Staff Status Reports

September 2014

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ACADIS

Status Report: March 2014 - September 2014

Sean Arms
Mohan Ramamurthy
Jeff Weber

Strategic Focus Areas

The *ACADIS* group's work supports the following Unidata funding proposal focus areas:

- **Enable widespread, efficient access to geoscience data**
  The ACADIS Data Portal is creating an effective way to access Arctic data
- **Develop and provide open-source tools for effective use of geoscience data**
  Unidata is creating an ASCII to netCDF translation tool that will allow a large amount of Arctic data to be translated to netCDF CF
- **Provide cyberinfrastructure leadership in data discovery, access, and use**
  ACADIS is an exemplar for data portals
- **Build, support, and advocate for the diverse geoscience community**
  ACADIS continues to champion useful access to data holdings

Background Information

The new Advanced Cooperative Arctic Data and Information Service (ACADIS) is a joint effort by the National Snow and Ice Data Center (NSIDC), the University Corporation for Atmospheric Research (UCAR), UNIDATA, and the National Center for Atmospheric Research (NCAR) to provide data archival, preservation and access for all projects funded by NSF's Arctic Science Program (ARC). ACADIS builds on the CADIS project that supported the Arctic Observing Network (AON). This portal will continue to be a gateway for AON data and is being expanded to include all NSF ARC data.

Activities Since the Last Status Report

- Unidata is moving forward with our contribution to homogenize the data for ease of re-use by the larger scientific comunity. This is being addressed with the Rosetta project, Rosetta's status report can be found here
- The ACADIS project successfully navigated through another NSF Program Manager "site visit" that took place early this summer, and is currently on year 4 funding. Based on feedback from a "blue ribbon" panel, NSF has decided that the management of Arctic Data will be recompeted sometime this fall.

Relevant Metrics

- ACADIS now holds metadata and data, or metadata alone (with link to external data), for about 30 AON projects
- ~30,000 files
- ~125 Gigabytes

- ACADIS Home Page

Prepared *September 2014*

The 2014 Unidata Equipment Awards Program

Sponsored by the National Science Foundation

The NSF provides the Unidata Program Center up to $100k in equipment grant funds each year. In alignment with the Unidata 2018 proposal, the Equipment Awards Program is designed to broaden participation and promote the use of Unidata tools and systems (e.g., THREDDS, NetCDF, IDV, GIS connections) to support education and research on various aspects of climate studies (e.g., diagnostics, change and impacts), by providing grants to be used in the procurement of new computers and equipment including upgrades to existing classroom and laboratory equipment.

This year, special consideration was given to proposals that included one or more of the following:

- Installation of a prototype AWIPS II standalone EDEX server and CAVE client, coupled with the Unidata LDM, to test data ingest and display both locally, and using the CAVE thin client to connect to remote servers
- Implementation of or pilot projects with remotely-accessible storage systems for geoscience data (“cloud-based storage”)
- Implementation of or pilot projects with remote server-based data analysis or visualization systems (“cloud-based analysis”)

A Request for Proposals was sent out on January 15, 2014 with a March 14 submission deadline. A review panel met on April 1 at the Unidata Program Center to review the 13 proposals that were received. The Panel recommended that seven proposals be funded. The following six proposals were awarded grants:

Embry-Riddle Aeronautical University - “Linux Server in the Cloud” - Dr. Curtis N. James

Metropolitan State University of Denver - "Enriching Meteorological Education in Undergraduate Courses Using Real-Time, High Resolution Datasets at Metropolitan State University of Denver" - Dr. Sam Ng

Pennsylvania State University - “AWIPS II Prototype Testing Equipment for a Standalone Experimental EDEX/LDM/CAVE System for Penn State and Unidata” - Dr. Charles F. Pavloski

San Jose State University - “Acquisition of AWIPS II EDEX Server and CAVE Client in a Synoptic Weather and Analysis Classroom” - Dr. Sen Chiao

University of Iowa - "Improving Visualization and Access to Radar Data Using Unidata Tools for Flood Prediction and Mangement" - Dr. Ibrahim Demir

University of Missouri - "Increasing Access to AWIPS II in the Unidata Community and at the University of Missouri" - Dr. Patrick S. Market, Dr. Bohumil Svoma, Dr. Anthony R. Lupo, and Dr. Neil I. Fox

Congratulations to all of the recipients and a special thank you to the Review Panel and the NSF for making the Equipment Awards program possible.

AWIPS II

Status Report September 2014

Michael James

AWIPS II Development

- Release 14.2.1 beta. Freely available to the world. EDEX Data Server resource load reduced by removing server functionality supporting GFE, Hydro, MPE perspectives. CAVE client load time reduced by removing GFE, Hydro, MPE plugins.
- Pulling from AWIPS II NWS repository, orphan branched NCEP 14.2.1 to a new Unidata baseline.
- Turned off default notification GUI presence on desktop.
- Updated default map layout in NCP to be consistent with D2D maps: county boundaries loaded when zoomed in a certain amount.
- Added a new class to the NCP resource loader which allows the user to quickly save an NCP bundle from the menu bar.
- Updated NCP resource loader and perspective feature to allow quick-loading of data in addition to loading / creating a bundle.
- Determined the changes neccessary to move Resource Stack from bottom-right to top-left by default, but decided for now to keep it consistent with NWS AWIPS II layout.
- Shortened CAVE NCP load time from ~40 seconds to ~10 seconds by removing a number of unneccessary "preloaded" geographic areas which were being slowly generated every time CAVE was launched.
- RPMs are being built in-house for the entirety of Unidata AWIPS II. 64-bit Linux RHEL 6 is the only supported operating system. An investigation of a Windows CAVE client build is underway, which uses Eclipse IDE for Linux but also requires a Windows development environment.
- Raytheon satellite decoder was updated to support FNEXRAD composite GINI images, and UNIWISC AREA file support added for Mercator and native projections, using the McIDAS gini and AREA decoders bundled with AWIPS II LDM.
- **EDEX Cloud Servers** demonstrated that a small footprint EDEX server (no NEXRAD level 2 or 3 or high-resolution CONDUIT models) functions well in both Microsoft Azure and Amazon EC-2 cloud server environments. The Azure instance is currently serving data to AWIPS II 14.2.1 beta testers. The EC-2 instance was recently setup at / for Embry Riddle.

