

ParFlow Docker Container Install and Setup

Reed Maxwell, rmaxwell@mines.edu
17-July-18

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`

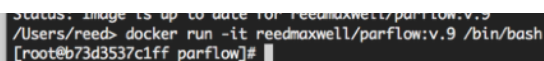


```
Terminal — Reed — 5
Last login: Tue Jul 17 08:29:05 on ttys007
/Users/reed> docker pull reedmaxwell/parflow:v.9
v.9: Pulling from reedmaxwell/parflow
Digest: sha256:20280aa03c8f393eafc866c9138253237bb041a8a59eb995a2284301907005c0
Status: Image is up to date for reedmaxwell/parflow:v.9
/Users/reed>
```

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



```
Status: Image is up to date for reedmaxwell/parflow:v.9
/Users/reed> docker run -it reedmaxwell/parflow:v.9 /bin/bash
[root@b73d3537c1ff parflow]#
```

4) Run the regression tests

```
cd /home/parflow/parflow
cd test
make check
```

```
@b73d3537c1ff:/home/parflow/parflow/test — Reed — %5
[root@b73d3537c1ff parflow]# cd /home/parflow/parflow
[root@b73d3537c1ff parflow]# cd test
[root@b73d3537c1ff test]# make check
make[1]: Entering directory `/home/parflow/parflow/test'
*****
Running default_single.tcl

default_single : PASSED
*****
Running default_richards_wells.tcl

default_richards_wells : PASSED
*****
Running forsyth2.tcl

forsyth2 : PASSED
*****
Running harvey_flow.tcl

harvey_flow.1 : PASSED
*****
Running harvey_flow_pgs.tcl
```

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.

A terminal window titled '@2aa683bacfb:/reed — Reed — %4'. The user runs 'docker run -it -v ~reed:/reed reedmaxwell/parflow:v.9 /bin/bash'. The prompt changes to '[root@2aa683bacfb parflow]#'. The user runs 'cd /reed' and then 'ls'. The output shows a directory listing with files like '2010-07-27-7-06-25-067.raw', 'ad hoc scaling.xlsx', 'Applications', 'AT.postflight.15071', 'AT.postflight.84617', 'BA470000', 'juegene.pub', 'kate', 'kinematic-comparison', 'letters_of_rec', 'Library', 'local', 'siirila f10 RASpreadSheet rev.RMM.xls', 'Simile', 'Sites', 'SLIM', 'SLIM2', and 'SLIM3'.

```
@2aa683bacfb:/reed — Reed — %4
/Users/reed> docker run -it -v ~reed:/reed reedmaxwell/parflow:v.9 /bin/bash
[root@2aa683bacfb parflow]# cd /reed
[root@2aa683bacfb reed]# ls
2010-07-27-7-06-25-067.raw      juegene.pub      siirila f10 RASpreadSheet rev.RMM.xls
ad hoc scaling.xlsx            kate             Simile
Applications                   kinematic-comparison Sites
AT.postflight.15071            letters_of_rec    SLIM
AT.postflight.84617           Library           SLIM2
BA470000                      local            SLIM3
```

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/>