Slides, videos, links and more:
https://github.com/physicell-training/ws2023

Setting up PhysiCell on Linux

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Overview

This document describes the PhysiCell installation on a Debian Linux distribution. If you run on another flavor, please adjust accordingly.

- GCC
- ImageMagick, FFmpeg
- Git (optional)
- PhysiCell

Minimum Setup

- Python3 (miniconda), iPython, PhysiCell DataLoader
- Jupyter (optional)
- PhysiCell Studio

Modeler Setup

- Copasi

Hackathon Setup

GCC (Minimum Setup)

- check if GCC (the gnu compiler collection) is already installed
  ```
  g++ --version
  ```
- if not:
  ```
  sudo apt install build-essential
  ```
- OpenMP (open multi processing) is a feature, used by PhysiCell, that is implemented in GCC.

ImageMagick (Minimum Setup)

ImageMagick is used for making jpeg and gif images from PhysiCell svg image output.

- check if ImageMagick is already installed.

  ```
  magick --version
  ```

  - if ok: wow, you have >= version 7 installed. you are all set!
  - if you receive: `Command 'magick' not found` try:

    ```
    convert --version
    ```

    if ok: you have most probably a version 6 installed, like the most of us!

- if both of these commands not worked:

  ```
  sudo apt install imagemagick
  ```

- the PhysiCell `Makefile` is written for ImageMagick >= version 7, which requires a `magick` command in front of each ImageMagick command (e.g. `magick convert` instead of `convert`).

  you can use sed to fix the Makefiles:

  ```
  sed -i -e 's/magick //g' Makefile

  -i: inplace -e: script expression s: substitute g: global
  ```

FFmpeg (Minimum Setup)

FFmpeg is used for making mp4 movies out of jpeg images.

- check if FFmpeg is already installed.

```
ffmpeg -version
```

- if not:

```
sudo apt install ffmpeg
```

Git (optional, Minimum Setup)

`git` is an alternative way to install the PhysiCell and the Studio source code. The common way is to use `wget`.

- check if git is already installed

```
git --version
```

- if not:

```
sudo apt install git
```

wget & unzip

Check if you have `wget` and `unzip` installed.

-
  ```
  wget --version
  ```
  if not:
  ```
  sudo apt install wget
  ```

-
  ```
  unzip
  ```
  if not:
  ```
  sudo apt install unzip
  ```

PhysiCell (Minimum Setup)

Download PhysiCell and place it where you want to work with this source code.

- Git:

```
git clone git@github.com:MathCancer/PhysiCell.git
```

- Wget:

```
wget https://github.com/MathCancer/PhysiCell/releases/download/1.12.0/PhysiCell_V.1.12.0.zip
unzip PhysiCell_V.1.12.0.zip
```

Test the installation with the biorobots sample project.

```
cd PhysiCell
make biorobots-sample
make
./biorobots
sed -i -e 's/magick //g' Makefile
make jpeg
make movie
```

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Python3 part I (Modeler Setup)

It is up to you to use the python3 that ships with the distribution. The miniconda python3 distribution comes in handy, when you want to run somewhere python3 where you have no root rights.

- `cd` to the folder where you have your manual installed programs.
  e.g. `~/.local/lib/`

- adjust the download according to your CPU architecture (here x86_64)!
  https://conda.io/en/latest/miniconda.html

```
wget https://repo.anaconda.com/miniconda/Miniconda3-py310_23.3.1-0-Linux-x86_64.sh
     chmod 775 Miniconda3-py310_23.3.1-0-Linux-x86_64.sh
     ./Miniconda3-py310_23.3.1-0-Linux-x86_64.sh
```

- adjust the installation location to where your manual installed programs are.
  e.g. `~/.local/lib/miniconda3`

- you wish the installer to initialize Miniconda3!
  `yes`
  `source ~/.bashrc` (or log out and in again).

Python3 part 2 (Modeler Setup)

- The (base) environment should now be activated.
  Check if the python and pip paths point to the installed location

  ```
  which python
  which pip
  ```

- Install the iPython shell:
  ```
  pip install ipython
  ```

- Install the PhysiCell DataLoader:
  ```
  pip install pcdl
  ```

- Optional: install Jupyter:
  ```
  pip install jupyterlab
  ```

PhysiCell Studio (Modeler Setup)

Download the studio and place it where you want to work with this source code.

- Git:

```
git clone git@github.com:PhysiCell-Tools/PhysiCell-Studio.git
```

- Wget:

```
wget https://github.com/PhysiCell-Tools/PhysiCell-Studio/archive/refs/tags/v2.26.5.zip
unzip v2.26.5.zip
```

Put the studio under the PATH:

`cd` to the folder where you have your manual installed binaries. e.g. `~/.local/bin/`

```
echo ‘python /absolute/path/to/PhysiCell-Studio/bin/studio.py $*’ > studio
chmod 775
which studio
```

Install the Qt library dependencies:

```
sudo apt install qtbase5-dev
pip install PyQt5
```

Test the installation with the biorobots sample project.

`cd` to wherever you have PhysiCell installed. Inside the PhysiCell folder:

```
studio
```

PhysiCell Studio should open, loaded with the biorobots settings file.

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Copasi (Hackathon Setup)

- The detailed instructions can be found here: https://copasi.org/Support/Installation/Linux/

- `cd` to the folder where you have your manual installed programs. e.g. `~/.local/lib`
  e.g. `~/.local/lib/`

- download copasi:

```
wget https://github.com/copasi/COPASI/releases/download/Build-278/COPASI-4.40.278-Linux-64bit.sh
```

- Install copasi:

  ```
  chmod 775 COPASI-4.40.278-Linux-64bit.sh
  ./COPASI-4.40.278-Linux-64bit.sh
  ```

  Thereby change the installation directory setting to where you right now are.

- Put copasi under the PATH
  `cd` to the folder where you have your manual installed binaries. e.g. `~/.local/bin/`

  ```
  ln -s /absolute/path/to/installed/CopasiSE
  ln -s /absolute/path/to/installed/CopasiUI
  ```

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- Jupyter (optional, local installation only)
- PhysiCell Studio

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