Unidata Cloud Computing

April 2014 - September 2014

Fisher, Arms, Caron, Ho, James, Schmidt, Yoksas

Strategic Focus Areas

Unidata's *Cloud Computing* activities support the following Unidata funding proposal focus areas:

1. **Enable widespread, efficient access to geoscience data**

   Making Unidata data streams available via various commercial and private cloud services will allow subscribers to those services to access data quickly and at low cost.

2. **Develop and provide open-source tools for effective use of geoscience data**

   Running existing Unidata-developed and supported tools and processes (e.g. IDV, RAMADDA, generation of composite imagery) in a range of cloud environments makes these tools and data streams available to cloud service subscribers at low cost. It also gives us insight into how best to configure existing and new tools for most efficient use in these environments.

3. **Provide cyberinfrastructure leadership in data discovery, access, and use**

   Unidata is uniquely positioned in our community to experiment with provision of both data and services in the cloud environment. Our efforts to determine the most efficient ways to make use of cloud resources will allow community members to forego at least some of the early, exploratory steps toward full use of cloud environments.

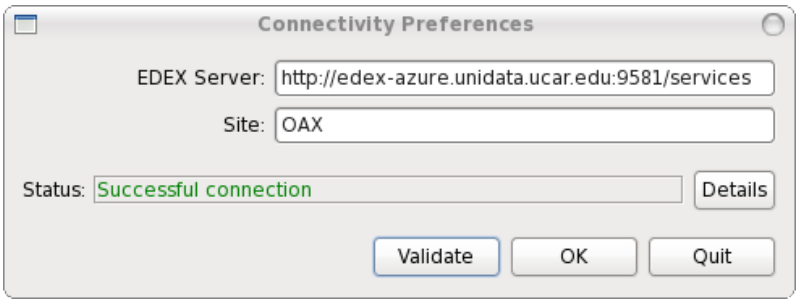
AWIPS II Cloud Servers

- Unidata is testing small footprint EDEX servers (no NEXRAD Level 2 or 3 or high-resolution CONDUIT models) on both **Microsoft Azure** and **Amazon EC2** cloud server environments.

- An EC2 instance was created cooperatively by Unidata and Embry Riddle Aeronautical University (ERAU) as part of ERAU's equipment grant award. This instance, which is configured to run AWIPS II Edex, has the following characteristics:

  - AWIPS II Size on Disk: **220 GB**
  - Grids: **97 GB/day raw, 51 GB processed**
  - NGRID: GFS 201, 212, 213, GFS/LAMPTstorm, MOSGuide, NAM 12km, NamDNG5, RTMA 5km and 2.5km, SREF 40km, GEFS. HiResW-NMM and HiResW-ARW, RAP 13km
  - CONDUIT: GFS global 1.0/2.5, NDFD, NAM 40km and 90km, RAP 20km and 40km, GFS 0.5 turned off
  - FSL2: HRRR (72 GB raw, ?? processed)
  - CMC: Regional GEM Model breaks grib2 decoder
  - UNIWISC: 5 GB/day
  - FNEXRAD: DHR, DVL, EET, HHC, N0R, N1P, NTP
  - NEXRAD3, FNMOC: turned off

  This Azure instance is currently serving data to AWIPS II 14.2.1 beta testers:



IDV Application-Streaming Cloud Servers

This project is evaluating *application streaming* as a strategy for making the IDV available to a new generation of users and computing platforms. It is using the Microsoft Azure cloud platform to look at delivering cloud-based IDV-as-a-service instances to our user community on an as-needed basis. The result will be a better understanding of how the IDV works in cloud environments and any changes that might improve that performance.

This project also serves as a pilot program; with it we will further develop expertise related to cloud computing and application streaming. This will allow us to extend cloud-based software offerings beyond the IDV to other Unidata projects.

Issues

- How best to adapt mouse-driven interfaces to a touch-based interface, while minimizing the need to re-engineer any part of the software package.
- Evaluation of bandwidth requirements for acceptable IDV use.
- How to make this transition *seamless* and *painless* to our user community.
- Evaluate the extent to which we can use "off-the-shelf" technology and under what circumstances do we need to create our own protocols and packages.

Current Status

- We are able to instantiate cloud-based IDV instances, which are then streamed via existing remote-desktop protocols to iOS devices. Nothing in the existing technology limits this to iOS devices, however; those are simply the devices on hand for testing.
- Using the Azure Web API, we are able to dynamically allocate and provision VMs for use with hosting the IDV.
- Current efforts are focused on creating a web dashboard which will allow users to register and manage IDV-streaming requests.

IDD Product Generation and Additional Experimentation

- Unidata operates mid-sized instances in both the Amazon EC2 and Microsoft Azure west clouds for the purpose of generating image products for the IDD FNEXRAD (NEXRAD Level III national composites) and UNIWISC (GOES-East/West image sectors) data streams. The EC2 instance is currently the primary source of the FNEXRAD and UNIWISC data streams to IDD participants. The plan is to transition to the use of the Azure cloud instance to reduce recurring costs of running an instance in EC2. (Ward Fisher spearheaded a Unidata effort that resulted in Microsoft awarding use of 32 small VM instances in Azure free-of-charge for approximately 1 year).

- Unidata is in the process of bringing up a TDS instance in the Azure west cloud. This effort may be fully configured by the opening of the User Committee meeting.

- A mid-sized VM instance in Azure is being used to investigate running the IDV in the cloud. RAMADDA has been installed and can generate non-interactive IDV displays using Xvfb for the needed XWindow environment.

Updated: September 8, 2014

Community Services

Status Report: March 2014 - September 2014

Doug Dirks, Jeff Weber, Joshua Young

Strategic Focus Areas

Community Services supports the following goals described in Unidata Strategic Plan:

1. **Enable widespread, efficient access to geoscience data**
   We monitor and collaborate with data sources to stay apprised of impending changes and to advocate for the needs of our user community. We provide user workshops, tutorials, and community workshops to help build supportive relationships between community members.
2. **Develop and provide open-source tools for effective use of geoscience data**
   We promote Unidata tools and software for multi-disciplinary use, with an eye toward finding additional research and educational communities that can benefit from our work.
3. **Provide cyberinfrastructure leadership in data discovery, access, and use**
   We work with government and industry data providers to secure access to data for Unidata community members.
4. **Build, support, and advocate for the diverse geoscience community**
   We coordinate with our governing committees to find ways to expand Unidata's community participation. We use our web site, electronic newsletters, and social media to keep community members informed about enhanced data services, software tools, and cyberinfrastructure.

