ctools - Bug #1425

cssens excessive memory usage

02/19/2015 09:31 AM - Knödlseder Jürgen

Status:	Closed	**Start date:**	02/19/2015
Priority:	Normal	**Due date:**	
Assigned To:	Knödlseder Jürgen	**% Done:**	100%
Category:		**Estimated time:**	0.00 hour
Target version:	1.0.0		

Description

Paola Grandi noted a problem when running cssens that is likely related to excessive memory usage (ctools version 00-08-01):

```
cssens
Calibration database [$CTOOLS/share/caldb/data/cta/dummy/bcf]
Instrument response function [cta_dummy_irf]
Source model type (point/gauss/shell/disk) [point]
Source offset angle (deg) (0.0) [0.0]
Background model file function (none=power law for E) [$CTOOLS/share/models/bkg_dummy.txt]
Effective exposure time (s) [10]
Radius of ROI (deg) [0.5] 1
Warning: obsutils.set is obsolete, use obsutils.set_obs instead.
Traceback (most recent call last):
 File "/home/grandi/ctools-00-08-01_build01/bin/cssens", line 724, in <module>
   app.execute()
 File "/home/grandi/ctools-00-08-01_build01/bin/cssens", line 167, in execute
   self.run()
 File "/home/grandi/ctools-00-08-01_build01/bin/cssens", line 234, in run
   result = self.get_sensitivity(obs, bkg_model, full_model)
 File "/home/grandi/ctools-00-08-01_build01/bin/cssens", line 445, in get_sensitivity
   log=self.m_log, debug=self.m_debug)
 File "/home/grandi/ctools-00-08-01_build01/lib64/python2.6/site-packages/ctools/obsutils.py", line 61, in sim
   sim.run()
 File "/home/grandi/ctools-00-08-01_build01/lib64/python2.6/site-packages/ctools/tools.py", line 268, in run
   return _tools.ctobssim_run(self)
RuntimeError: std::bad_alloc
```

