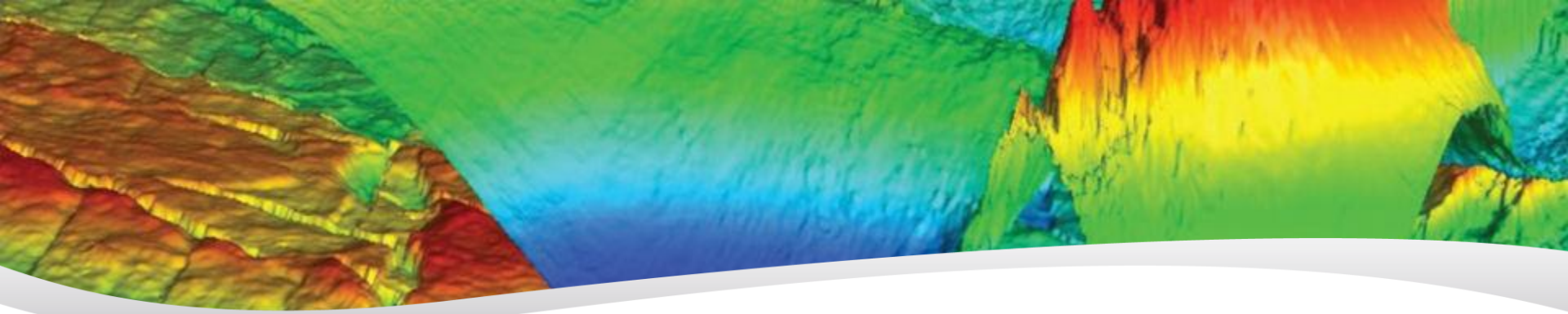


Tornado scripting

Passion for Geoscience

Outline

- Requests from USI for repetitive existing tornado functions
  - Old solution
  - Our proposal
- Requests from USI for research algorithm not in tornado
  - Old solution
  - Our proposal
- Tornado Scripting Survey
- Next steps

Requests from USI for repetitive existing tornado functions

- Task Tracker
  - Task 1503563 - Tornado scripting functionality? (Qiming Liu)
  - Task 1531183 - Tornado script to support TTI Axis Convert (Chanjuan Sun)
  - Task 1685003 - Get a script for creating dipx dipy from seismic (Jun Yin)
  - Task 1393983 - Arthur's horizon trim script not working as expected (Hui Chen)
  - Task 1527273 - Fdm regrid outside tornado (Chanjuan Sun)
  - Task 1243533 - Batch script for repeated tornado functions
  - Task 1243513 – Tornado Script for image capture
  - Task 1124943 - Scripting Expose, Tornado, and Khoros
  - Task 1730823 - Batch operations for survey rotation and unit conversion (Minshen Wang)
  - Task 2763603 - Need a script doing tos/bos horizons conversion under different sediment velocity (Shu Dai)
  - Task 1218733 - Inserting salt script (Taejong Kim)
  - Task 643493 - Create salt insertion script (Daniel Chaikin)
  - …….

Old solution

cig2gamma_raw
cig2gath
cig_butterflyx2y
cig_combine_ave
cig_m2f
cigdipmath
cigpick_correct_by_gamma
cube_flip
dipx_quality
dipy_qualitx
dipy_quality
fdm2cmu_with_hrz_attr
fdm2cmu_with_wb
fdm2hrz2
fdm2hrzRMS
fdm2slice
fdm2slxlxyzv
fdm2tango
fdm2vol
fdm_binary_merge
fdm_binary_or
fdm_diff_sum2hor
fdm_dump
fdm_extrp
fdm_group_regrid
fdm_group_smooth
fdm_hmerge_by_region
fdm_maxv2hor
fdm_minv2hor
fdm_mute_by_region
fdm_norm
fdm_regrid2
fdm_regrid2tango
fdm_regrid2tango2
fdm_regrid_insert_salt2tango
fdm_remove_insersion
fdm_struct_smooth

