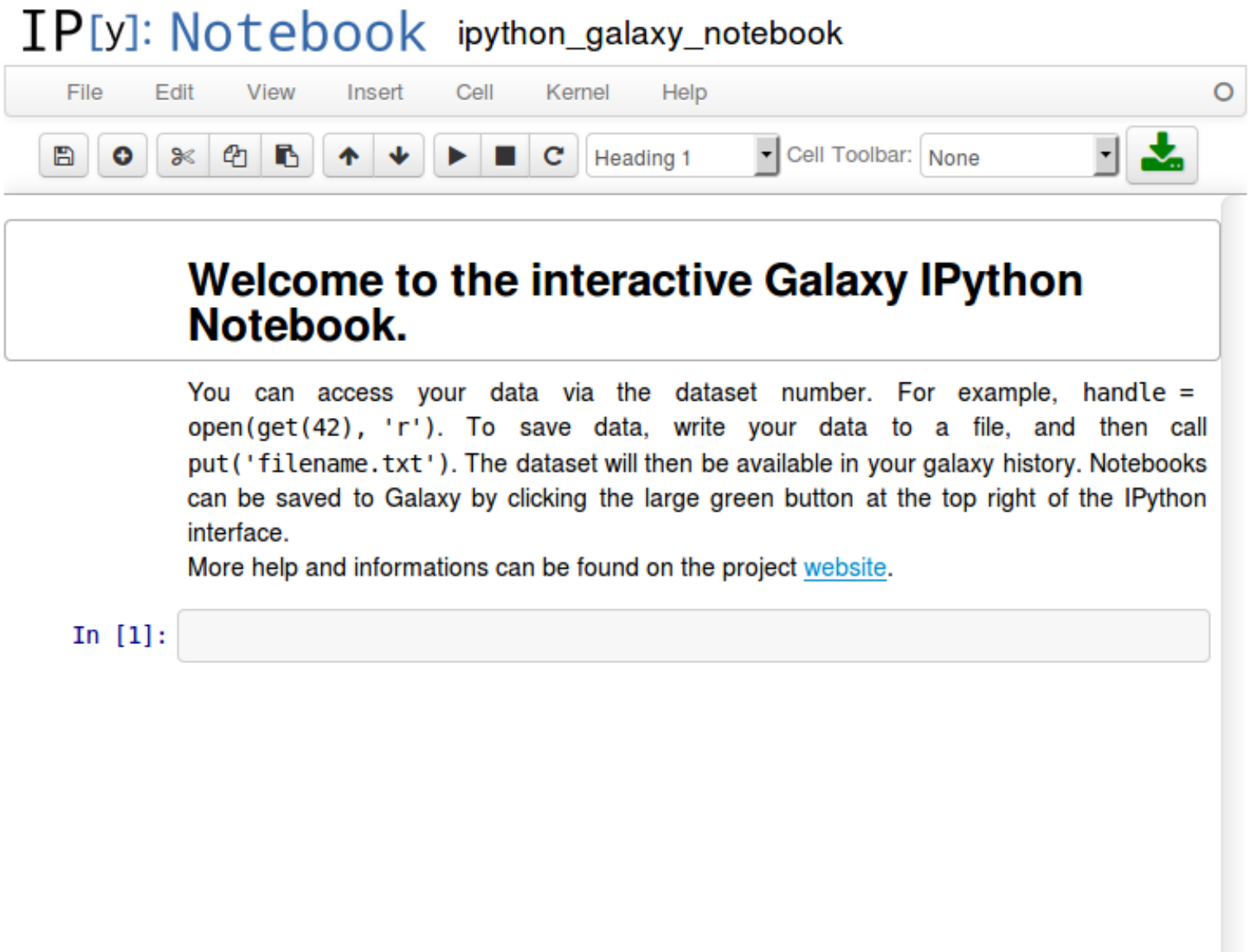

... Inside of Galaxy

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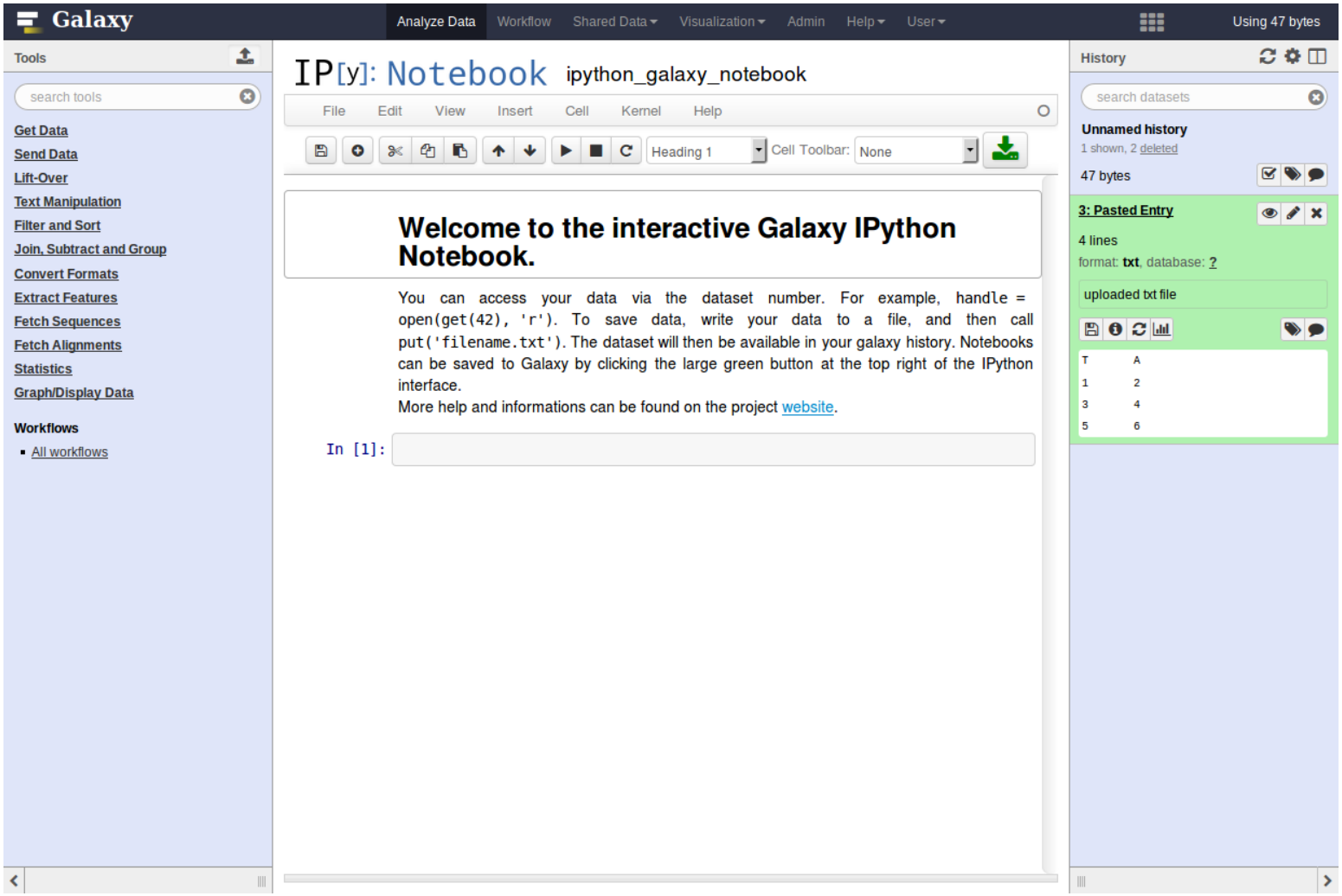

IE Demonstration

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- We'll demonstrate some analysis ...
- `www.youtube.com/watch?v=UOFFkDuJxgk`

How does this magic work?