   We participate in UCAR/NCAR and NSF projects for underrepresnted populations and minority communities (SOARS, AIHEC, outreach to HBCUs). We provide services and tools to facilitate education and research in diverse communities. We work to broaden the Unidata community by participating in student and professional conferences.

Activities Since the Last Status Report

News@Unidata blog

Posts to the News@Unidata blog appear regularly, but not on a specific schedule. Some highlights:

- Unidata Interns Wrap Up Summer Projects
- Unidata Program Center Welcomes Marty Bright
- Unidata Seminar on GEOSS Common Infrastructure
- New IDV Tutorial Videos: Adaptive Resolution and More
- 2014 Community Equipment Awards
- Software release information
- Community job postings
- Community meetings and other announcements

Community Outreach and Services

- Organized Unidata Seminar Series talk on GEOSS Common Infrastructure (Stefano Nativi)
- Distributon of Lightning data from Earth Networks Total Lightning Data is under discussion
- Coordinating with ESRL/GSD on distribution of HRRR, FIM, and HIWPP data
- Participate in weekly AWIPS II meetings with NCEP Headquarters and NCEP Centers technical staff discussing progress and technical issues

- Representing the Unidata community in professional society events such as the AMS and the ESIP summer meetings and federal events such as the NOAA NWS Community of Services meeting
- Participating in the AMS's Committee to Improve Climate Change Communcations (CICCC)
- Actively engaged in the UCAR Education Working Group and UCAR-Connect to explore novel techniques and applications for the educational community
- Work with UPC staff to aid in the set up of EDEX servers for equipment award grantees

Social Media Outreach Activities

- We have continued to update the Facebook and Twitter feeds.
- We continue to publish short videos/screencasts on the Unidata YouTube channel.

Planned Activities

Ongoing Activities

We plan to continue the following activities:

- NAWIPS migration to AWIPS II, including the overall AWIPS II project
- Ongoing development of news articles for publication through News@Unidata
- Continue to support and contribute to governing committees
- Seminars
- Outreach
- Engagement with professional societies
- Triennial workshop planning and coordination

New Activities

We plan to organize or take part in the following:

- Begin creating "Teaching Respources" for the community using RAMADDA and the IDV
- Unidata site visits to the university member community
- AGU annual meeting December 2014 - presentation(s)
- Booth at AMS 2015 January annual meeting
- Table at AMS 2015 January student conference

Relevant Metrics

Statistics from the Community pages on the Unidata web site. Comparisons are made with statistics from the previous six-month period.

All Community pages

Most recent six months

- 43,313 unique pageviews (up from 41,637 in previous period)
- 7.1% of total unique pageviews to site (up from 4.9% in previous period)
  (NOTE: This reflects a change in the way netCDF documentation is presented on the Unidata site, dramatically reduced the recorded number of unique visits to the site, thus increasing the percent of total views for all other pages.)

Top community pages

1. All blog pages
   News@Unidata blog and developers' blog
   - 31,724 unique pageviews (29,370 in previous period)
   - 73% of total community unique pageviews (71% in previous period)
2. About Unidata (www.unidata.ucar.edu/about/)
   Information about Unidata
   - 3877 unique pageviews (4167 in previous period)

9.0% of total community unique pageviews (10.0% in previous period)

3. Events pages (www.unidata.ucar.edu/events/)
   Information about training courses and other events
   - 3379 unique pageviews (2522 in previous period)
   - 7.8% of total community unique pageviews (6.1% in previous period)
4. Community pages (www.unidata.ucar.edu/community/)
   Information about Unidata community events and governance
   - 3217 unique pageviews (3424 in previous period)
   - 7.4% of total community unique pageviews (10.4% in previous period)

Social media statistics, March 5, 2014

1. # of Twitter followers: 359 (330 in March 2014)
2. # of Facebook followers: 317 (290 in March 2014)

Prepared September 2014

IDV with RAMADDA

Status Report: April 2014 - September 2014

Yuan Ho, Julien Chastang

This report updates the status of Unidata's Integrated Data Viewer (IDV) development efforts since the last report (April, 2014).

Strategic Focus Areas

The *IDV* group's work supports the following Unidata funding proposal focus areas:

1. **Enable widespread, efficient access to geoscience data**
   The IDV is a state of the art geoscience visualization application. It gives users the ability to view and analyze a rich set of geoscience data, including real time data, in a seamless and integrated fashion. This analysis is captured in IDV bundles. RAMADDA is a content management system and service specifically tailored towards the sharing and distribution of IDV bundles facilitating distribution of scientific data and analysis.
2. **Develop and provide open-source tools for effective use of geoscience data**
   The IDV has been an open-source project for several years. The IDV is available on the github version control platform for greater open-source collaboration. The IDV provides users the unparalleled ability to analyze, integrate, and visualize heterogeneous geoscience data in two, three, and four dimensions. The IDV coupled with RAMADDA enables geoscience specialists the capability to share and collaborate their IDV analysis via social scientific networks.
3. **Provide cyberinfrastructure leadership in data discovery, access, and use**
   RAMADDA allows geoscience specialists the ability to search and publish their IDV bundles on-line. Unidata's RAMADDA installation enables the IDV team to communicate more effectively to our users concerning their IDV issues. Specifically, during support ticket conversations, the IDV team requests that users upload pertinent data to RAMADDA for analysis. The IDV team also takes advantage of RAMADDA to share instructional IDV screencasts with users.
4. **Build, support, and advocate for the diverse geoscience community**
   Unidata offers yearly multi-day training and occasionally regional workshops for IDV and RAMADDA. The IDV coupled with RAMADDA enables our earth science community partners to distribute geoscience data and metadata through web-based technologies thereby fostering scientific collaborations. Moreover, the IDV's ability to share bundles through RAMADDA creates a scientific social and collaborative network for the geoscience community.

Activities Since the Last Status Report

System Changes

Latest netCDF-Java Version: 4.3.22

Install4J installers now on Java 7: The IDV installers now run on Java 7 (in contrast to the IDV itself which has been running on Java 7 for some time now). The IDV team made this change because Java 6 was end-of-lifed quite a while ago. In addition, some NOAA users were reporting problems running Java 6 on their OS X machines. Also, we continue to enhance the install4j IDV deployment workflow as issues arise.

New version warning: Continue to fix bugs and make improvements to the mechanism that provides an old version warning to users.

