# ctools - Bug #1370

## ctools 00-08-00 'make check' errors and failed test macros

11/22/2014 07:58 PM - Farnier Christian

| | | | |
|---|---|---|---|
| **Status:** | In Progress | **Start date:** | 11/22/2014 |
| **Priority:** | High | **Due date:** | |
| **Assigned To:** | Knödlseder Jürgen | **% Done:** | 50% |
| **Category:** | | **Estimated time:** | 0.00 hour |
| **Target version:** | | | |

**Description**

While compiling the latest version of gammalib and ctools (git version from 2014/11/21), everything get installed but ctools does not pass the installation test 'make check'

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- ctools unit testing * **********
  Test ctobssim functionality: ..... ok
  Test ctobssim on observation container: .... ok
  Test ctselect functionality: E.. NOK
  Test ctbin functionality: ... ok
  Test ctlike functionality: ... ok
  Test cttsmap functionality: ... ok
  Test ctmodel functionality: ... ok
  Test ctskymap functionality: ... ok
  Test ctexpcube functionality: ... ok
  Test ctpsfcube functionality: ... ok
  Test ctbkgcube functionality: ... ok
  Test ctcubemask functionality: ... ok
  Test ctbutterfly functionality: ... ok
  Test unbinned pipeline with FITS file saving: .E.. NOK
  Test unbinned in-memory pipeline: .E.. NOK
  FAIL: test_python.py ==========
  1 of 3 tests failed
  Please report to jurgen.knodlseder@irap.omp.eu ==========
  make[2]: *** [check-TESTS] Erreur 1**
  **make[2]: quittant le répertoire « /raid/cfarn/SOFT/GAMMALIB/20141121/ctools/test »**
  **make[1]: [check-am] Erreur 2**
  **make[1]: quittant le répertoire « /raid/cfarn/SOFT/GAMMALIB/20141121/ctools/test »**
  **make:** ** [check-recursive] Erreur 1

In addition, some 'examples' macros fail:

./make_binned_analysis.py

---

- CTA binned analysis scripts * **********
  ... this script will take 1-2 minutes

Executable analysis pipeline: ==========
Simulated events (2.96 CPU seconds)
Binned events into counts map (2.56 CPU seconds)
Maximum likelihood fitting (12.52 CPU seconds)
Total wall time elapsed: 7.0 seconds
Total CPU time used ...: 18.04 seconds

In memory analysis pipeline: ==========
Simulated events (2.32 CPU seconds)
Binned events into counts map (2.19 CPU seconds)
Maximum likelihood fitting (18.87 CPU seconds)
Total wall time elapsed: 10.0 seconds
Total CPU time used ...: 23.38 seconds

Make plots (using matplotlib): ==============================
/usr/lib64/python2.6/site-packages/matplotlib/backends/backend_gtk.py:621: DeprecationWarning: Use the new widget gtk.Tooltip
self.tooltips = gtk.Tooltips()
Traceback (most recent call last):
File "./make_binned_analysis.py", line 422, in <module>
pipeline_v2()
File "./make_binned_analysis.py", line 232, in pipeline_v2
plot_counts(bin.obs())
File "./make_binned_analysis.py", line 275, in plot_counts
ebounds = cube.ebounds()
AttributeError: 'SwigPyObject' object has no attribute 'ebounds'

Snapshot of the faulty section of the code:  # Loop over observations
for obs in observations:

1. Get event cube
   cube = obs.events()

1. Create energy axis
   energy  = []
   ebounds = cube.ebounds()

Now "cube" do not have ebounds attribute anymore and isn't iterative (next complaint in the script at line 282: for bin in cube:).

### History

#### #1 - 11/24/2014 09:09 AM - Knödlseder Jürgen

*- Status changed from New to In Progress*

*- Assigned To set to Knödlseder Jürgen*

*- Target version set to 1.0.0*

*- % Done changed from 0 to 50*

I corrected the make_binned_analysis.py and make_unbinned_analysis.py scripts.

Concerning the test script errors you encountered, could you please post the file test/reports/ctools.xml?

Could you also check if after removing all files in your ~/pfiles folder the make check errors persist?

#### #2 - 11/24/2014 10:47 AM - Farnier Christian

*- Status changed from In Progress to Closed*

*- % Done changed from 50 to 100*

Thanks for your help. This fully solved the issue.