fdmfill_by_region
fdminterp3d
fdmmath
fdmsum
fdmsum1
fdmtrim
fdm_trim_to_new_value
hor2fdm
hpick2d_pwang
hpick2d_pwang2
hpick2d_pwang3
hpick2d_pwang4
hpick2d_pwang5
hpick2d_pwang6
hpick2d_pwang7
hpick3d_pwang
hrz2plot
hrz_attrib_copy
hrz_clam_interp
hrz_regrid_by_bilinar
hrz_replace_by_range
hrz_salt_thickness
hrz_shift
hrz_trim_by_maxdepth
hrz_trim_by_pair3
hrz_trim_by_pair4
hrz_trim_by_pair5
hrz_trim_by_saltfdm
hrz_trim_by_segment
hrz_trim_by_value
hrz_trim_interp
insert_salt
insertsalt
insertsed
las_curveseg
list_hg_surface
seismic2dipxy

notesfill
qcexam_merger2hrz
rca_structSmooth sphere2hrz
struct_smooth
tango2fdm
txt_trace2fdm
v2h_resample
vol_replace
voxel_merge
waz2hor_gamma
waz_cigpicker
wbmultpick
well2mplot
well_top_dump
wellcurve2fdm
wellcurve2hg
welltops2Notes
welltops2horAsCircle
welltops2horAsNotes
xyzv2fdm

Old solution (cont)

- There are 132 tornado scriptings at hou058ws /ts1/old_ama_home/arma/bin.
  - rwxrwxrwx 1 input 68472013 cig2gamma_raw.cggv5
    -rwxrwxrwx 1 input 164169932 cig2gath.cggv5
    -rwxrwxrwx 1 input 195925001 cig_butterflyx2y.cggv5
    -rwxrwxrwx 1 input 168223845 cig_combine_ave.cggv5
    -rwxrwxrwx 1 input 169272974 cig_m2f.cggv5
    -rwxrwxrwx 1 input 56157899 cigdipmath.cggv5
    -rwxrwxrwx 1 input 59597449 cigpick_correct_by_gamma.cggv5
  - .....
- Each one is almost a snapshot of tornado at the time the script was created
  - Outdated
  - Hard to find the original source

Our proposal

- Only one tornado script that supports these functions, instead of one tornado binary for one feature
  - Can't put all tornado features into scripting
    - Hard to count how many features in tornado
  - Start with a few frequently used, such as
    - Attribute->Update->Advanced Salt Insertion
    - Attribute->Update->Attribute Smooth
    - Utils->Volume Regrid
    - Movie->Image Output
    - Utils->Volume Math
- Wrap this tornado script into a standalone G2 module

Requests from USI for research algorithm not in tornado

- Task Tracker
  - Task 2786183 - shift horizon along normal vector (David Hren)
  - Task 2671433 - horizon generation based on gradients (Yi Huang)
  - …
- Old solutions
  - Users write their own code to generate horizon/velocity model/seismic
  - Output into a format that can be loaded into tornado and QC results
  - Ask Tornado developers

Our proposal

- Open some tornado data structure for users
  - Users write their own algorithms to modify horizon, attribute or seismic data
  - View the results immediately in tornado
- Quick Demo (example script)

```
from Vision import *
from Horizon import *
hrz= vision.getCurrentHorizon()
(nx,ny)=getHrzSize(hrz)
for i in range(nx):
    for j in range(ny):
        if (i <nx/3):
            setHrzVal(hrz,i,j,2000.)
        elif (i<(2*nx/3):
            setHrzVal(hrz,i,j,4000.)
        else:
            setHrzVal(hrz,i,j,7000.)
```

Tornado Scripting Survey (1/2)

1. Select Preferred Workflow :
   A. Run the same process on different input data (repetitive computing)
   B. Run a series of processes on the same data (form a workflow)
2. Working environments
   A. Run all the previous on the cluster instead of workstation (run a job deck)
   B. Run on workstation (save images for PPT, plugin your own algorithm)
3. What algorithms are the most interesting to have for scripting
   A. Those available in Tornado
   B. Your own algorithms (e.g. Convert your data into a tornado data)
4. Set the priority of the following Tornado features (1 = top, 5 = lowest):
   A. Attribute Smoothing (2)
   B. Attribute Replace (3)
   C. Volume Math (1)
   D. Salt Insert (5)
   E. Other __ Horizon Manipulation (4) _____

Tornado Scripting Survey (2/2)

5. Set priority for data types used for scripting (1 = top, 5 = lowest)
   A. Horizons (2)
   B. Seismic (stack) (3)
   C. Attribute (1)
   D. Well (5)
   E. CigPick (4)