IDV Java 7 / Java3D 1.6 migration: Continue to address minor issues concerning the migration to Java 7 and Java 3D 1.6 especially on OS X.

Display Changes

New ADDE Image Chooser: Added an image preview panel in the data subset window, and moved the image property widgets from the original chooser to the Advanced panel in the subset window. The result is a more intuitive and efficient user experience when selecting the area of interest before creating the final display.

Progressive Resolution (PR): This capability is a new advanced feature in the IDV. When loading large datasets with PR enabled, the IDV calculates the resolution of the the map view window, dynamically sets the magnification, and loads sufficient data to generate a high quality image. The result of this improvement is more efficient use of both client and server system resources thereby reducing network traffic significantly.

Match Display Area (MD): When the user selects this option in the data source property or subset panel, the IDV will automatically spatially subset to match the display area in the view window. This feature will allow IDV users to switch to new areas of interest by simply defining the area before creating the display. Users can also redefine the area of interest for a bundle created after 5.0 release.

Backwards trajectories: Fixed a bug associated with the display of backwards trajectories reported by Jim Steenburgh.

Data Changes

GEMPAK Upper Air format Support: Continue to collaborate with Kevin Tyle and the IDV community to improve the GEMPAK upper air data format display capability.

Multiple CF Trajectory Support: Collaborated with Adam Houston from the University of Nebraska and Jim Biard from NOAA to have the IDV handle and display CF compliant trajectory data. This effort is ongoing with these researchers and there will likely be more development in this area over the next 6 months.

IDV and RAMADDA Training and Conference Attendance

- Produced three new IDV training videos:
    - Matthew Dewey explores synoptic meteorology
    - Professor Mapes IDV Seminar on Climate and Weather
    - Adaptive Resolution and Match Display Region
- Provided IDV training at the WRF User's Tutorial in July.

RAMADDA

There is a new RAMADDA plugin available in the IDV. The image generators now allows users to create a movie and save it as a zip file of images. Users can then publish the zip file to RAMADDA to be animated by the RAMADDA image player.

Planned Activities

New Activities

Preparing for the IDV fall training workshop at Unidata on November 3-6.

Preparing for Advanced Operational Aviation Weather System (AOAWS) Fall Training Sep 3-18, 2014.

Submitted an abstract on progressive disclosure in the IDV for the AMS 2014 meeting in Phoenix, Arizona.

Relevant Metrics

The IDV team continues to provide the geoscience community with high-quality support through e-support software and idv-users maillist. In the last half year the IDV team has closed ~150 e-support tickets many of which had involved back-and-forth discussions.

The number of both casual and regular IDV users is stable or increasing. For example, in August 2013, there were 436 IDV users starting the IDV more than 5 times per month compared with 549 users for the same period in 2014. In July 2014, there were 68 IDV users starting the IDV more than 30 times per month compared with 77 users for the same period in 2013. Notably, there are large numbers of new IDV users are from China. Readers can find the raw metrics at http://www.unidata.ucar.edu/software/idv/logging/left.html.

In the area of greater collaborative development, since the migration of the IDV project to github, we have accepted 81 "pull requests" or code contributions from internal and external collaborators.

In the area of online IDV training, the Youtube IDV instructional videos have been viewed over 3,000 times compared with 2,000 from six months ago.

Prepared September 2014

International Activities and Collaborations

Status Report: April 2014 - September 2014

Tom Yoksas

Strategic Focus Areas

The International Activities and Collaboration group's work supports the following Unidata funding proposal focus areas:

1. Develop and provide open-source tools for effective use of geoscience data
   The majority of tools downloadable from Unidata are available free-of-charge to everyone (the exception being McIDAS-X).
2. Provide cyberinfrastructure leadership in data discovery, access, and use
   Activities of the Unidata Program Center are routinely provided to the worldwide atmospheric science community. Strategic partnerships with leading organizations in other countries minimize the impact on UPC staff.
3. Build, support, and advocate for the diverse geoscience community
   By informing the international atmospheric science community of the products, data and services available in the Unidata Program, an extended community has been enabled.
   Non-U.S. users of products available from Unidata reflect, in a number of cases, minority constituencies in the U.S. atmospheric science community.

Activities Since the Last Status Report

There are no significant new activities since the last status report.

The UCAR African Initiative transfer of technologies developed during the Google-funded Meningitis project to the African Centre of Meteorological Application for Development (ACMAD) continues at a low level.

Prior International Activities

Unidata's Africa-related international outreach activities have largely focused on its role in the UCAR Africa Initiative (AI) which officially ended on April 15. The UPC is currently involved in transfer of technologies developed during the UCAR Africa Initiative project to the African Centre of Meteorological Application for Development (ACMAD) which is located in Niamey, Niger. The following are some highlights of the UPC's involvement in the UCAR Africa Initiative:

- The IDV was used to generate displays of forecast relative humidity that is created using TIGGE ensemble data from ECMWF (via the NCAR/CISL TIGGE repository). The 2013 products and data being made available in the RAMADDA instance on motherlode.ucar.edu can be found in:

  Motherlode Data Server

  RAMADDA Data Repository

  Projects -> Africa Initiative -> Data -> 2013 Prediction Exercise
  -> Areal Coverage
  -> Timeseries
  -> TIGGE Model Ensembles

  - areal distribution of the 50% quantile for RH (which means that each point in the RH field has a 50% probability of being that value or less).

These products have been stored as animated GIFs, individual frames of the animated GIFs, and week 1 and 2 averages.

- probe timeseries plots of QC25, QC50, and QC75 fields for districts (a district is a subdivision of a region which is like a U.S. state) in a select set of countries (Benin, Burkina Faso, Cote D'Ivoire, Nigeria, Senegal, Tchad, and Togo) that are located in the meningitis belt (which is roughly the Sahel) in Africa.

  The locations for the probe time series plots are determined by meningitis ***attack rates*** (number of new cases per week normalized by population) that are reported by the national health service of each country.

- Also made available were the RH and quantile regression fields (in netCDF format) that are created from ECMWF ensembles that are part of TIGGE.

Every other Thursday UCAR/NCAR AI team members (Tom Hopson NCAR/RAL, Raj Pandya formerly of UCAR/Spark, and/or Arnaud Dumont NCAR/RAL) participated in conference calls with WHO, U Lancaster, and African nation stake holders to discuss the forecast of meningitis cases for the upcoming 1-4 weeks (focusing on the next and second weeks).