#### #3 - 11/24/2014 10:57 AM - Knödlseder Jürgen

*- Status changed from Closed to Feedback*

What did you do? Delete the files in the ~/pfiles folder? (we want to keep track of the solutions so that they could go into a "Known Problems" section).

#### #4 - 11/24/2014 11:13 AM - Farnier Christian

*- File ctools.xml added*

Sorry, I was not explicit.

No, I did not deleted the ~/pfiles folder, I wanted to do it step by step. So, I simply updated the ctools directory:
git remote update -p
git pull

and tried again to run the make_binned_analysis.py script. And it works fine now.

As for the report file, I have attached it now. As indeed this is still pending, I shouldn't have changed the completion level to 100, sorry for the mess.

#### #5 - 11/24/2014 11:44 AM - Knödlseder Jürgen

*- Status changed from Feedback to Closed*

No worries.

Unfortunately the XML file is not very informative, some exceptions occurred. This was maybe indeed due to obsolete pfiles, but they should get updated when we re-run the ctools configuration script (which I guess is done when you connect to a new terminal when you have added the ctools setup script to your .bashrc file).

I think we can close this now.

#### #6 - 11/24/2014 02:58 PM - Farnier Christian

Sorry again, I should have said that the fix only applies to the ploting (and therefore access of the energy boundaries), which is the initial problem I reported.

The 'make check' problem persists, even when removing the pfile/ directory.

For completeness, the source of the problem is the run() function of test_ctselect.py example:

```
>>> select["infile"].filename("data/crab_events.fits")
>>> select["outfile"].filename("selected_events.fits")
>>> select["ra"].real(83.63)
>>> select["dec"].real(22.01)
>>> select["rad"].real(3.0)
>>> select["tmin"].real(0.0)
>>> select["tmax"].real(1800.0)
>>> select["emin"].real(0.1)
>>> select["emax"].real(100.0)
>>>
>>> select["debug"].boolean(True)
>>> select.run()
2014-11-24T13:56:34: +=============+
2014-11-24T13:56:34: | Parameters |
2014-11-24T13:56:34: +=============+
2014-11-24T13:56:34:  infile .....: data/crab_events.fits
2014-11-24T13:56:34:  outfile .....: selected_events.fits
2014-11-24T13:56:34:  prefix .....: selected_
2014-11-24T13:56:34:  usepnt .....: no
2014-11-24T13:56:34:  ra .....: 83.629999999999995
2014-11-24T13:56:34:  dec .....: 22.010000000000002
2014-11-24T13:56:34:  rad .....: 3.
2014-11-24T13:56:34:  tmin .....: 0.
2014-11-24T13:56:34:  tmax .....: 1800.
2014-11-24T13:56:34:  emin .....: 0.1
2014-11-24T13:56:34:  emax .....: 100.
2014-11-24T13:56:34:  expr .....:
2014-11-24T13:56:34:  usethres .....: NONE
2014-11-24T13:56:34:  chatter .....: 2
2014-11-24T13:56:34:  clobber .....: yes
2014-11-24T13:56:34:  debug .....: yes
2014-11-24T13:56:34:  mode .....: ql
```

```
2014-11-24T13:56:34:  logfile .....: ctselect.log
2014-11-24T13:56:34:
2014-11-24T13:56:34: +================================+
2014-11-24T13:56:34: | Observations before selection |
2014-11-24T13:56:34: +================================+
2014-11-24T13:56:34: === GObservations ===
2014-11-24T13:56:34:  Number of observations ....: 1
2014-11-24T13:56:34:  Number of predicted events : 0
2014-11-24T13:56:34: === GCTAObservation ===
2014-11-24T13:56:34:  Name .....:
2014-11-24T13:56:34:  Identifier .....:
2014-11-24T13:56:34:  Instrument .....: CTA
2014-11-24T13:56:34:  Event file .....: data/crab_events.fits
2014-11-24T13:56:34:  Event type .....: EventList
2014-11-24T13:56:34:  Statistics .....: Poisson
2014-11-24T13:56:34:  Ontime .....: 1800 s
2014-11-24T13:56:34:  Livetime .....: 1710 s
2014-11-24T13:56:34:  Deadtime correction .....: 0.95
2014-11-24T13:56:34:  User energy range .....: undefined
2014-11-24T13:56:34: === GCTAPointing ===
2014-11-24T13:56:34:  Pointing direction .....: (RA,Dec)=(83.63,22.01)
2014-11-24T13:56:34:  Response function .....: undefined
2014-11-24T13:56:34: === GCTAEventList ===
2014-11-24T13:56:34:  Number of events .....: 6141
2014-11-24T13:56:34:  Time interval .....: 51544.5 - 51544.5 days
2014-11-24T13:56:34:
2014-11-24T13:56:34: +==================+
2014-11-24T13:56:34: | Event selection |
2014-11-24T13:56:34: +==================+
2014-11-24T13:56:34: === Observation ===
2014-11-24T13:56:35:  Time range .....: 0 - 1800 s
2014-11-24T13:56:35:  Selected energy range .....: 0.1 - 100 TeV
2014-11-24T13:56:35:  Requested ROI .....: Centre(RA,DEC)=(83.63, 22.01) deg, Radius=3 deg
2014-11-24T13:56:35:  ROI of data .....: Centre(RA,DEC)=(83.63, 22.01) deg, Radius=5 deg
2014-11-24T13:56:35:  Selected ROI .....: Centre(RA,DEC)=(83.63, 22.01) deg, Radius=3 deg
2014-11-24T13:56:35:  cfitsio selection .....: TIME >= 0,00000000 && TIME <= 1800,00000000 && ENERGY >= 0,10000000 && ENERGY <=
 100,00000000 && ANGSEP(83,630000,22,010000,RA,DEC) <= 3,000000
2014-11-24T13:56:35:  FITS filename .....: /tmp/filehbtaeQ[EVENTS][TIME >= 0,00000000 && TIME <= 1800,00000000 && ENERGY >=
 0,10000000 && ENERGY <= 100,00000000 && ANGSEP(83,630000,22,010000,RA,DEC) <= 3,000000]
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "/raid/cfarn/SOFT/GAMMALIB/20141121/lib64/python2.6/site-packages/ctools/tools.py", line 408, in run
    return _tools.ctselect_run(self)
RuntimeError: *** ERROR in GFits::open(std::string&): Unable to open FITS file "/tmp/filehbtaeQ[EVENTS][TIME >= 0,00000000 && TIME <=
 1800,00000000 && ENERGY >= 0,10000000 && ENERGY <= 100,00000000 && ANGSEP(83,630000,22,010000,RA,DEC) <= 3,000000]"
 (status=431)
```

