

Pi-WRF 3.0: Transition to Jupyter Notebook



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BACKGROUND

Pi-WRF is an education outreach project through the National Center for Atmospheric Research (NCAR) that allows users to run the Weather Research and Forecasting (WRF) model on a Raspberry Pi.

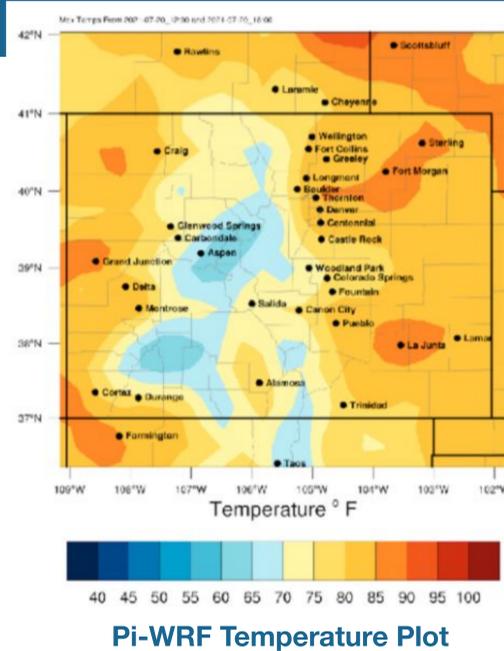


Raspberry Pi



Education Modules

While Pi-WRF enables students to run WRF themselves, developing educational modules related to WRF and numerical weather prediction in general would better facilitate education in the classroom making Pi-WRF even more useful for the classroom.



Pi-WRF Temperature Plot

OBJECTIVES

Community Contributions

Transitioning Pi-WRF to a community driven effort will harness the experience of educators and other contributors. A goal was to **provide a more flexible framework for community contributed module development.**

User Interface

Pi-WRF's user interface is Python Tkinter based GUI which presents various hurdles to development. Consistent with Pi-WRF's transition to a community driven effort, a **shift away from the Tkinter GUI towards a more flexible framework** and user interface became a major objective.



DEVELOPMENT

Jupyter Book was used as a framework for publishing informational content related to Pi-WRF called, 'Pi-WRF Teaching Box'. Jupyter Book is easy to learn as it has lots of available support.



Jupyter Notebook was used in place of Pi-WRF's Tkinter based GUI. For this, we developed our own Jupyter Docker image compatible with Raspberry Pi's ARM architecture. This was then merged into the existing Pi-WRF Docker image.

Ipyleaflet is a Jupyter – LeafletJS bridge we used for the domain selection. With this, the user clicks and drags a marker to select the center of their desired domain. After running the model, the user may access the generated plots.



CONCLUSIONS

Pi-WRF

This new version of Pi-WRF is currently doing what the previous version did. The important difference is the new framework opens Pi-WRF up for community contributed modules. With Jupyter notebook as the UI, Pi-WRF gains:

- Interactivity and an expansion in what is possible.
- Developers now have more convenient access to the underlying model files.
- The notebook is now conducive to building computational narratives around the PiWRF concept.
- It also expands the suite of capabilities across platforms beyond the Raspberry Pi.

ACKNOWLEDGMENTS

We would like to thank the University Corporation of Atmospheric Research (UCAR), the National Center for Atmospheric Research (NCAR), and the National Science Foundation (NSF).