

RADMEP workshop

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Installation guidelines

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Get the latest G4SEE release!



Options to be able run the G4SEE toolkit on your local computer:

A) Using Docker (recommended) → slides 4–8

(Geant4 is not, but Docker is needed!)

-- OR --

B) Building from source → slide 9

(Docker is not, but Geant4 is needed!)



Docker – 1) Installing Docker

- Docker is an easy-to-install, cross-platform application that enables you to build, share and run **containerized applications** in loosely isolated environments called Docker containers. It's an ideal tool for sharing and running the G4SEE toolkit without building Geant4 or G4SEE from source!



Docker installation steps



[Docker Desktop for Linux](#)



[Docker Desktop for Windows](#)



[Docker Desktop for Mac](#)

Docker – 2) Pulling G4SEE Docker image



- A Docker container uses a custom and isolated file system, provided by a container image. Such an **image** contains everything needed to run the G4SEE application: Linux (Debian 12) environment, Python3.11, all dependencies including Geant4 (11.1.3), compiled executable and source code of G4SEE (v0.5.2), Python scripts, etc.

To download image using *docker pull* via CLI

G4SEE **v0.5.2** release with Geant4 v**11.1.3** (current release):

```
$ docker pull gitlab-registry.cern.ch/g4see/g4see:v0.5.2_G4-11.1.3
```

CLI = Command Line Interface

Docker – 3) Starting a G4SEE container



- ❑ A **container** is a lightweight, runnable instance of an image. You can create, start, stop or delete a container. Everyone gets the same G4SEE container that works in the same way and has the same content inside.
- ❑ Sharing a folder (using docker's `-v` argument) between the host machine and the container is recommended, e.g. to share macro and output files.

To start a container using *docker run* via CLI

```
$ docker run -it -h g4see -v /host/path/to/shared_folder:/home \
gitlab-registry.cern.ch/g4see/g4see:v0.5.2_G4-11.1.3
```

Use a **real, absolute path of host machine** you want to access also from the container!

Docker – 4) Running a G4SEE simulation



- ❑ In the container, copy example macros and create a new folder for outputs.
- ❑ Let's run a short example simulation with G4SEE to test it!

To run a simulation inside the container via CLI

```
root@g4see:/home# cp -r $G4SEE_SRC/examples /home
root@g4see:/home# mkdir output
root@g4see:/home# g4see -h
root@g4see:/home# g4see examples/SRAM_example.mac -o output/
root@g4see:/home# ls -l
```

To quit a container press Ctrl+d keys, to detach it instead press Ctrl+p and Ctrl+q.
To attach again a detached (but running) container use **docker attach** command.

Docker – Displaying visualization/GUI

[optional]

- ❑ You might need to install the *X Window System* on your host machine to forward any visualization or GUI display: [Xming](#) (Win) or [XQuartz](#) (Mac)

To start a container via CLI with visualization/GUI forwarding

On Linux hosts:

```
$ export DISPLAY=:0.0
$ xhost +local:docker
$ docker run -it -h g4see -e DISPLAY=$DISPLAY \
    -v /tmp/.X11-unix:/tmp/.X11-unix \
    -v /host/path/to/shared_folder:/home \
    gitlab-registry.cern.ch/g4see/g4see:v0.5.2_G4-11.0.3
```

For Windows and Mac hosts [find steps here](#)

Depending on your display settings, the **0.0** value might be different for you!

Building G4SEE from source



[if you use G4SEE Docker image you don't need this]

- ❑ [Documentation](#) , no Docker is needed
- ❑ Dependencies: [Geant4](#) ($\geq 11.0.0$), [CMake](#) (≥ 3.17), [Python3](#) (≥ 3.10)

To clone and build G4SEE toolkit via CLI on Linux

Clone recursively the G4SEE GitLab repositories:

```
$ git clone --recursive https://gitlab.cern.ch/g4see/g4see.git  
$ cd g4see
```

In the main repo's root dir., build the app with your Geant4:

```
$ mkdir build && cd build  
$ export G4LIB=<Geant4_install_path>/lib64/Geant4-<version>/  
$ cmake -DGeant4_DIR=$G4LIB ..  
$ make -j <jobs>  
$ sudo make install
```

(the last step is optional)

User support – Links & Contact



- ❑ G4SEE Website: <https://g4see.web.cern.ch>
- ❑ G4SEE Documentation: <https://g4see-docs.web.cern.ch>
- ❑ G4SEE User Forum: <https://g4see-forum.web.cern.ch>
- ❑ G4SEE Main GitLab repository: <https://gitlab.cern.ch/g4see/g4see>

- ❑ G4SEE Developers' email: g4see.toolkit@cern.ch

Contact us for additional help, or if you have any questions about G4SEE!