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TFC Changes necessary for Xrootd

There needs to be a slight TFC change for Xrootd monitoring. In order to properly test if a site is working with the redirector, we need the ability to force requests to a given site; we accomplish this through crafty TFC mappings.

We request the following LFN:

```
/store/test/xrootd/$SITENAME/$LFN
```

(where \$SITENAME is your CMS site name, such as T2_US_Nebraska) map to the same local file as \$LFN. For example, at Nebraska, the following two LFNs are equivalent:

```
/store/test/xrootd/T2_US_Nebraska/store/mc/JobRobot/RelValProdTTbar/GEN-SIM-DIGI-RECO/MC_3XY_V24_
/store/mc/JobRobot/RelValProdTTbar/GEN-SIM-DIGI-RECO/MC_3XY_V24_JobRobot-v1/0001/56E18353-982C-DF
```

Because each site will use a different prefix, we now have a unique namespace we can query at each site - without having to produce a site-specific dataset!

You can find a copy of your TFC in the COMP GIT in SITECONF/\$SITENAME/PhEDEx/storage.xml; you should already be using this in your xrootd.cfg in a line like this:

```
oss.namelib /usr/lib64/libXrdCmsTfc.so file:/etc/xrootd/storage.xml?protocol=hadoop
```

Here, /etc/xrootd/storage.xml is the location of the TFC you will be editing and hadoop is the protocol you'll make the change for.

Making the TFC change

The simplest case is if the protocol you use is not chained to another protocol. In this case, you just need to add a more-specific testing line prior to the default one. Here's the "before" picture for Nebraska:

```
<lfm-to-pfn protocol="hadoop" destination-match=".*" path-match="/+store/(.*)" result="/user/us
```

And the "after" picture:

```
<lfm-to-pfn protocol="hadoop" destination-match=".*" path-match="/+store/test/xrootd/T2_US_Nebraska/store/(.*)" result="/user/us  
<lfm-to-pfn protocol="hadoop" destination-match=".*" path-match="/+store/(.*)" result="/user/us
```

A common usage pattern is to chain specific protocols to a generic one called "direct". For example,

```
<lfm-to-pfn protocol="direct" path-match="/+store/(.*)" result="/user/uscms01/pnfs/unl.edu/data  
<lfm-to-pfn protocol="hadoop" chain="direct" path-match="(.*)" result="dcap://lcgsedr02.jinr.ru
```

In this case, you'll want to add a new, more-specific "direct" rule:

```
<lfm-to-pfn protocol="direct" path-match="/+store/test/xrootd/T2_US_Nebraska/store/(.*)" result="/user/us  
<lfm-to-pfn protocol="direct" path-match="/+store/(.*)" result="/user/uscms01/pnfs/unl.edu/data  
<lfm-to-pfn protocol="hadoop" chain="direct" path-match="(.*)" result="dcap://lcgsedr02.jinr.ru
```

We **strongly** recommend keeping only one version of your `storage.xml` at your site; integrate any changes back into the one used for PhEDEx and CMSSW and commit it to GIT.

Testing the change

Admittedly, TFC manipulation is somewhat of a black art - even for seasoned CMS admins. You'll want to test things out. After performing the change, restart the `xrootd` and `cmsd` services. As root:

```
service xrootd restart
service cmsd restart
```

Note: after any configuration changes, get in the habit of restarting both `xrootd` and `cmsd`! Then, assuming the JobRobot dataset is at your site, you should get the same results from both of the following commands:

```
xrdcp -f root://$HOSTNAME//store/mc/JobRobot/RelValProdTTbar/GEN-SIM-DIGI-RECO/MC_3XY_V24_JobRobo
xrdcp -f root://$HOSTNAME//store/test/xrootd/$SITENAME/store/mc/JobRobot/RelValProdTTbar/GEN-SIM-
```

Similarly, the following command should force a transfer to come from your site:

```
xrdcp -f root://xrootd.unl.edu//store/test/xrootd/$SITENAME/store/mc/JobRobot/RelValProdTTbar/GEN-
```

If you suspect protocol is wrongly defined in the `storage.xml`, PHEDEX TestCatalog tool from PHEDEX/Utilities may come in handy for debugging. Troubleshooting steps you can find [here](#).

Replace `xrootd.unl.edu` with `xrootd-itb.unl.edu` as necessary.

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