

Introduction to the Software

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MCC Tutorial

This talk:

<https://mcdwiki.docs.cern.ch/tutorials/cern2023/setup/>

Software Stack

<https://github.com/MuonColliderSoft/>

- **Original software based on iLCSoft.**
 - Many packages forked and modified .
- **Ongoing migration to Key4HEP (details).**
 - Centrally supported software for turnkey HEP with many users.
 - Still using **iLCSoft processors** (backwards compatibility in key4hep).
 - Package management done via **Spack**.
- **Supported OS is AlmaLinux 9**

MCC Software Stack

Generation

- Whizard, MadGraph5_aMC@NLO, <your favourite generator w/ LHE output>

Simulation

- dd4hep

Event Digitization and Reconstruction

- Marlin

This tutorial will show you how to run all three steps.

Ways To Get Software

- **CVMFS (/cvmfs/muoncollider.cern.ch)**
 - **This tutorial.** Compiled for **Alma Linux 9** only.
- **Docker/Apptainer image.**
 - `gitlab-registry.cern.ch/muon-collider/mucoll-deploy/mucoll:2.8-patch2-el9`
 - Still beta, but should be usable for tutorial (non-lxplus users).
- **Compile on your own using Spack.**
 - Instructions: <https://github.com/MuonColliderSoft/mucoll-spack>

Login into lxplus9

Tutorial will be run on **Alma Linux 9 lxplus9** nodes.

```
kkrizka@roof ~ $ ssh your-username@lxplus9.cern.ch
(base) [kkrizka@lxplus914 ~]$ ls
/cvmfs/muoncollider.cern.ch/release/
2.8  2.8-patch1  2.8-patch2
(base) [kkrizka@lxplus914 ~]$
```

Docker/Apptainer image for remote users:

- `gitlab-registry.cern.ch/muon-collider/mucoll-deploy/mucoll:2.8-patch2-el9`

Setup the Environment

1) Create a work directory for today's tutorial.

```
(base) [kkrizka@lxplus914 ~]$ mkdir -p ~/work/mucoll-tutorial-2023
(base) [kkrizka@lxplus914 ~]$ cd ~/work/mucoll-tutorial-2023
(base) [kkrizka@lxplus914 mucoll-tutorial-2023]$
```

2) Source the setup script to load the mucoll software

- Tip: Link to work directory for ease of access.

```
(base) [kkrizka@lxplus914 mucoll-tutorial-2023]$ ln -s
/cvmfs/muoncollider.cern.ch/release/2.8-patch2/setup.sh ./
(base) [kkrizka@lxplus914 mucoll-tutorial-2023]$ source
setup.sh
```

Setup file in container: /opt/setup_mucoll.sh

Tutorial Data Files

3) Clone the tutorial steering files.

```
(base) [kkrizka@lxplus914 mucoll-tutorial-2023]$ git clone  
https://github.com/MuonColliderSoft/mucoll-benchmarks.git
```


Each section of the tutorial will start in your work directory.

```
(base) [kkrizka@lxplus914 mucoll-tutorial-2023]$ pwd
/afs/cern.ch/user/k/kkrizka/work/mucoll-tutorial-2023
(base) [kkrizka@lxplus914 mucoll-tutorial-2023]$ ls *
setup.sh

mucoll-benchmarks:
README.md  analysis  digitisation  generation  plotting
reconstruction  simulation  workflows
```

If you skip a section, available inputs are available!

`/cvmfs/muoncollider.cern.ch/datasets/tutorial_20230705`

Outside of lxplus: https://nbartosi.web.cern.ch/tutorial_20230705