

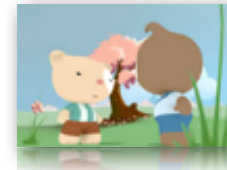
# EOS @ the LPC

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# Is EOS free of limitations?

Is it web scale?



Is it really organic?



# NO !

**EOS**

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<https://indico.in2p3.fr/event/8114/session/2/material/slides/0?contribId=5>

EOS is a file storage system built on XRootD framework

You can (should) always use xrootd commands to interact with EOS content.

```
xrd fs root://cmseos.fnal.gov/ ls /store/user/jjesus/
```

```
xrd cp:
```

- local file to eos
- eos to local file
- eos to eos



way to 'ls'  
EOS areas

Not everything works here, things that you can do with xrd fs are: `ls`, `mkdir`, `rm`, `rmdir`, `cat`, `tail`, some 'query' (checksum for example), `stat`, ...

**In particular, to copy files in and out of EOS use xrdcp.**

- Local file to EOS

```
xrdcp ~/test.txt root://cmseos.fnal.gov//store/user/jjesus/copyOfLocalFile.txt
```

- EOS to local file

```
xrdcp root://cmseos.fnal.gov//store/user/jjesus/E0SFile.txt ~/copyOfE0SFile.txt
```

- EOS to EOS

```
xrdcp root://cmseos.fnal.gov//store/user/jjesus/E0SFile.txt root://  
cmseos.fnal.gov//store/user/jjesus/E0SFile1.txt
```

# <https://twiki.cern.ch/twiki/bin/view/CMSPublic/WorkBookXrootdService#OpenwithRoot>

## Open a file using ROOT

If you are using bare ROOT, you can open files in the xrootd service just like you would any other file:

GOOD!

```
TFile *f =TFile::Open("root://cmsxrootd.fnal.gov///store/mc/SAM/GenericTTbar/GEN-SIM-RECO/CMSSW_5_3_1_START53_V5-v1/0013/CE4D66EB-5AAE-E111-96D6-003048D37524.r
```

Note the prefix of the root://cmsxrootd.fnal.gov/ (or any other redirector name name) in front of your LFN. This returns a TFile object, and you can proceed normally. The same is true for FWLite environment.

**BEWARE:** do **not** use the apparently equivalent syntax, which is known not to work :

```
TFile("root://cmsxrootd.fnal.gov//store/foo/bar")
```

```
TFile("root://cmsxrootd.fnal.gov//store/foo/bar")
```

BAD!

## Open a file in CMSSW

You want to edit the PoolSource line in your python configuration file to point directly at the Xrootd service, instead of using a generic LFN.

For example, this might be the "before" picture:

```
process.source = cms.Source("PoolSource",
                             #
                             # replace 'myfile.root' with the source file you want to use
                             fileName = cms.untracked.vstring('/store/myfile.root')
                             )
```

Here's the same file, but accessed through the Xrootd Service by simply adding prefix root://cmsxrootd.fnal.gov/ :

```
process.source = cms.Source("PoolSource",
                             #
                             # replace 'myfile.root' with the source file you want to use
                             fileName = cms.untracked.vstring('root://cmsxrootd.fnal.gov//store/myfile.root')
                             )
```

Note that if your site has fallback configured, as described [ConfiguringFallback][here], you don't even need to make the above change -- CMSSW will automatically read the file from a remote site!

# Example



```
//  
// main.cpp  
//  
// Created by Jesus Orduna on 9/18/15.  
// Copyright © 2015 Brown University. All rights reserved.  
//  
  
#include <iostream>  
#include "TFile.h"  
#include "TTree.h"  
  
int main(int argc, const char * argv[]) {  
    TFile *theFile = TFile::Open("root://cmsxrootd.fnal.gov///store/user/cmsdas/2016/jjesus/MC13TeV_TTJets.root");  
    TTree *theTree = (TTree*)theFile->Get("data");  
    std::cout << "The number of entries " << theTree->GetEntries() << std::endl;  
    return 0;  
}
```

How do I know my quota as a user:

```
eos root://cmseos.fnal.gov/ quota | grep -a5 jjesus
```

(replace my username)

What about a group I belong to:

```
eos root://cmseos.fnal.gov/ quota | grep -a5 lpctau
```

(replace the group name for your favorite one).

Live demo



# DONT'S

Don't:

```
ls /eos/uscms/store/user/...
```

Particularly bad for directories with large amounts of files. Don't do it interactively (it will hang) but most of all NEVER in a job.

Be a good citizen and do it as shown in slide 3.

Don't:

```
cp localFile /eos/uscms/store/user/...  
cp /eos/uscms/store/user/... localFile  
cp /eos/uscms/store/user/... /eos/uscms/store/user/...
```

Be a good citizen and do it as shown in slide 4.

When opening ROOT files, `/eos/uscms/` **should not** appear:

```
TFile *theFile = TFile::Open(“/eos/uscms/store/...”);
```



**BAD!**

neither interactively nor from a job, just don't do it.

Be a good citizen and do it as shown in slide 5 (go the the link on the slide for more info).