- The final stage of AI work in Unidata included automating the generation of display products upon receipt of a new forecast file produced in RAL (by Tom Hopson).

  There were a number of challenges that had to be overcome to automate the product generation process:

  - The programmatic use of the IDV

    Yuan was very helpful in making changes/additions to the IDV to enable this. Don Murray has also been contributing expertise to help Yuan in his efforts.

  - Use of RAMADDA to serve display products to the African Decision Information System (ADIS) interface that Arnaud Dumont (NCAR/RAL) created for the project.

    Jeff McWhirter (NASA, UNAVCO) readily implemented enhancements to RAMADDA for this task.

  - Scraping human-generated documents to get the list of districts for which probe time series plots should be generated.

    The issue is that the sort of information being made available to folks reading MS excel spreadsheets or MS word documents needs to be turned into machine-readable documents that can be used in the product generation workflow.

Other activities of note:

- Data from UCAR GOES East/West ingest systems continue to be routinely accessed by international users in North, Central and South America using McIDAS-X, IDV, and McIDAS-V.

- Use of Unidata tools, especially netCDF, the IDV and GEMPAK, continues to grow internationally.

- IDD-Brazil continues to deliver data via the LDM in Africa.

Updated: August 29, 2014

IDD and NOAAPort

Status Report: April 2014 - September 2014

Mike Schmidt, Jeff Weber, Tom Yoksas

Strategic Focus Areas

The *IDD/NOAAPort* group's work supports the following Unidata funding proposal focus areas:

1. Enable widespread, efficient access to geoscience data
   A project like the IDD demonstrates how sites can employ the LDM to move data in their own environments.
2. Develop and provide open-source tools for effective use of geoscience data
   The IDD is powered by the Unidata LDM-6 which is made freely available to all. The Unidata NOAAPort ingest package is being used by a variety of university and non-university community members. Both the LDM and NOAAPort ingest packages are being bundled by Raytheon in AWIPS-II.
3. Provide cyberinfrastructure leadership in data discovery, access, and use
   The community-driven IDDs provide push data services to users an ever increasing community of global educators and researchers
4. Build, support, and advocate for the diverse geoscience community
   Providing access to data in real-time is a fundamental Unidata activity.
   The IDD-Brasil, the South American peer of the North American IDD operated by the UPC, is helping to extend real-time data delivery outside of the U.S. to countries in South America and Africa. The Universidad de Costa Rica is experimenting with relaying data received in the IDD to Colombia.

Activities Since the Last Status Report

Internet Data Distribution (IDD)

- Unidata receives High Resolution Rapid Refresh (**HRRR**) grids (both 2D and 3D fields) in an LDM/IDD feed from NOAA/GSD. These products are being made available from the **gale.unidata.ucar.edu**. The challenge in making the data routinely available is its large data volume which is on the order of ~8 GB for the pressure level output and ~10 GB/hour for the sigma level output.

  The HRRR is being experimentally served at: http://thredds-jumbo.unidata.ucar.edu/thredds/modelsHrrr.html (.xml for machines)

- Other data sets we are actively exploring with NOAA/GSD/ESRL are:

  - FIM
  - HIWPP

- HRRR and ESTOFS data are scheduled to be added to NOAAPort in mid to late September. The following TINs announced these additions:

  http://www.nws.noaa.gov/os/notification/tin14-28hrrr-cca.htm
  http://www.nws.noaa.gov/os/notification/tin13-43estofs_noaaport_aaa.htm

  Briefly, these additions will be comprised of:

- HRRR: 81 products, hourly F00-15 each hour. CONUS 2.5km grid184. ~44 GB/day
- ESTOFS: 3 products, hourly F00-F180, 00, 06, 12, 18z runs. CONUS 2.5km grid, Puerto Rico 1.25 km grid. ~2 GB/day

HRRR fields and forecasts times that are not included in the NOAAPort expansion will be evaluated as additions to the CONDUIT IDD datastream.

- The UPC continues to relay FNMOC and the CMC data model output directly to the community. FNMOC provides the COAMPS and NAVGEM model output and the CMC provides the GEM model output. Unidata has provided access to these data for the past 8 years, but on a "point-to-point" basis. GEM model output was converted from GRIB1 to GRIB2 in January. The CMC is now relaying output of there new hi-resolution (15 km) GEM model to Unidata.

NOAAPort Data Ingest

- The NOAAPort SBN, which transitioned from DVB-S to DVB-S2 in April/May 2011, is being upgraded to support just over 60 mbps throughput in aggregate. The UPC has been testing ingest of the high speed broadcast since the onset of a "dual illumination" period (a 45 day window in which existing and new SBN transmissions are active) on August 18.

- Unidata's NOAAPort ingest package is bundled with current versions of the LDM. The current LDM release is v6.12.5.

- Raytheon bundles a version LDM-6 with AWIPS-II and is actively using Unidata's NOAAPort ingest code at a variety of NOAA offices. Raytheon has been providing the UPC code modifications and GRIB table updates needed to support new data to be added to in the NOAAPort expansion. when possible

Relevant IDD Metrics

- Approximately **600** machines at **235** sites are running LDM-6 **and** reporting real time statistics to Unidata. Unidata staff routinely assist in the installation and tuning of LDM-6 at user sites as a community service.

  A number organizations/projects continue use the LDM to move substantial amounts of data that do not report statistics to Unidata: NOAA, NASA, USGS, USACE, Governments of Spain, South Korea, private compaines, etc.).

- IDD toplevel relay node, **idd.unidata.ucar.edu**

  The cluster approach to toplevel IDD relay, has been operational at the UPC since early summer 2005.

  The cluster, described in the June 2005 CommunitE-letter article Unidata's IDD Cluster, routinely relays data to more than 700 downstream connections. Data input to the cluster nodes now routinely averages about 20 GB/hr (~0.5 TB/day); average data output from the entire cluster exceeds 1.3 Gbps (~14 TB/day); peak rates routinely exceed 2.2 Gbps (which would be ~24 TB/day if the rate was sustained).