I'm not particularly familiar with FITS format, so could it be some misinterpration of dot and comma?

The save() function works just fine.

```
>>> select.save()
ls -lh selected_events.fits
-rw-r--r-- 1 cfarn su-users 735K 24 nov.  14:26 selected_events.fits
```

Opening the file with fv, everything seems perfectly fine:

```
XTENSION= 'BINTABLE'           / binary table extension
BITPIX  =                    8 / 8-bit bytes
NAXIS   =                    2 / 2-dimensional binary table
NAXIS1  =                  119 / width of table in bytes
NAXIS2  =                 6141 / number of rows in table
PCOUNT  =                    0 / size of special data area
GCOUNT  =                    1 / one data group (required keyword)
TFIELDS =                   26 / number of fields in each row
TTYPE1  = 'EVENT_ID'           / label for field   1
TFORM1  = '1J      '           / data format of field: 4-byte INTEGER
TZERO1  =           2147483648 / offset for unsigned integers
```

```
TSCAL1  =                    1 / data are not scaled
TTYPE2  = 'OBS_ID  '           / label for field   2
TFORM2  = '1J      '           / data format of field: 4-byte INTEGER
TZERO2  =           2147483648 / offset for unsigned integers
TSCAL2  =                    1 / data are not scaled
TTYPE3  = 'TIME    '           / label for field   3
TFORM3  = '1D      '           / data format of field: 8-byte DOUBLE
TTYPE4  = 'TLIVE   '           / label for field   4
TFORM4  = '1D      '           / data format of field: 8-byte DOUBLE
TTYPE5  = 'MULTIP  '           / label for field   5
TFORM5  = '1I      '           / data format of field: 2-byte INTEGER
TTYPE6  = 'TELMASK '           / label for field   6
TFORM6  = '100X    '           / data format of field: BIT
TTYPE7  = 'RA      '           / label for field   7
TFORM7  = '1E      '           / data format of field: 4-byte REAL
TTYPE8  = 'DEC     '           / label for field   8
TFORM8  = '1E      '           / data format of field: 4-byte REAL
TTYPE9  = 'DIR_ERR '           / label for field   9
TFORM9  = '1E      '           / data format of field: 4-byte REAL
TTYPE10 = 'DETX    '           / label for field  10
TFORM10 = '1E      '           / data format of field: 4-byte REAL
TTYPE11 = 'DETY    '           / label for field  11
TFORM11 = '1E      '           / data format of field: 4-byte REAL
TTYPE12 = 'ALT     '           / label for field  12
TFORM12 = '1E      '           / data format of field: 4-byte REAL
TTYPE13 = 'AZ      '           / label for field  13
TFORM13 = '1E      '           / data format of field: 4-byte REAL
TTYPE14 = 'COREX   '           / label for field  14
TFORM14 = '1E      '           / data format of field: 4-byte REAL
TTYPE15 = 'COREY   '           / label for field  15
TFORM15 = '1E      '           / data format of field: 4-byte REAL
TTYPE16 = 'CORE_ERR'           / label for field  16
TFORM16 = '1E      '           / data format of field: 4-byte REAL
TTYPE17 = 'XMAX    '           / label for field  17
TFORM17 = '1E      '           / data format of field: 4-byte REAL
TTYPE18 = 'XMAX_ERR'           / label for field  18
TFORM18 = '1E      '           / data format of field: 4-byte REAL
TTYPE19 = 'SHWIDTH '           / label for field  19
TFORM19 = '1E      '           / data format of field: 4-byte REAL
TTYPE20 = 'SHLENGTH'           / label for field  20
TFORM20 = '1E      '           / data format of field: 4-byte REAL
TTYPE21 = 'ENERGY  '           / label for field  21
TFORM21 = '1E      '           / data format of field: 4-byte REAL
