

June 2015

Data Analysis Services Group - June 2015

News and Accomplishments

VAPOR Project

Project information is available at: <http://www.vapor.ucar.edu>

WASP Award:

John prepared a Google document with all of the year one and year two deliverables identified in anticipation of the upcoming year-end report.

John implemented floating point version of the WASP GetAtt and PutAtt methods.

John also added embedding of data range values into each wavelet coefficient block in order to enable clamping of reconstructed values to the original data range. This, unfortunately, necessitated a slight change in the WASP file format.

Finally, John made the bior4.4 wavelet the default for compression and fixed the long outstanding problem related to the maximum number of wavelet transforms possible.

KISTI Award:

Irfan's team was able to implement a version of the Open Grid Engine (OGE) on the High Performance Futures Lab. Scott was able to find a way to launch concurrent 'tasks' on the OGE by submitting what is referred to as an Array Job. These Array Jobs take a given script and launch it a number of times specified by the batch submission arguments. Within each child process, system variables exist that define the current process ID number, and the first /last process ID numbers. Using these identifiers, a subset of files is given to each process to convert into VDC.

The syntax for the batch job of the OGE are reportedly the same as those for the Sun Grid Engine (SGE), which is what KISTI is actually running on their supercomputer. We could not get a working implementation of SGE on the Futures Lab because it is proprietary, over 10 years old, and is no longer supported. These reasons were the impetus for the open-source OGE release. If there are differences between SGE and OGE that affect our parallel conversion script, only the three variables that define the first, last, and current process ID would need to be changed. Scott was able to adapt the code to operate with LSF as well, which also has mechanisms for Array Job batch submission.

John began working on support for tiled image display within vaporgui. An established convention for storing and managing a hierarchy of tiled geo-referenced images exists, and is widely supported by web browsers and other applications. The GDal tools are capable of converting a global, geo-referenced image into a tiled hierarchy with the caveat that the projection used is Mercator. Currently the vapor tools expect global cylindrical equal distant projections. John experimented with converting our images into tiled representations with GDal, and made modifications to the GeoTile class to support the mercator projection. Unfortunately, the images are not registering correctly at the moment.

3.x Development:

Alan restructured the renderer tab design to simplify the process of creating a new renderer. He also implemented a simplified "Hello World" renderer to illustrate the basic steps of implementing a new renderer for VAPOR 3.0.

John fixed a bug in DCWRF.cpp that was preventing the ingest of older WRF files.

2.x Development:

The 2.4.2 patch release of VAPOR was posted on the web site on June 1.

Administrative:

John contributed a section on VAPOR to Davide's NASA EONS proposal. If accepted the vapor team would provide a short tutorial for undergraduate students.

Education and Outreach:

On June 19 Scott gave a 1.5 hour VAPOR tutorial to ~16 WRF users in a classroom setting at the annual WRF workshop at Center Green. The tutorial went very well, but there were a few takeaway items for next time:

- Not all machines behaved as expected in the days prior to the tutorial, which required more substantial. In the end, most of the machines performed acceptably, but some had inexplicable failures.
- reorganize the presentation to get the students rendering something before editing the visualizer features
- use PowerPoint instead of Prezi, which has the crippling disadvantage of not allowing embedded videos unless they are streamed through YouTube.

Scott's animation of Peter Sullivan's LES simulation data was accepted into the XSEDE 2015 visualization showcase with strong reviews.

John gave a talk on VAPOR at CU's Boulder Fluid Dynamics Seminar Series.

We agreed to provide a 30 minute introduction to VAPOR for the July WRF tutorial. Alan and Scott will work on this together

John reviewed 10 NSF CISE proposal in preparation for a review panel at NSF in July.

Visitors:

Before returning to Germany Niklas Roeber demonstrated his extensions to VAPOR 2.4 that support visualizing Icon and MPAS data. There was considerable interest from the MPAS team at MMM. We expect to include these in the next VAPOR release. Niklas managed to add support for not only ICON data, but also MPAS-A and MPAS-O data.

Two SOARS students arrived in June. Dongliang Chu (U. of Tennessee) has been working on a fragment shader that will support rendering of layered grids with correct sampling. Ultimately, it is hoped that the code can be generalized for curvilinear grids. Shreya Mitappalli (NJIT) is exploring compression parameters used in VAPOR to experimentally determine the best choices for different data sets.

Additionally, Samuel Li, a PhD student from U. of Oregon arrived and began research work on the SPIHT and SPECK wavelet coefficient encoders.

Research Projects

John co-authored and submitted two papers to LDAV, one with Kenny Gruchalla et al, and one with Samuel Li.

John is also a co-author on a poster submitted to IEEE VIS with the wavelet group from U. of Calgary.

Production Visualization Services & Consulting

Alan continues to help Rich Rotunno (from MMM) on visualization of his weather models

Scott gave William Evonosky a hands-on VAPOR demo and email correspondence. William is a SOARS student being coached by Art Richmond (for research) and Bill Anderson (for computing). He is visualizing "Interactive Ion-Neutral Dynamics in the Ionosphere" and is very enthusiastic about the results he's producing.

ASD Support

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Publications, Papers & Presentations

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Systems Projects

John reviewed and evaluated NWSC2 vendor proposals.