  The following shows a snapshot by feedtype of the data being received on one node of the Unidata toplevel IDD relay, idd.unidata.ucar.edu.

```
Data Volume Summary for uni14.unidata.ucar.edu

Maximum hourly volume  27500.168 M bytes/hour
Average hourly volume  16285.983 M bytes/hour

Average products per hour     308585 prods/hour

Feed                            Average             Maximum     Products
                      (M byte/hour)           (M byte/hour)   number/hour
NEXRAD2                  7042.426     [ 43.242%]     9842.548    71041.318
CONDUIT                  2531.718     [ 15.545%]     4401.147    50981.750
NEXRAD3                  2228.789     [ 13.685%]     2924.057    97256.909
NGRID                    1624.678     [  9.976%]     3372.235    21758.409
FNMOC                    1166.527     [  7.163%]     6643.485     3242.273
FSL2                      835.136     [  5.128%]     1613.164     1013.523
HDS                       358.902     [  2.204%]      692.099    18245.659
NIMAGE                    160.874     [  0.988%]      292.486      193.727
GEM                        81.814     [  0.502%]      463.448      792.295
```

FNEXRAD	65.020	[0.399%]	110.009	48.318
NOTHER	57.996	[0.356%]	365.100	1162.955
IDS|DDPLUS	53.046	[0.326%]	66.749	42150.591
EXP	36.403	[0.224%]	74.339	326.909
UNIWISC	36.218	[0.222%]	84.984	19.591
LIGHTNING	5.817	[0.036%]	15.456	348.682
DIFAX	0.512	[0.003%]	1.968	0.636
GPS	0.109	[0.001%]	1.197	1.045

Currently six real server nodes operating in one location on the UCAR campus (in the UCAR co-location facility in FL-2) and two directors comprise idd.unidata.ucar.edu. The cluster approach to IDD relay has been adopted by NOAA/GSD, Penn State and Texas A&M.

Updated: August 29, 2014

LDM

Status Report: March 2014 - September 2014

Steve Emmerson, Mike Schmidt, Tom Yoksas

Strategic Focus Areas

The *LDM* group's work supports the following Unidata funding proposal focus areas:

1. **Enable widespread, efficient access to geoscience data**
   The LDM powers the Unidata Internet Data Distribution (IDD) system.
2. **Provide cyberinfrastructure leadership in data discovery, access, and use**
   The LDM allows sites to move data in their own environments.
3. **Build, support, and advocate for the diverse geoscience community**
   The LDM is used by US universities and by entities throughout the world.

Highlights Since the Last Status Report

Multicast-capable LDM-7

Work on the multicast sending and receiving components of LDM-7 are about 80% completed. The components still need to be integrated into the rest of the LDM. LDM-7 has the potential to greatly reduce the bandwidth used by the UPC to distribute data via the Internet Data Distribution (IDD) system.

Added ability to disable anti-denial-of-service feature

This was done in response to a difficulty in using the LDM by NASA's Johnson Space Center. The anti-DOS feature should only be disabled by sites that know and trust *all* downstream LDM-s that can feed from it.

LDM now using c99(1) standard

Had to happen sometime. The LDM code is deliberately kept back from the latest standards in order to accomodate older environments.

Adapting to new NOAAPORT SBN broadcast

Two new data channels were added and work continues on enhancing ingestion of the new NOAAPORT broadcast.

Added support for the syslog-ng(8) system logging daemon

The LDM installation process traditionally expected that the system logging daemon was syslog(8) or rsyslog(8). Debian-based Linux systems (e.g., Ubuntu) use syslog-ng(8) instead. This would break the LDM installation until the user reverted to a syslog(8) variant.

Increased assumed mean product-size from 4096 bytes to 51,000 bytes

This parameter is used to compute the default maximum number of data-products that the LDM product-queue can hold -- given the maximum size for the queue in bytes. The smaller number was correct for 1996 -- but not now.

Planned Activities

Ongoing Activities

We plan to continue the following activies:

- Support LDM users
  - Email, phone, etc.
  - Training workshops
- Work on multicast-capable LDM-7
- Incrementally improve the LDM as necessary
- Incorporate additional AWIPS-II-related changes into the LDM
- Update table-driven decoding of GRIB products as necessary

Prepared August 2014

McIDAS, ldm-mcidas, Satellite Data Ingest

Status Report: April 2014 - September 2014

Tom Yoksas

Strategic Focus Areas

McIDAS activities support the following Unidata funding proposal focus areas:

1. Enable widespread, efficient access to geoscience data
   *McIDAS remains **the** application of choice for the satellite meteorology community.*
   The Advanced Data Distribution Environment (ADDE) componet of McIDAS was the first application offered by Unidata to provide remote, programmatic access to a wide variety of data that is important to the atmospheric science community.
2. Develop and provide open-source tools for effective use of geoscience data *The fifth generation of McIDAS, McIDAS-V, unlike its predecessors, is a fully open source application that is is in wide scale and growing use in the satellite meteorology community.*
   McIDAS ADDE continues to evolve and provide access to increasing volumes of image and non-image data.
3. Provide cyberinfrastructure leadership in data discovery, access, and use
   Concepts articulated in ADDE inspired the development of THREDDS (to address the lack of rich metadata available in ADDE) and RAMADDA. ADDE remains one of the most used data services in the Unidata suite serving over 3 TB per month.
4. Build, support, and advocate for the diverse geoscience community
   McIDAS is sought for use by those interested in satellite meteorology worldwide.

Activities Since the Last Status Report

Unidata McIDAS v2014 released on September 8, 2014

Unidata McIDAS version 2014 includes all SSEC versions up to and including the current release, v2014.1 and Unidata updates and bugfixes. Changes to Unidata McIDAS continue to be made through an **addendum** process.

SSEC McIDAS Advisor Committee (MAC)

The UPC (Yoksas, Ho) continues to participate as the Unidata representative to the McIDAS Advisory Committee (MAC) that is operated by SSEC.

The MAC was assembled by UW/SSEC to advise SSEC on McIDAS-X users needs/concerns/desires for development in the next generation McIDAS, McIDAS-V. The MAC was modeled after the Unidata IDV Steering Committee.

Interest in McIDAS by Non-core Users

The UPC continues to receive requests for McIDAS from international university users, U.S. government agencies and other non-traditional Unidata users (e.g., private businesses, etc.). Government agencies and non-traditional Unidata users are referred to UW/SSEC for access to McIDAS; international educational community user requests are granted on a case-by-case basis after they provide a clear statement of their acceptance of the terms of use provided by SSEC.

Planned Activities

Ongoing Activities

Continued support of existing and new community members.

