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Accessing files on SEs from ROOT

Castor and DPM

A bit of history

Following a mail exchange with Flavia and discussion in the Architect's Forum about being able to use a universal libshift.so that would serve Castor and DPM, I have made a few tests.

Just a bit of history for those who didn't follow the saga: at Mumbai (February 2006!!), it was decided to provide with highest priority a universal libshift that would then steer to Castor or DPM library depending on the flavour of the backend. In August 2006 the WLCG MB agreed the proposed timeline to have it as a prototype in October 2006 and released soon afterwards. In the mean time the EGEE TCG (that is defining the priorities of developments in EGEE) decided to set a very low priority on this point and essentially everything stopped (at least officially).

Now the problem is to be able to set up an application that defines an environment suitable for reading either files on a Castor or a DPM backend. The solution used by CMS (?) and ATLAS on sites supporting DPM is to create a soft link (on the LD_LIBRARY_PATH) called libshift.so.2.1 pointing to libdpm.so. Of course this is cumbersome as the environment setting script has to know a priori whether it will access files through DPM or Castor. LHCb doesn't have (yet) the problem as we don't use site with DPM. However NIKHEF proposes us a disk1tape0 storage at NIKHEF (rather than dCache at SARA) based on DPM. Hence before embarking on a migration we have to test it out...

It was suggested by Flavia to go through the ROOT gfal plugin since gfal is able to steer the appropriate library depending on an environment variable LCG_RFIO_TYPE. She kindly set up an SPath for LHCb tests on a DPM instance on the CERN PPS. Thanks!

I used this opportunity for testing again all tURLs of the creation against ROOT... I used the file

`/castor/cern.ch/grid/lhcb/production/DC06/phys-v2-lumi2/00001650/DST/0000/00001650_00000055_5.dst` that is on the lhcbdata pool (i.e. `srm-durable-lhcb.cern.ch`) as well as on the default pool (`srm.cern.ch`).

For LFN tests, I used the file

`lfn:/grid/lhcb/production/DC06/phys-v3-lumi2/00001857/RDST/0000/00001857_00000024_1.rdst` that has its replica defined on `srm.cern.ch` while the former file is registered in the LFC as `srm-durable-lhcb.cern.ch`

Results of the tests

Originally for this test, I used an SLC3 LXPLUS node, ROOT 5.14.00e and gfal 1.7.7 as installed in the AA. On SLC4, I used a GFAL plugin kindly built by Gerri on May 23rd for ROOT 5.14.00f and gfal 1.9.0 as it didn't make it to the official release.

On June 22nd, I remade the tests with with ROOT 5.14.00f, gfal 1.9.0, DPM 1.6.5 on both SLC3 and SLC4 platforms. The gfal plugin of ROOT has been added by Bertrand to the released 5.14.00f.

```
/afs/cern.ch/sw/lcg/external/root/5.14.00f/slc3_ia32_gcc323/root/lib
/afs/cern.ch/sw/lcg/external/Grid/gfal/1.9.0/slc3_ia32_gcc323/lib
/afs/cern.ch/sw/lcg/external/Grid/globus/4.0.3-VDT-1.6.0/slc3_ia32_gcc323/globus/lib
/afs/cern.ch/sw/lcg/external/Grid/DPM/1.6.5/slc3_ia32_gcc323//lib
/afs/cern.ch/sw/lcg/external/Grid/dm-util/1.5.1/slc3_ia32_gcc323/lib
/afs/cern.ch/sw/lcg/external/Grid/voms-api-c/1.7.16/slc3_ia32_gcc323/lib
/afs/cern.ch/sw/lcg/external/Grid/LFC/1.6.5/slc3_ia32_gcc323/lib
/afs/cern.ch/sw/lcg/external/Grid/lcg-dm-common/1.6.5/slc3_ia32_gcc323/lib
/afs/cern.ch/sw/lcg/external/Grid/cgsi-gsoap/1.1.15/slc3_ia32_gcc323/usr/lib
```

```
/afs/cern.ch/sw/lcg/external/root/5.14.00f/slc4_ia32_gcc34/root/lib
```