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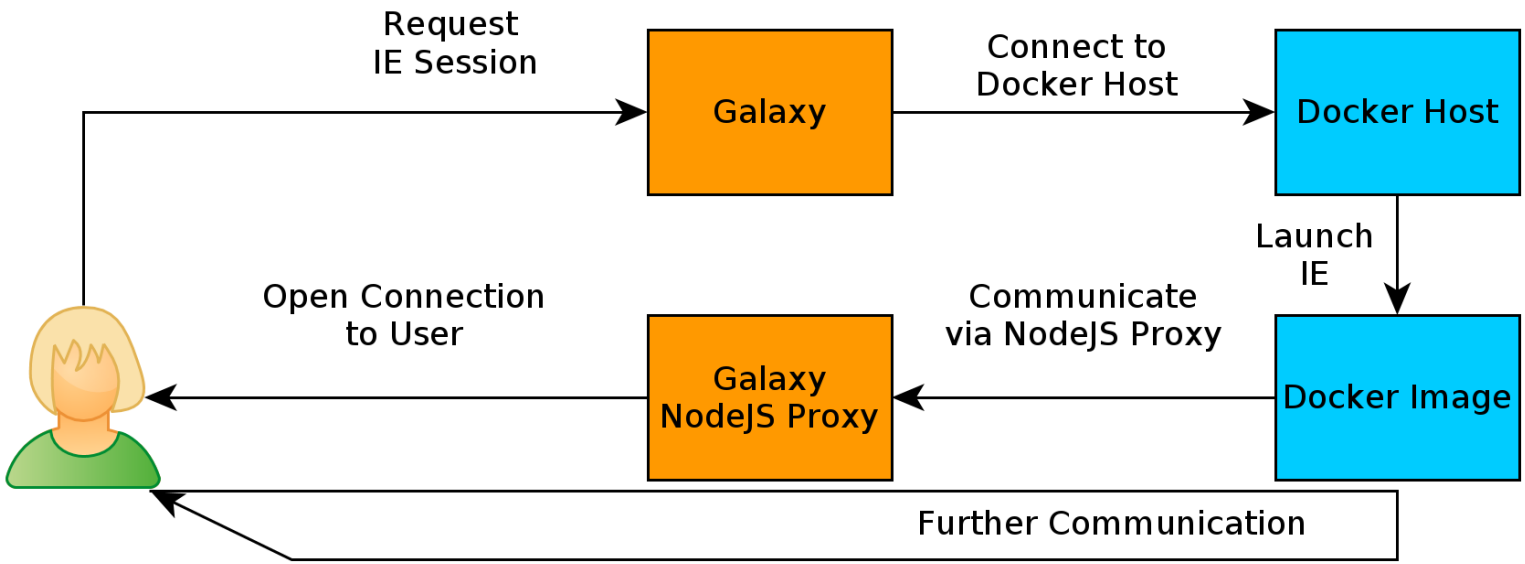

Who should use IEs?

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Q&A

- Everyone!
- IPython/RStudio are great for bioinformaticians and Data Scientists
- The upcoming iobio visualization IEs are great for Life Scientists

Why use IEs instead of ... Galaxy Tools/Viz?

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Q&A

- Tools are not one-size-fits-all
- Visualisations are restrictive
- Complete freedom!

Why use IEs instead of ... "normal" service deployments?

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Q&A

- IPython Notebooks are stored as history elements
- Notebooks are re-runnable, maintaining reproducibility
- API interactions required to access data are all 100% transparent
- Transparently integrates with standard Galaxy deployments and authentication schemes
- Notebooks are rendered into HTML for easy viewing/sharing, without launching an IE

Teaching

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Q&A

- Ideal for teaching:
  - Researchers
  - Bioinformatics
  - Data Wrangling
  - and Scientific Programming
- Share notebooks with students inside of Galaxy
- Use “literate programming” in IPython to teach students how analyses work, line-by-line

Research

Interactive Environments

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Q&A

- Reproducible and transparent scripts
- Share “hotfix” scripts easily between bioinformaticians and researchers

Development

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Q&A

- Rapidly prototype new scripts and tools for your organisation
- Immediately test them on your large, real datasets
- Does an existing visualisation not meet your goals? Build a new one immediately in IPython/RStudio.

IEs

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Available Now

- IPython (included in Galaxy 15.05/Cloudman)
- RStudio (coming in Galaxy 15.07)

Coming Soon

- iobio BAM
- iobio VCF

In the Works

- Apache Zeppelin
- WebApollo
- Jupyter 3/4 (Python/R/Julia/Perl/Ruby)

IPython IE Features

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Q&A

- Baked in Bioblend access to Galaxy
- Easily get data from/put data into Galaxy
- Bash and R “magics”
- Pre-installed: numpy biopython scikit-learn pandas scipy sklearn-pandas bioblend matplotlib patsy pysam khmer dendropy ggplot mpld3 sympy rpy2

RStudio IE Features

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Q&A

- Easily get data from/put data into Galaxy
- R version 3.2.1
- Knitr/Sweave available
- R Packages: RCurl, XML, markdown, shiny, ggvis, dplyr, ggplot2, plyr, reshape2, devtools, RODBC, maps, pheatmap, readr, tidyr, dplyr, RJSONIO, shinyapps, knitr
- Bioconductor: edgeR, Rgraphviz, biomaRt, topGO, limma, DESeq2, cummeRbund, Biostrings, GenomicRanges, Rsamtools, affy

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A big thank you to:

- John Chilton for his help getting the IE codebase merged into Galaxy originally
- Enis Afgan for getting the IEs into Cloudman
- the Galaxy Team for supporting this exciting new feature we've developed.

Q&A

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`github.com/bgruening` `github.com/erasche`

- IPython `http://bit.ly/gxIEipython`
- RStudio `http://bit.ly/gxIErstudio`