New Activities

Implementing an indexing scheme for ADDE image datasets to speed up access especially in large and archive datasets. A preliminary design for ADDE image dataset indexing has been made. Investigations for how to integrate the new capbilities in to the suite of existing ADDE servers is in progress.

Add support for new types of data when they become available, otherwise McIDAS-X support is in maintenance mode.

Relevant Metrics

- Internet2 (I2) bandwidth usage by the McIDAS ADDE protocol routinely exceeds several TB/week.
- McIDAS Inquiry Metrics

ldm-mcidas Decoders Activities

Development

ldm-mcidas releases are made when needed to support changes in software development and operating system environments. **ldm-mcidas** v2012 was released at the end of September, 2012. This release addressed building on newer OS versions.

Geostationary Satellite Data Ingest

Unidata continues to ingest GOES-East and GOES-West imager data at the UCAR Foothills Lab campus in Boulder. GOES-South (GOES-South America) was decommissioned on August 16, 2013, and there appears to be no current plans for repurposing an existing GOES platform for South American surveillance.

- Direct, programmatic access to real-time GOES-East (GOES-13) data via McIDAS ADDE is being used by approx. 35 users who downloaded an average of approx. 0.75 TB/week over the past year.
- Direct, programmatic access to real-time GOES-West (GOES-15) data via McIDAS ADDE is used by approx. 25 users have downloaded an average of 0.4 TB/week for the past year.

Planned Activities

Ongoing Activities

Continued ingest and serving of GOES-East and GOES-West imagery. This effort sporadic requires maintenance of the satellite ingest and computer data equipment.

New/future Activities

Repurpose former USAN dish at Mesa Lab to operation as a remotely controllable ingester for any of the GOES platforms. This is a moderately low priority activity.

Proposed Activities

Begin planning for the resources it will take to ingest and disseminate GOES-R data (which is currently scheduled to become available in second quarter 2016). This activity will proceed with cooperation/coordination of NCAR/RAL, NCAR/EOL and NOAA. A draft DRAFT Executive Summary and Budget (i.e., a *non-proposal* "proposal") was developed in cooperation with RAL and EOL, and submitted to Steve Goodman who is in NOAA's GOES-R office. This funding effort will be resurrected for fiscal year 2014.

Updated: September 2, 2014

The Unidata Program Center is a member of the UCAR Community Programs, is managed by the University Corporation for Atmospheric Research, and is funded by the National Science Foundation.

NetCDF

Status Report: April 2014 - September 2014

Russ Rew, Ward Fisher, Dennis Heimbigner

Strategic Focus Areas

The *netCDF* group's activities support Unidata's strategic goals in the following ways:

1. **Enable widespread, efficient access to geoscience data** *by developing netCDF and related cyberinfrastructure solutions to facilitate local and remote access to scientific data.*
2. **Develop and provide open-source tools for effective use of geoscience data** *by supporting the use of netCDF and related technologies for analyzing, integrating, and visualizing multidimensional geoscience data; enabling visualization and effective use of very large data sets; and accessing, managing, and sharing collections of heterogeneous data from diverse sources.*
3. **Provide cyberinfrastructure leadership in data discovery, access, and use** *by developing useful data models, frameworks, and protocols for geoscience data; advancing geoscience data and metadata standards and conventions; and providing information and guidance on emerging cyberinfrastructure trends and technologies.*
4. **Build, support, and advocate for the diverse geoscience community** *by providing expertise in implementing effective data management, conducting training workshops, responding to support questions, maintaining comprehensive documentation, maintaining example programs and files, and keeping online FAQs, best practices, and web site up to date; fostering interactions between community members; and presenting community perspectives at scientific meetings, conferences, and other venues.*

Activities Since the Last Status Report

Project and Issue Tracking

We use a project tracker tool to manage bug reports, track issues, plan releases, and make our development process more transparent to users. Between 1 April 2014 and 29 August 2014, we created **15** new Jira issues, updated **3** issues, resolved **9** issues, and we currently have **81** open issues. In addition, **17** GitHub issues were resolved, and **8** GitHub issues currently remain open. (Note: issues vary greatly in size and effort required to resolve, so number of issues is not a useful measure of amount of work to do.)

An important milestone during the last six months was completion of CMake support for netCDF-Fortran, which makes it possible to now build netCDF-Fortran libraries on Windows platforms, after installing the netCDF-C library. Another related milestone is prominent use of netCDF data in ESRI visualizations in one of the short opening plenary talks at the recent annual ESRI User Community meeting.

The netCDF-C test dashboard continues to provide results of testing the most recent development code with various configurations on multiple platforms.

Releases

The netCDF-C 4.3.2 release was made available in April, following 2 release candidates. Since then, we announced a release candidate for version 4.3.3 that includes various bug fixes and enhancements to portability and documentation, as described in the latest Release Notes.

A July release of netCDF-Fortran version 4.4.0, the first full Fortran release since October 2011, added support for recent language standard updates, in particular C-compatibility features that have greatly improved portability for various Fortran compilers on a variety of platforms. Use of the C compatibility feature in modern Fortran standards instead of a complex netCDF-specific header file has already lessened our support burden for netCDF-Fortran, as demonstrated by the decline in support questions.

Another important netCDF-related release is version 2.2.17 of the UDUNITS package, adopted over a decade ago by the CF (Climate and Forecast) Conventions for netCDF metadata. Although previous versions of UDUNITS have been easy to install on Unix-based platforms, this is the first version adapted to support building and installing on Windows. Its C library provides for arithmetic manipulation of units and for conversion of numeric values between compatible units. The package also contains an extensive user-extendable units database and a command-line utility for investigating units and converting values.

Collaborations

Increasing collaboration includes continued "pull requests" from community developers contributing fixes, as well as use of the GitHub issue-tracking system.

We continue to work with Jeff Whitaker (NOAA/ESRL), developer of netcdf4-python, a widely used Python interface to netCDF-4 now hosted in the Unidata GitHub repository.

A collaborator at Mississippi State, Associate Research Professor Richard Weed, has contributed much of the new Fortran-2003 code as well as new Fortran-2008 enhancements.

Planned Activities

Ward will be presenting an afternoon session on netCDF in September for a group of visitors from the Chinese Aviation Agency, as part of a two-week workshop associated with a RAL project.

For the October Unidata Training Workshops, we plan to lead sessions on the use of netCDF with Python, in collaboration with other Unidata developers and Jeff Whitaker.

Short- and medium-term development plans are driven by the list of about 90 open Jira and GitHub issues for netCDF libraries, utilities, and documentation.

