



for Dirac and LHCb

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Dirac in LHCb

- Ganga provides integration with the Dirac system
- The Dirac backend allows jobs to be seamlessly submitted to Dirac

```
j = Job(backend=Dirac(), application=Root())
```

```
# How do I set the CPU time for my job?
```

```
help(j.backend) # I use CPUtime
```

```
j.backend.CPUtime = 6000
```

Data splitters

- Ganga provides a number of splitters
- `SplitByFiles` works intelligently for Dirac jobs
 - It will try to send jobs to sites where the data is

```
j = Job(backend=Dirac(), application=Root())
```

```
j.splitter = SplitByFiles()
```

```
j.splitter.filesPerJob = 10
```

Output data

- Large output files can be saved directly to Dirac storage

```
j = Job(backend=Dirac())
```

```
j.outputfiles = [DiracFile('largefile.root')]
```

- Wildcards work too

```
j = Job(backend=Dirac())
```

```
j.outputfiles = [DiracFile('*.*root'),  
                 SandBoxfile('*.*log')]
```

Getting data from Dirac

- `DiracFiles` have a `get()` method to download an individual file

```
j.outputfiles[0].get()
```

- Or the `Dirac` backend has `getOutputData()` to download them all

```
j.backend.getOutputData()
```

- Remove files from `Dirac` with `remove()`

```
j.outputfiles[0].remove()
```

Uploading files

- Can also upload files to Dirac storage through Ganga using `put()`

```
d = DiracFile('data.root')  
d.put()
```

- Set a specific local directory with `localDir`

```
d = DiracFile('data.root')  
d.localDir = '/data/lhcb/user/m/mwilliam'
```

- Downloading and removing works as expected

```
d.get()  
d.remove()
```

Using existing LFNs

- A `DiracFile` can be pointed at an existing LFN to represent it

```
d = DiracFile()  
d.lfn = '/lhcb/user/m/mwilliam/input.root'
```

- `getMetaData()` will populate the metadata such as GUID and sites

```
d.getMetaData()
```

- `get()` will download the file as usual

```
d.get()
```

LHCb extensions

- LHCb adds:
 - Applications for the suite of LHCb analysis tools (such as DaVinci, GaudiPython, Bender etc.)
 - `LHCbDataset` – provides some LHCb-specific abilities to input data
 - A number of task- and application-specific splitters (Gauss, OptionsFile)
 - `LHCbFileMerger` – merge DaVinci DST files

Bookkeeping integration

- In LHCb, Ganga is also integrated with the bookkeeping tools

```
j.inputdata = browseBK() # opens BK browser
```

The screenshot displays two windows from the LHCb Bookkeeping browser. The left window, titled 'Feicim - LHCb Bookkeeping browser', shows a hierarchical tree view of simulation conditions. The right window, titled 'Feicim FileDialog', shows a table of event data with columns for File Name, Event Stat, File Size, Creation Date, Job Start, Job End, Data Quality, Run Number, and Fill. The 'Nb of Files/Events' folder in the tree view and the 'Save Files...' button in the FileDialog are circled in red.

File Name	Event Stat	File Size	Creation Date	Job Start	Job End	Data Quality	Run Number	Fill
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000062_2.dst	11804	4708742295		2008-07-10 13:29:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000055_2.dst	11763	4714322411		2008-07-03 19:42:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000054_2.dst	11864	4757832425		2008-07-03 19:38:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000053_2.dst	11943	4763801918		2008-07-01 03:47:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000048_2.dst	11911	4776994063		2008-07-01 10:05:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000047_2.dst	11862	4743822473		2008-06-27 11:30:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000046_2.dst	4245	1701121388		2008-06-25 03:34:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000045_2.dst	5634	2252421031		2008-06-25 04:15:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000044_2.dst	6228	2489809890		2008-06-25 05:01:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000042_2.dst	8895	3545802875		2008-07-06 02:23:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000041_2.dst	10426	4131097166		2008-06-28 00:15:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000038_2.dst	11928	4731710255		2008-06-22 10:20:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000037_2.dst	11792	4758761336		2008-06-22 09:26:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000036_2.dst	11845	4702679097		2008-06-21 17:25:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000035_2.dst	11807	4719096713		2008-06-21 17:32:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000034_2.dst	11899	4754848537		2008-06-21 17:27:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000033_2.dst	11853	4734547831		2008-06-21 17:58:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000032_2.dst	11773	4694721183		2008-06-21 17:01:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000031_2.dst	11969	4801891806		2008-06-21 17:02:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000030_2.dst	11827	4766079080		2008-06-21 17:17:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000029_2.dst	11901	4776852995		2008-06-21 17:16:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000028_2.dst	11897	4732465404		2008-06-21 16:33:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000026_2.dst	11771	4693307576		2008-06-21 19:42:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000025_2.dst	11998	4801028127		2008-06-21 19:57:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000022_2.dst	11812	4672882585		2008-06-21 21:12:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000021_2.dst	11878	4726713350		2008-06-21 20:44:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000014_2.dst	11882	4749959740		2008-07-06 07:18:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000013_2.dst	11758	4714462925		2008-07-06 05:15:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000012_2.dst	11834	4717987720		2008-07-06 07:15:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000011_2.dst	11835	4726631714		2008-07-06 06:40:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000010_2.dst	11804	4734510058		2008-07-06 06:20:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000009_2.dst	11744	4691120061		2008-06-21 17:26:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000008_2.dst	11975	4779399961		2008-06-21 16:26:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000007_2.dst	11795	4699877464		2008-06-21 17:21:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000006_2.dst	11855	4685946879		2008-06-21 16:26:00		UNCHECKED		
/lhcb/production/DC06/v1r0/00002147/DST/0000/00002147_00000005_2.dst	11836	4748178450		2008-06-21 16:43:00		UNCHECKED		

Dirac usability

- Within Ganga, Dirac is entirely split from LHCb
- It is possible to use Dirac even for non-LHCb experiments (as long as you have a Dirac instance)
- Gaudi is also split so it is possible for other experiments to use Gaudi software with Ganga