Geophysical Research Abstracts
Vol. 21, EGU2019-11014, 2019
EGU General Assembly 2019

Bridging the gap between web interfaces and notebooks in the eWaterCycle II project

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A large number of online systems for creating, processing, or analysing scientific data exist. More and more such an online environment is seen as the ideal way to give users quick and easy access to large amounts of data, software, and hardware resources. Often these systems provide a web interface for easy access and exploration of the available data. Recently, notebook environments are becoming popular for providing advanced access to large datasets and HPC resources. When designing and building an online system, developers are often faced with a choice: either provide a ready made user interface, with limited options for users, or provide a notebook environment, requiring advanced knowledge about the system from a user to use effectively, hindering explorative use.

In the eWaterCycle II project (www.ewatercycle.org) we provide a novel solution to this problem: We have created a web interface allowing a user to select models, data, and other options, from a pre-made set. Our system is then capable of generating a notebook specifically for the settings chosen by the user. This notebook can be run by the users to do the requested computation or analysis (in our case running a Hydrological model and providing a first hydrograph). It also forms the perfect basis for a user to start tinkering with the experiment, and change it any way she or he sees fit. This method thus allows novice users to get going quickly, while still allowing advanced users all the freedom they require.

Our system is build on and would not be possible without Free and Open Source Software (FOSS). Our data and model explorer is based on a modified version of Terriajs. The notebook generator builds on OpenAPI to provide a service to create Jupyter notebooks, and in turn calls a JupyterHub service. Of course all our software is available as FOSS, available at https://github.com/eWaterCycle.