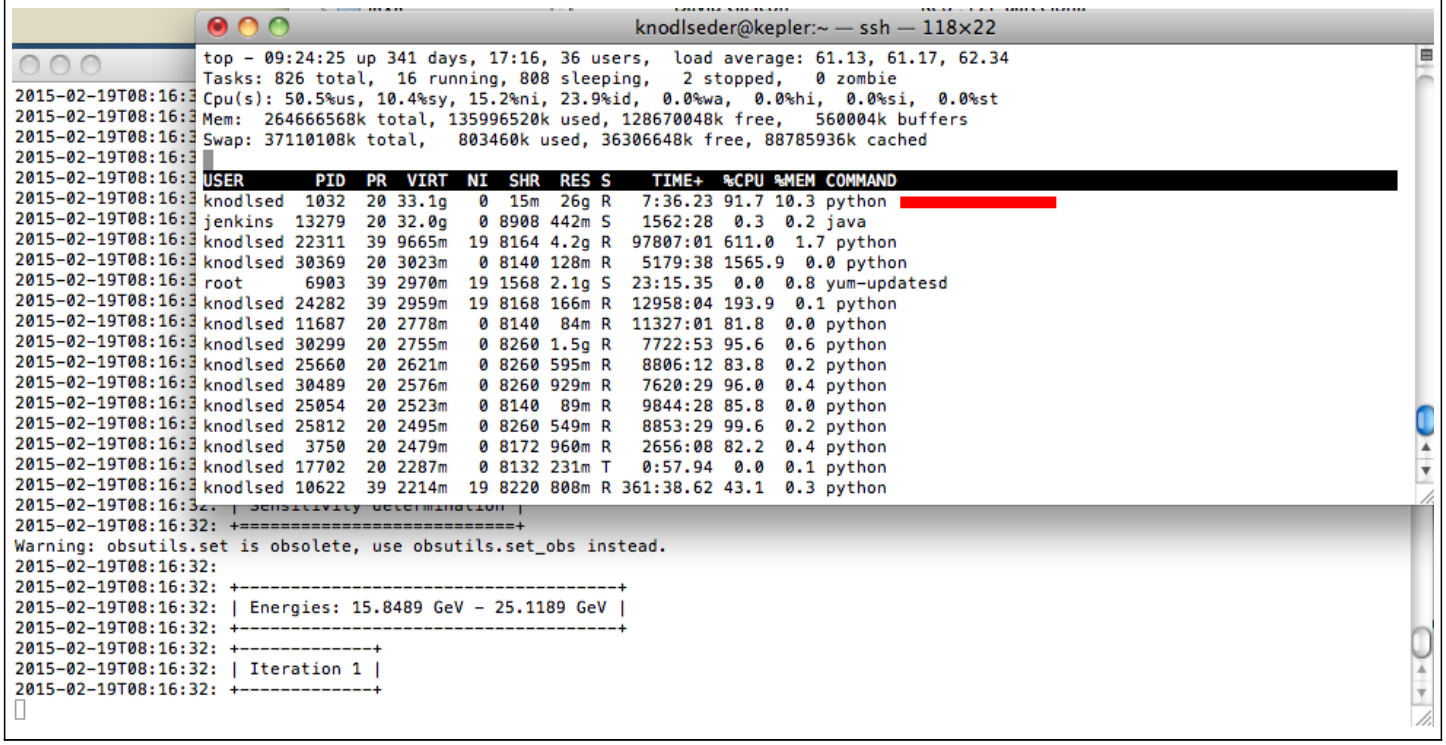
the LOG file:

```
more cssens.log
*******************************************************************************
*                                cssens                                       *
* ---------------------------------------------------------------------------- *
* Version: 0.4.0                                                               *
*******************************************************************************
2015-02-18T12:47:55: +============+
2015-02-18T12:47:55: | Parameters |
2015-02-18T12:47:55: +============+
2015-02-18T12:47:55:  outfile ...................: sensitivity.dat
2015-02-18T12:47:55:  caldb .....................: $CTOOLS/share/caldb/data/cta/dummy/bcf
2015-02-18T12:47:55:  irf .......................: cta_dummy_irf
2015-02-18T12:47:55:  type ......................: point
2015-02-18T12:47:55:  offset ....................: 0.0
2015-02-18T12:47:55:  bkg .......................: $CTOOLS/share/models/bkg_dummy.txt
2015-02-18T12:47:55:  duration ..................: 10
2015-02-18T12:47:55:  rad .......................: 1
2015-02-18T12:47:55:  enumbins ..................: 0
2015-02-18T12:47:55:  npix ......................: 200
2015-02-18T12:47:55:  binsz .....................: 0.05
2015-02-18T12:47:55:  sigma .....................: 5.0
2015-02-18T12:47:55:  ts_use ....................: yes
2015-02-18T12:47:55:  index .....................: -2.48
```

```
2015-02-18T12:47:55:  radius ....................: 0.1
2015-02-18T12:47:55:  width .....................: 0.05
2015-02-18T12:47:55:  max_iter ..................: 50
2015-02-18T12:47:55:  num_avg ...................: 3
2015-02-18T12:47:55:  chatter ...................: 2
2015-02-18T12:47:55:  clobber ...................: yes
2015-02-18T12:47:55:  debug .....................: no
2015-02-18T12:47:55:  mode ......................: ql
2015-02-18T12:47:55:
2015-02-18T12:47:55: +========+
2015-02-18T12:47:55: | Models |
2015-02-18T12:47:55: +========+
2015-02-18T12:47:55: +------------------+
2015-02-18T12:47:55: | Background model |
2015-02-18T12:47:55: +------------------+
2015-02-18T12:47:55: === GModels ===
2015-02-18T12:47:55:  Number of models ..........: 1
2015-02-18T12:47:55:  Number of parameters ......: 3
2015-02-18T12:47:55: === GCTAModelRadialAcceptance ===
2015-02-18T12:47:55:  Name ......................: Background
2015-02-18T12:47:55:  Instruments ................: CTA
2015-02-18T12:47:55:  Instrument scale factors ..: unity
2015-02-18T12:47:55:  Observation identifiers ...: all
2015-02-18T12:47:55:  Model type ................: "Gaussian" * "FileFunction" * "Constant"
2015-02-18T12:47:55:  Number of parameters ......: 3
2015-02-18T12:47:55:  Number of radial par's ....: 1
2015-02-18T12:47:55:   Sigma ....................: 3 +/- 0 [7.71728e-08,infty[ deg2 (free,scale=1,gradient)
2015-02-18T12:47:55:  Number of spectral par's ..: 1
2015-02-18T12:47:55:   Normalization ............: 1 +/- 0 [0,1000]  (free,scale=1,gradient)
2015-02-18T12:47:55:  Number of temporal par's ..: 1
2015-02-18T12:47:55:   Constant .................: 1 (relative value) (fixed,scale=1,gradient)
2015-02-18T12:47:55:
2015-02-18T12:47:55: +------------+
2015-02-18T12:47:55: | Full model |
2015-02-18T12:47:55: +------------+
2015-02-18T12:47:55: === GModels ===
2015-02-18T12:47:55:  Number of models ..........: 2
2015-02-18T12:47:55:  Number of parameters ......: 9
2015-02-18T12:47:55: === GCTAModelRadialAcceptance ===