TTYPE22 = 'ENERGY_ERR'         / label for field  22
TFORM22 = '1E      '           / data format of field: 4-byte REAL
TTYPE23 = 'HIL_MSW '           / label for field  23
TFORM23 = '1E      '           / data format of field: 4-byte REAL
TTYPE24 = 'HIL_MSW_ERR'        / label for field  24
TFORM24 = '1E      '           / data format of field: 4-byte REAL
TTYPE25 = 'HIL_MSL '           / label for field  25
TFORM25 = '1E      '           / data format of field: 4-byte REAL
TTYPE26 = 'HIL_MSL_ERR'        / label for field  26
TFORM26 = '1E      '           / data format of field: 4-byte REAL
EXTNAME = 'EVENTS  '           / name of this extension
DSTYP1  = 'TIME    '           / Data selection type
DSUNI1  = 's       '           / Data selection unit
DSVAL1  = 'TABLE   '           / Data selection value
DSREF1  = ':GTI    '           / Data selection reference
DSTYP2  = 'POS(RA,DEC)'        / Data selection type
DSUNI2  = 'deg     '           / Data selection unit
DSVAL2  = 'CIRCLE(83.63,22.01,5)' / Data selection value
DSTYP3  = 'ENERGY  '           / Data selection type
DSUNI3  = 'TeV     '           / Data selection unit
DSVAL3  = '0.1:100 '           / Data selection value
NDSKEYS =                    3 / Number of data selections
CREATOR = 'GammaLib'           / Program which created the file
TELESCOP= 'CTA     '           / Telescope
OBS_ID  =                    0 / Observation identifier
DATE_OBS= '2000-01-01'         / Observation start date
TIME_OBS= '11:58:56'           / Observation start time
DATE_END= '2000-01-01'         / Observation end date
TIME_END= '12:28:56'           / Observation end time
TSTART  =                    0 / [s] Mission time of start of observation
TSTOP   =                    1 / [s] Mission time of end of observation
MJDREFI =                51544 / [days] Integer part of time reference MJD
```

```
MJDREFF =                   5 / [days] Fractional part of time reference MJD
TIMEUNIT= 's       '          / Time unit
TIMESYS = 'TT      '          / Time system
TIMEREF = 'LOCAL   '          / Time reference
TELAPSE =                   1 / [s] Mission elapsed time
ONTIME  =                   1 / [s] Total good time including deadtime
LIVETIME=                   1 / [s] Total livetime
DEADC   =                   9 / Deadtime correction factor
TIMEDEL =                   1 / Time resolution
OBJECT  = '        '          / Observed object
RA_OBJ  =                   0 / [deg] Target Right Ascension
DEC_OBJ =                   0 / [deg] Target Declination
RA_PNT  =                   8 / [deg] Pointing Right Ascension
DEC_PNT =                   2 / [deg] Pointing Declination
ALT_PNT =                   0 / [deg] Average altitude of pointing
AZ_PNT  =                   0 / [deg] Average azimuth of pointing
RADECSYS= 'FK5     '          / Coordinate system
EQUINOX =                   2 / Epoch
CONV_DEP=                   0 / Convergence depth of telescopes
CONV_RA =                   0 / [deg] Convergence Right Ascension
CONV_DEC=                   0 / [deg] Convergence Declination
OBSERVER= 'string  '          / Observer
N_TELS  =                 100 / Number of telescopes in event list
TELLIST = 'string  '          / Telescope IDs
GEOLAT  =                   0 / [deg] Geographic latitude of array centre
GEOLON  =                   0 / [deg] Geographic longitude of array centre
ALTITUDE=                   0 / [km] Altitude of array centre
EUNIT   = 'TeV     '          / Energy unit
EVTVER  = 'draft1  '          / Event list version number
END
```

