

## GammaLib - Bug #1717

### Python segfault during GFilename.is\_fits() using OpenMP

02/28/2016 12:35 PM - Mayer Michael

<b>Status:</b>	Closed	<b>Start date:</b>	02/28/2016
<b>Priority:</b>	Normal	<b>Due date:</b>	
<b>Assigned To:</b>	Knödlseher Jürgen	<b>% Done:</b>	100%
<b>Category:</b>		<b>Estimated time:</b>	0.00 hour
<b>Target version:</b>	1.1.0		

#### Description

I have a problem on the Zeuthen batch farm (Scientific Linux 6.6, Python 2.6.6, cfitsio: 3.340):  
Running ctlike stops with a segmentation fault from time to time. There is no rule when it might happens:

```
$ ctlike debug=yes
```

```
Input event list, counts cube or observation definition XML file [myinobs.xml]
```

```
Input model XML file [inmodel.xml]
```

```
Output model XML file [outmodel.xml]
```

```
...
```

```
2016-02-28T10:58:14: +=====+
```

```
2016-02-28T10:58:14: | Maximum likelihood optimisation |
```

```
2016-02-28T10:58:14: +=====+
```

```
[1] 106012 segmentation fault ctlike debug=yes
```

I have tested it with HESS data and also with simulated CTA data (running csobsdef, ctobssim, ctselect, ctlike in a row). The problem occurs in both cases.

Here is the backtrace from gdb:

```
(gdb) backtrace
```

```
#0 0x0000003e8d867404 in fread () from /lib64/libc.so.6
```

```
#1 0x00007fff731fcb3 in file_read ()
```

```
from /afs/ihf.de/group/hess/scratch/software/stable/cfitsio/sl6/cfitsio-3.340-gcc-4.8.1/lib/libcfitsio.so
```

```
#2 0x00007fff731a474 in fread ()
```

```
from /afs/ihf.de/group/hess/scratch/software/stable/cfitsio/sl6/cfitsio-3.340-gcc-4.8.1/lib/libcfitsio.so
```

```
#3 0x00007fff73117ef in ffdrc ()
```

```
from /afs/ihf.de/group/hess/scratch/software/stable/cfitsio/sl6/cfitsio-3.340-gcc-4.8.1/lib/libcfitsio.so
```

```
#4 0x00007fff731dd07 in fopen ()
```

```
from /afs/ihf.de/group/hess/scratch/software/stable/cfitsio/sl6/cfitsio-3.340-gcc-4.8.1/lib/libcfitsio.so
```

```
#5 0x00007fff7ae44b1 in GFilename::is_fits() const () at GFilename.cpp:267
```

```
#6 0x00007fff7ae4551 in GFilename::exists() const () at GFilename.cpp:226
```

```
#7 0x00007fff7c7641b in GCTAEventList::fetch() const () at src/GCTAEventList.cpp:646
```

```
#8 0x00007fff7c77029 in GCTAEventList::operator[](int const&) const () at src/GCTAEventList.cpp:215
```

```
#9 0x00007fff7bbcaa9 in GObservation::likelihood_poisson_unbinned(GModels const&, GVector*, GMatrixSparse*, double*) const () at GObservation.cpp:924
```

```
#10 0x00007fff7bbafee in GObservation::likelihood(GModels const&, GVector*, GMatrixSparse*, double*) const () at GObservation.cpp:197
```

```
#11 0x00007fff7bb991b in GObservations::likelihood::eval () at GObservations_likelihood.cpp:270
```

```
#12 0x00007fff70e835a in gomp_thread_start () at ../../gcc-4.8.1/libgomp/team.c:115
```

```
#13 0x0000003e8e407aa1 in start_thread () from /lib64/libpthread.so.0
```

```
#14 0x0000003e8d8e893d in clone () from /lib64/libc.so.6
```

So there seems to be some problem with the file I/O access. I don't see this problem on my Mac where I don't have OpenMp. Therefore, in my view, it could be a problem with parallel access to some FITS files?

I have also tried to compile gammalib and ctools without OpenMP support (using the configure option --disable-openmp). Then everything works smoothly which supports the above hypothesis.

I also have the feeling that the larger the observation container, the more likely the code will fail. Could someone reproduce this error

on a system that supports OpenMP?  
Here is the command sequence:

```
$ csobsdef
Input pointing definition file [pnt.dat]
Output observation definition XML file [obs.xml]
Pointing duration (seconds) [1800.0]

$ ctobssim inobs=obs.xml
Calibration database [prod2]
Instrument response function [South_50h]
Lower energy limit (TeV) [0.5]
Upper energy limit (TeV) [50]
Radius of FOV (degrees) (0-180) [3.0]
Input model XML file [CTOOLS/share/models/crab.xml]
Output event data file or observation definition XML file [sim_events.xml]

$ ctselect usepnt=yes usethres=DEFAULT
Input event list or observation definition XML file [sim_events.xml]
Radius of ROI (degrees) (0-180) [2.5]
Start time (CTA MET in seconds) [INDEF]
Lower energy limit (TeV) [0.6]
Upper energy limit (TeV) [20.0]
Output event list or observation definition XML file [sel_obs.xml]

$ ctlike
Input event list, counts cube or observation definition XML file [sel_obs.xml]
Input model XML file [CTOOLS/share/models/crab.xml]
Output model XML file [optmodel.xml]
```

The input file pnt.dat is attached.

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## History

### #1 - 02/28/2016 02:35 PM - Knödlseider Jürgen

- Status changed from New to Feedback
- Assigned To set to Knödlseider Jürgen
- Target version set to 1.1.0
- % Done changed from 0 to 100

I put the relevant code in a critical OMP zone which should make this thread safe.

Code is in devel.

Can you check if this solves your problem?

### #2 - 02/28/2016 06:04 PM - Mayer Michael

Thanks for the quick feedback. I have tested the new code and everything works fine now.

### #3 - 02/29/2016 09:58 PM - Knödlseider Jürgen

- Status changed from Feedback to Closed

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## Files

pnt.dat	655 Bytes	02/28/2016	Mayer Michael
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