How to use MuGirl

Preparing the work area

Athena root

Decide on an area where you want to run Athena. Make sure there is ample space in the corresponding volume and quota. I use my scratch disk for all athena work. In the following discussion, this area will be refered to as `ATLAS_TEST_AREA`.

Under the root, create a directory for the generic CMT setup. I call it `cmtdir`. In there, put a generic `requirements` file that will enable you to set up any release you want. **In the requirements file you must edit the `ATLAS_TEST_AREA` entry to fit your Atlas root.**

After installing the `requirements` file, and once only, you should run the following in the `cmtdir` directory:

```
source /afs/cern.ch/sw/contrib/CMT/v1r18p20060505/mgr/setup.sh cmt config
```

This will create the setup script `setup.sh`.

Work area

Again under the root, create the directory for the actual work area. Its name is **not** arbitrary, and it depends on whether you are using a formal release or a nightly build.

In both cases, the name of the work area is always `AtlasOffline-<rel>` where `<rel>` is either the name of the release (like `12.0.1`) or the name of the nightly build (like `rel_2`). After setting up (see below), the full path of this directory will be stored in the environment variable `$TestArea`.

Under the work area, create a `run` directory where job options and output files will be created.

Setting up

The setup involves sourcing two scripts, one from the generic `cmtdir` (with arguments referncing the correct release) and one from the official release area. I encapsulate this work in a simple release-dependent script called `init.sh` that I put in the `run` directory of every release setup I have.

In the `init.sh` file you must edit tag to match the release or nightly you are using. For a release, just change the release name. For a nightly, you must enter both the relase framework (such as 12.0.X) and the name of the nightly - so a complete tag may look like `-tag=12.0.X,rel_2,opt`.

For example, after setting up my work area for release 11.5.0: `$TestArea = /afs/cern.ch/user/z/ztarem/scratch0/athena/AtlasOffline-11.5.0`

This script must be sourced in every shell in which you plan to use Athena.

Building MuGirl

If you plan to use the MuGirl that is built into a release, you do not need to build it youself. If, on the other hand, you want to use the latest version of MuGirl, you need to check it out and build it.

1. In you work area, do:
    1. `cmt co Reconstruction/MuonIdentification/MuGirl`
    2. `cmt co Reconstruction/MuonIdentification/MuGirlEvent`
    3. `cmt co Reconstruction/MuonIdentification/MuGirlParticleCreator`

2. In the `run` area, do:
    1. Create a `requirements` file
    2. `cmt br cmt config`
    3. `cmt br gmake`

If you need to check out a specific tag of MuGirl (or any other package) use the following varaint of the checkout command:

```
cmt co -r <rev> <path>
```

Running MuGirl

MuGirl can run in two modes:

1. The standard mode produces an AOD object for the muon candidates, which can be used in analysis programs.
2. The intenal mode produces an NTuple file with all details of the reconstruction.

We created a sample job options file for the internal mode. You can copy it to your run area by executing

`get_files MuGirl_SampleTobOptions.py` (sorry for the typo in the file name)

In that file you should change the following:

1. The number of events (`EvtMax`)
2. The source of data (`PoolRDOInput`)
3. The name of the output NTule file (`MuGirlNTupleFile`)

Then you can run Athena as usual. In order to both see and save the log to a file, I use the following line:

```
athena MuGirl_SampleTobOptions.py |& tee MuGirl.log
```

Station numbering

The NTuple has fields that contain a station number. The correpondance between these numbers and the station names is given here.

Good luck!

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