From Linux Desktop Tools to Jupyter Notebooks to web-based widgets: Deploying your application on the Hubzero Platform

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Abstract—**Anyone can deploy their unique application on the Hubzero platform - ranging from a novice programmer to a research scientist, to a seasoned software engineer, and everyone in-between. On a Hub, a single instance of the Hubzero science ateway framework, users have access to previously created simulation tools via a modern web browser. Many users throughout the world are developing tools for plant phenotyping, geospatial simulation, nanotechnology, cancer research, among other research focused fields. Like the broad range of potential application developers, Hubzero, i.e. Hubs, have the ability to provide a range of methods to publish an application as well, and it is the goal of this tutorial is to provide the knowledge to "get-started" creating an application on the platform.**

I. INTRODUCTION

During the tutorial, the Hubzero team will walk through entire process to publish a tool on a hub. We encourage everyone to follow along and if you so desire, create your own tool on the provided hub instance with some of your own code. Participants will learn how to develop an application as a Linux tool, a Jupyter Notebooks, and as a web page. At the end of the tutorial, each participant will have to opportunity to present their work with the rest of the group.

II. PRESENTERS

Erich Huebner and Shawn Rice

III. RECOMMENDED SKILL LEVEL

All levels with software programming experience

IV. TECHNICAL PREREQUISITES FOR PARTICIPANTS

- Required: Modern Firefox or Chrome browser, Linux Environment, Linux terminal, SVN or GIT repositories.
- Recommended: Your favorite programming language, Linux system troubleshooting skills.
- Optional: Submitting jobs to HPC clusters, package vs. manual installations.

Tutorial will become progressively more advanced during the allotted time.

V. Tutorial Outline (Tuesday, September 25, 2018 1:30pm – 5:00pm)

A. *Introduction: (1:30pm – 2:00pm)*
- o   Introduction to the Hubzero Platform.
- o   Today's Goals and Activities.
- o   Activity: Create accounts on provided Hubzero instance.
- o   Demonstration: Linux tool.

B. *Modifying and publishing a Jupyter Notebook tool: (2:00pm – 3:00pm)*
- o   Activity: Test the Installed tool.
- o   Activity: Modify the code.
- o   Activity: Resource Page creation.
- o   Activity: Approval Process.
- o   Publishing the Tool.
- o   Review of Tool Resource Page.

C. *Break (3:00pm – 3:30pm)*

D. *Step-by-step:Creating and publishing a Jupyter Notebook Tool: (3:30pm – 4:45pm)*
- o   Discussion: What resources do you need? (tool name, software, database, dataset storage, etc.)?
- o   Activity: Tool Registration.
- o   Activity: Repository Check-out.
- o   Activity: Download Example Notebook and Code Modifications.
- o   Activity: Building the User Application Interface.
- o   Activity: Check-in code to Repository.
- o   Demonstration: Web tool.
- o   Discussion: Who are tool administrators and tool developers what are their responsibilities?
- o   Activity: Installing the tool.
- o   Activity: Testing the Installed tool.
- o   Activity: Resource Page creation.
- o   Activity: Approval Process.
- o   Publishing the Tool.

E. *Wrap-up (4:45pm – 5:00pm)*
- o   Participant Demonstrations.
- o   Additional Demonstrations: RStudio.
- o   What did you learn? Were you able to publish a Jupyter Notebook tool on your own?
- o   Questions?