2015-02-18T12:47:55:  Name ......................: Background
2015-02-18T12:47:55:  Instruments ................: CTA
2015-02-18T12:47:55:  Instrument scale factors ..: unity
2015-02-18T12:47:55:  Observation identifiers ...: all
2015-02-18T12:47:55:  Model type ................: "Gaussian" * "FileFunction" * "Constant"
2015-02-18T12:47:55:  Number of parameters ......: 3
2015-02-18T12:47:55:  Number of radial par's ....: 1
2015-02-18T12:47:55:   Sigma ....................: 3 +/- 0 [7.71728e-08,infty[ deg2 (free,scale=1,gradient)
2015-02-18T12:47:55:  Number of spectral par's ..: 1
2015-02-18T12:47:55:   Normalization ............: 1 +/- 0 [0,1000]  (free,scale=1,gradient)
2015-02-18T12:47:55:  Number of temporal par's ..: 1
2015-02-18T12:47:55:   Constant .................: 1 (relative value) (fixed,scale=1,gradient)
2015-02-18T12:47:55: === GModelSky ===
2015-02-18T12:47:55:  Name ......................: Test
2015-02-18T12:47:55:  Instruments ................: all
2015-02-18T12:47:55:  Instrument scale factors ..: unity
2015-02-18T12:47:55:  Observation identifiers ...: all
2015-02-18T12:47:55:  Model type ................: PointSource
2015-02-18T12:47:55:  Model components ..........: "SkyDirFunction" * "PowerLaw" * "Constant"
2015-02-18T12:47:55:  Number of parameters ......: 6
2015-02-18T12:47:55:  Number of spatial par's ...: 2
2015-02-18T12:47:55:   RA ........................: 266.405 deg (fixed,scale=1)
2015-02-18T12:47:55:   DEC .......................: -28.9362 deg (fixed,scale=1)
2015-02-18T12:47:55:  Number of spectral par's ..: 3
2015-02-18T12:47:55:   Prefactor ................: 5.7e-16 +/- 0 [0,infty[ ph/cm2/s/MeV (free,scale=5.7e-16,gradient)
2015-02-18T12:47:55:   Index ....................: -2.48 [10,-10]  (fixed,scale=-2.48,gradient)
2015-02-18T12:47:55:   PivotEnergy ..............: 300000 MeV (fixed,scale=300000,gradient)
2015-02-18T12:47:55:  Number of temporal par's ..: 1
```

```
2015-02-18T12:47:55:   Constant .................: 1 (relative value) (fixed,scale=1,gradient)
2015-02-18T12:47:55:
2015-02-18T12:47:55: +===========================+
2015-02-18T12:47:55: | Sensitivity determination |
2015-02-18T12:47:55: +===========================+
2015-02-18T12:47:55:
2015-02-18T12:47:55: +-------------------------------------+
2015-02-18T12:47:55: | Energies: 15.8489 GeV - 25.1189 GeV |
2015-02-18T12:47:55: +-------------------------------------+
2015-02-18T12:55:52:
```

Repeating this run on a Linux box indeed shows a hugh memory usage. This should be fixed. A possible reason could be a large background rate and a correspondingly large memory allocation.



History

#1 - 02/19/2015 05:45 PM - Knödlseder Jürgen

- File cssens added

- File show_sensitivity.py added

- Status changed from New to Feedback

- % Done changed from 0 to 100

The problem was due to a wrong internal scaling of the source flux, related to an interface change a couple of time ago. Since the script is not really tested regularly this escaped my attention.

Attached a modified script that fixes the problem. The modifications have also been merged into the actual devel branch.

As bonus, attached is also a Python script that allows plotting of the result file. The script needs matplotlib installed.

#2 - 04/10/2015 10:52 PM - Knödlseder Jürgen

- Status changed from Feedback to Closed

Files

memory.png	105 KB	02/19/2015	Knödlseder Jürgen
cssens	26.6 KB	02/19/2015	Knödlseder Jürgen
show_sensitivity.py	2.97 KB	02/19/2015	Knödlseder Jürgen