#### #7 - 11/24/2014 03:41 PM - Knödlseder Jürgen

*- Status changed from Closed to In Progress*

*- % Done changed from 100 to 50*

This is VERY strange. Here the code that writes the time selection string:

```
    // Format time with sufficient accuracy and add to selection string
    char cmin[80];
    char cmax[80];
    sprintf(cmin, "%.8f", tmin);
    sprintf(cmax, "%.8f", tmax);
    selection = "TIME >= "+std::string(cmin)+" && TIME <= "+std::string(cmax);
    if (logTerse()) {
        log << gammalib::parformat("Time range");
        log << tmin << " - " << tmax << " s" << std::endl;
    }
```

It looks like if the sprintf(cmin, "%.8f", tmin) writes a comma instead of a dot.

Do you use a custom compiled version of ctools? I guess you have selected French in your OS?

This apparently has happened to others already:

- http://stackoverflow.com/questions/3709886/sprintf-commas-and-dots-in-c-and-localization
- http://stackoverflow.com/questions/14753505/c-c-printf-use-commas-instead-of-dots-as-decimal-separator
- http://en.cppreference.com/w/cpp/locale/setlocale

We may need to add some code to cools to make this country safe!!!

#### #8 - 11/24/2014 03:50 PM - Farnier Christian

I am actually on a swedish system...
Also, I haven't changed my setup and everything was ok for the previous version of gammalib/ctools.

#### #9 - 11/24/2014 03:53 PM - Knödlseder Jürgen

This part of the code has probably been changed. Any clues if a Swedish system uses comma or dot as separator?

#### #10 - 11/24/2014 03:54 PM - Knödlseder Jürgen

Well, looks like Sweden also uses a comma: http://en.wikipedia.org/wiki/Decimal_mark

#### #11 - 10/28/2015 08:26 AM - Knödlseder Jürgen

Christian, is this still a problem for you or have you fixed the issue?

#### #12 - 10/30/2015 12:20 AM - Knödlseder Jürgen

*- Priority changed from Normal to Low*

*- Target version deleted (1.0.0)*

Nothing new on that, and since about almost one year nobody has bothered about that, so let's keep it as an issue but remove it from the release 1.0.

#### #13 - 03/13/2017 12:23 PM - Knödlseder Jürgen

*- Priority changed from Low to High*

Eirik Saether Hatlen stumbled possibly over the same problem. He wrote:

*I have started using CTOOLS and was making reasonable unbined .fits file using ctselect for my studies.*

*All of a sudden I get the following error when I enter ctselect in the terminal:*

libc++abi.dylib: terminating with uncaught exception of type GException::par_file_syntax_error: *** ERROR in GApplicationPars::parse(): Syntax error occured in the following line of the parameter file (found 8 fields, require 7): rad, r, a,0.5,1,0,180, "Radius of ROI (degrees)"
Abort trap: 6

*I dont recall doing anything other than calling ctselect. All the other functions are working (i.e. ctobssim, ctbin etc).*

*Any suggestions? CTOOLS was installed completely standard by the instructions on MAC OS X El Capitan 10.11.6*

*Best*
*Eirik*

### Files

| | | | |
|---|---|---|---|
| ctools.xml | 9.73 KB | 11/24/2014 | Farnier Christian |