ParFlow Docker Container Install and Setup

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This is a short tutorial that walks through step by step instructions on how to set up and run ParFlow in a Docker container. The screen snapshots are for macOS and may not look exactly like what you see as you walk through this process.

Basic Setup:

1) Download and install Docker for Windows, linux or macOS.

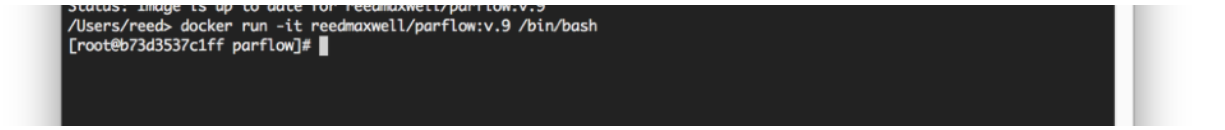
Get Docker here: https://www.docker.com/get-docker

You install like a regular program and it makes the docker commands available in your terminal window. Use CE version, which is free. There are different versions of Docker for different versions of Windows, getting the correct one may require a little googling.

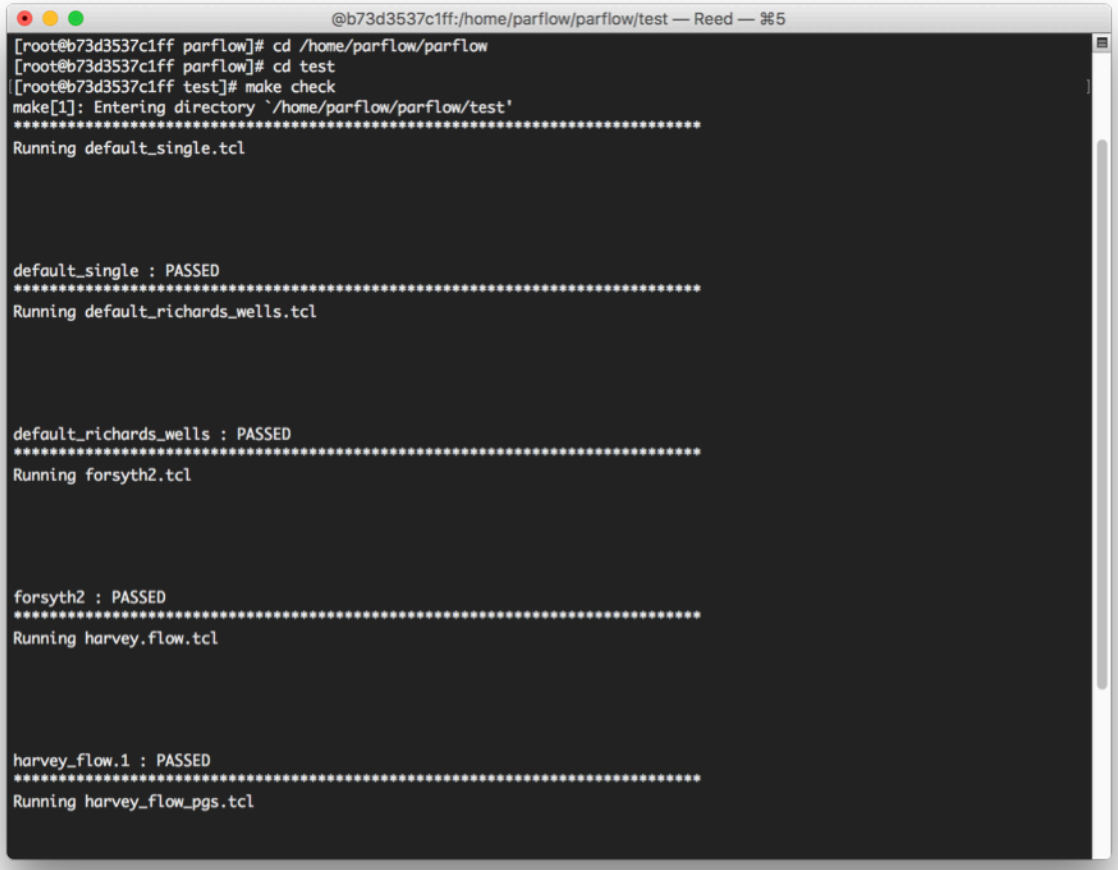
2) Load the ParFlow Docker image
At the command line open a terminal window and type:
docker pull `reedmaxwell/parflow:v.9`

3) run interactively in this docker image
`docker run -it reedmaxwell/parflow:v.9 /bin/bash`

This will put you in the docker environment in the ParFlow directory, it should give you a hex code like thing with the command prompt again



4) Run the regression tests
```
cd /home/parflow/parflow
cd test
make check
```

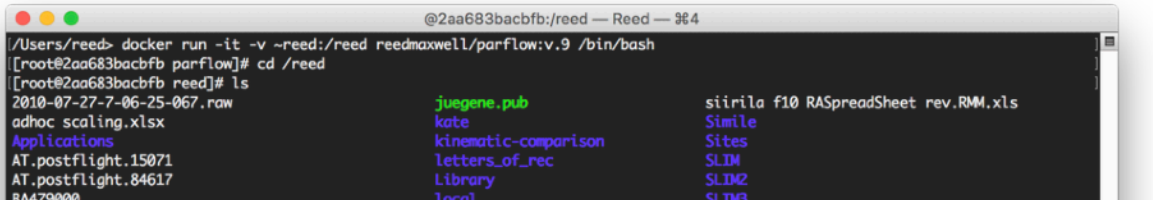


You now have ParFlow installed on your system in the Docker container. To leave the ParFlow Docker container, you type `exit` at the command line.
* NOTE: that it will erase any local files you created or changes you made in the container. This allows you to run ParFlow in the Docker Container and map input and output files to your local file system.

More advanced option:
If you run interactively with the -v option you can point a real directory on your machine to a link (or fake directory) on the container. This means any output goes to your actual drive, allowing you to run VisIt or anything you like to view the output, you can edit the tcl input files outside of the Docker container.

```
docker run –it –v ~reed:/reed reedmaxwell/parflow:v.9 /bin/bash
```

Note that the -v argument maps a real directory on your system (~reed) to a virtual directory in the Docker container (/reed which I just made up, it doesn't have to actually exist yet on the Docker side). On my system this looks like this, I am changing to the /reed directory in the Docker container which is my home directory on my machine.



There is a lot more information about how to do this here:
https://docs.docker.com/v1.13/engine/tutorials/dockervolumes/

From here you can cd to the directory you just mapped (‘cd /reed’) and then navigate to any files on your computer and run ParFlow simulations using ‘tclsh’ the same way you would outside the docker.

Additional resources for Docker for Windows
Video here: https://www.youtube.com/watch?v=6lNQlpCcpKI
Some background here: https://docs.docker.com/docker-for-windows/