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```
/afs/cern.ch/sw/lcg/external/Grid/gfal/1.9.0/slc4_ia32_gcc34/lib
/afs/cern.ch/sw/lcg/external/Grid/globus/4.0.3-VDT-1.6.0/slc4_ia32_gcc34/globus/lib
/afs/cern.ch/sw/lcg/external/Grid/DPM/1.6.5/slc4_ia32_gcc34//lib
/afs/cern.ch/sw/lcg/external/Grid/dm-util/1.5.1/slc4_ia32_gcc34/lib
/afs/cern.ch/sw/lcg/external/Grid/voms-api-c/1.7.16/slc4_ia32_gcc34/lib
/afs/cern.ch/sw/lcg/external/Grid/LFC/1.6.5/slc4_ia32_gcc34/lib
/afs/cern.ch/sw/lcg/external/Grid/lcg-dm-common/1.6.5/slc4_ia32_gcc34/lib
/afs/cern.ch/sw/lcg/external/Grid/cgsi-gsoap/1.1.15/slc4_ia32_gcc34/usr/lib
```

The results are identical on SLC3 and SLC4.

Tests on srm-durable-lhcb

Returns a tURL of the form:

```
rfio://castorlhcb:9002/?svcClass=lhcbdata&castorVersion=2&path=//castor/cern.ch/grid/lhcb/product
and similarly for the rootd protocol (rfio: replaced by castor:)
```

- Direct call: OK

```
root [6] f=TFile::Open("rfio://castorlhcb.cern.ch:9002/?svcClass=lhcbdata&castorVersion=2&path=//castor/cern.ch/grid/lhcb/product")
(class TFile*)0x9b0a3d0
```

- Through gfal: not OK

```
root [7] f=TFile::Open("gfal:rfio://castorlhcb.cern.ch:9002/?svcClass=lhcbdata&castorVersion=2&path=//castor/cern.ch/grid/lhcb/product")
SysError in
```

- Through gfal using the SURL: not OK

```
root [8] f=TFile::Open("gfal:srm://srm-durable-lhcb.cern.ch:8443/castor/cern.ch/grid/lhcb/product")
SysError in
```

Test of gfal 1.9.2: almost OK

After we were told gfal 1.9.2 was fixing the problems observed above, Oliver installed it on lcg/external and the test was performed again and it works better but not quite yet (gfal: doesn't work:

```
root [4] f=TFile::Open("gfal:srm://srm-durable-lhcb.cern.ch:8443/castor/cern.ch/grid/lhcb/product")
(class TFile*)0x9076dd0
root [5] f=TFile::Open("gfal:rfio://castorlhcb:9002/?svcClass=lhcbdata&castorVersion=2&path=//castor/cern.ch/grid/lhcb/product")
SysError in
```

Tests on srm.cern.ch

Returns a tURL of the form (note the different number of slashes)

```
rfio:///castor/cern.ch/grid/lhcb/production/DC06/phys-v2-lumi2/00001650/DST/0000/00001650_000000
castor:/castor/cern.ch/grid/lhcb/production/DC06/phys-v2-lumi2/00001650/DST/0000/00001650_0000005
```

- Direct call: OK

```
root [9] f=TFile::Open("rfio:///castor/cern.ch/grid/lhcb/production/DC06/phys-v2-lumi2/00001650/DST/0000/00001650_0000005")
(class TFile*)0x9e99a20
root [10] f=TFile::Open("castor:/castor/cern.ch/grid/lhcb/production/DC06/phys-v2-lumi2/00001650/DST/0000/00001650_0000005")
Info in
```

Note that ROOT accepts the following number of slashes: 1, 3, 4, 5 (but not 2) for both protocols

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`srm-durable-lhcb.cern.ch`. Note that `gfal` supports less syntaxes for the `tURL` as the native `RFIO` or `ROOTD` plugins (only one `/` is not accepted)

- Using either a `libshift.so.2.1` link to `libdpm.so` or setting the `LCG_RFIO_TYPE` variable allows us to read a DPM file (in the first case with both `rfio:` and `gfal:rfio:`, in the second case only with `gfal:rfio:`)

Note that ATLAS are conducting similar tests and their results can be found [here](#)

-- Main.phicharp - 22 May 2007

This topic: LHCb > FileAccess

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