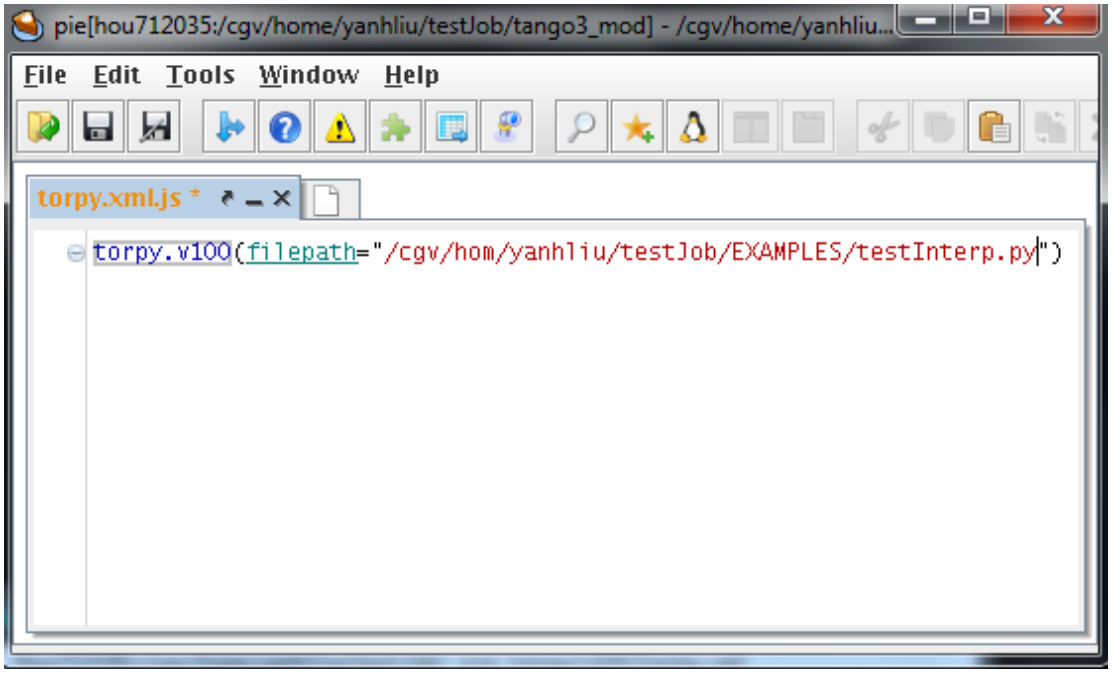
6. Scripting language (yes/no)
   A. Do you know Python? No problem to learn it
   B. Do you think Python is a good choice? yes
   C. Do you consider other format (i.e.: matlab, text) as a must have? no

7. Some processes need a huge number of parameters and some parameters are dependent on others. Select the best way to set them ?
   A. Use an external file row/column for the parameters (generated by Tornado GUI)
   B. Set the parameters in the script
   C. Use some tools like pie/ui and load in the script
   D. Others ideas _____

Next Steps

- First release between 1-2 months
  - Send a list of tasks we are going to achieve in our first release
    - Demo the implemented functionalities
    - Set the priorities for next iteration
- Nice to have focus points (users)
  - Any user volunteers?

Job



! Created by PIE on Mar 5, 2015 6:13:29 PM

!!!!!! Job Sequence !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

torpy(filepath="/cgv/home/yanhliu/testJob/EXAMPLES/testInterp.py")

!!!!!! End Sequence !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

Result ;)

```
(((((((((( geovation 2 ))))))))))  Job Exit status: Thu Mar  5 18:31:18 CST 2015 SUCCESS       Job number: 134231146        Job start: Thu Mar  5 18:30:31 CST 2015        Job name: testInterp      Project name:
uds:devtest        Directory: /cgv/home/yanhliu/testJob              Host: hou712035             User: yanhliu       JS Location:        G2 Release: /cgv/geovation2/2/rel              g2: /cgv/geovation2/2/rel/bin/g2          Revision: $Id:
//vega/xp/src/base/miscg2/g2#186 $          Job args: testInterp.js uds:devtest              GeoDB: vpmh          JobType: normal  !       Created by PIE on Mar 5, 2015 6:13:29 PM  ! !!!!!! Job Sequence !!!!!
```