During the next six months, we also plan to continue efforts to

- improve example programs for netCDF-4
- implement Doxygen-generated documentation for netCDF-Fortran
- improve organization of Doxygen-generated documentation for the netCDF-C library

Ongoing Activities

- respond to support questions and help requests from netCDF users
- improve support for netCDF on various platforms
- incorporate successful features of Java and Python APIs into C-based libraries
- improve capabilities for representing observational data, satellite products, and geoinformatics data

New Activities

Longer-term plans include addressing a need discussed at the last Strategic Advisory Committee meeting, to survey and help tool providers work towards more complete support of the netCDF-4 enhanced data model-4. There has already been much recent progress adding netCDF-4 support to NCO and NCL. NCO now supports groups, chunking, and all of the netCDF-4 primitive types. NCL now provides beta-level support for the complete NetCDF 4 data model, including primitive and user-defined netCDF-4 data types: string, variable-length, compound, enumeration, and opaque, as well as features like groups, chunking, compression, and caching. The netcdf4python package also continues to add support for more features of the enhanced data model.

Efforts we have taken to encourage and support use of the enhanced data model include:

- a white paper on developing CF conventions for netCDF-4
- providing complete support for every feature of the netCDF-4 enhanced model in our **ncdump** and **ncgen** utilities
- providing the **nccopy** utility for format conversions to and from netCDF classic and enhanced model formats, where possible
- a past AGU talk on experience converting software to use the enhanced data model

Metrics

Detailed metrics, including for netCDF-Java/CDM, are available.

Other metrics, with comparisons from 5 months ago, include number of

- Defects per thousand lines of code (Coverity estimate): **0.36**, (0.87 in April 2014)
- Google hits for "netcdf-3": **395,000**, (828,000 in April 2014)
- Google hits for "netcdf-4": **393,000**, (759,000 in April 2014)
- Google scholar entries for "netcdf": **11,800**, (11,000 in April 2014)
- Free software packages that can access netCDF data: **83**
- Commercial software packages that can access netCDF data: **23**

Prepared September 2014

The Unidata Program Center is a member of the UCAR Community Programs, is managed by the University Corporation for Atmospheric Research, and is funded by the National Science Foundation.

GEMPAK/NAWIPS

Status Report: September 2014

Michael James

Strategic Focus Areas

GEMPAK supports the following goals described in Unidata Strategic Plan:

1. **Enable widespread, efficient access to geoscience data**
   GEMPAK remains widely used among academics, researchers and students as a way to visualize meteorological data in a package used by a number of operational forecasters. New data formats continue to be added and support for existing formats continues to improve.
2. **Develop and provide open-source tools for effective use of geoscience data**
   GEMPAK is and always will be open-source.
3. **Build, support, and advocate for the diverse geoscience community**
   GEMPAK continues to support new data formats, and Unidata continues to focus on training and documentation to bring in more of the university and research community. Scatterometer data visualization, for example, is being improved to prepared for use by marine forecasters from tje India Meteorological Department. A training workshop in Hyderabad, India is in the preliminary planning stage.

Activities Since the Last Status Report

- Major release 7.1.
- Binary builds for three Linux platforms and OS X Darwin, with rpmbuild spec files hosted on Github.
- Added a fix for NEXRAD compositing functionality for Enhanced Echo Tops (EET), which use dual linear parameter scales to transmit echo height and topped status, which previously resulted in incorrect values over radar dish antennea locations.
- GEMPAK GINI product generation was updated to conform to standards used in McIDAS for radar values of "missing", "no data", "unknown", etc.
- Still producing / testing new precipiation accumulation composites OHA, DPA, DAA, etc.
- Extended FNEXRAD compositing functionality to ensure exact data equivalence in gridded and GINI satellite composite products.
- **Scatterometer data investigation** (**Action Item**): OSCAT data from NESDIS no longer available due to **instrument failure**. ASCAT_HI and Jason data pulling from CPTEC/INPE via LDM.
- GEMPAK tabes have been updated to support more international grids
- Added live product generation via LDM on our in-house gempak data server.
- Working on full HRRR support in anticipation of upcoming NOAAport changes.

Prepared March 2014

Unidata Python Efforts

Status Report: April 2013 - September 2014

Sean Arms, Julien Chastang, Ben Domenico, Ward Fisher, Ryan May, Russ Rew

Python has been embraced by the earth science community for analysis, visualization and data exploration. Geoscience professionals are replacing collections of poorly integrated software tools and languages with this general purpose programming language that can handle remote data requests, statistics, analysis, and visualization. As a result, the Unidata 2018 Proposal highlights the Python programming language and ecosystem as an area where Unidata should focus efforts to benefit the core community. To that end, we have initiated Python training and software projects centered around existing Unidata technology.

Strategic Focus Areas

Python activity at Unidata supports the Unidata strategic goals in the following ways:

1. **Enable widespread, efficient access to geoscience data.** Python can facilitate data-proximate computations and analyses through IPython (now Jupyter) Notebook technology. In particular, IPython Notebook web servers can be co-located to the data source for analysis and visualization through web browsers. This capability in turn, reduces the amount of data that must travel across computing networks. There are also external providers such as Wakari and coLaboratory that help to promote the use of this technology as a cloud service.

2. **Develop and provide open-source tools for effective use of geoscience data.** Our current and forthcoming efforts in the Python arena will facilitate analysis of geoscience data. This goal will be achieved by continuing to develop Python APIs tailored to Unidata technologies. For the summer 2013 Unidata training workshop, we developed an API to facilitate data access from a THREDDS data server. This effort was later encapsulated with the new pyUDL (a collection of Python utilities for interacting with Unidata technologies) project. Moreover, Python technology coupled with HTML5 IPython Notebook technology has the potential to address "very large datasets" problems. In particular, an IPython Notebook can be theoretically co-located to the data source and accessed via a web browser thereby allowing geoscience professionals to analyze data where the data reside without having to move large amounts of information across networks. This concept fits nicely with the "Unidata in the cloud" vision. Lastly, as a general purpose programming language, Python has the capability to analyze and visualize diverse data in one environment through numerous, well-maintained open-source APIs.

3. **Provide cyberinfrastructure leadership in data discovery, access, and use.** The TDS catalog crawling capabilities found in pyUDL will facilitate access to data remotely served by the Unidata TDS, as well as other TDS instances around the world. The desired goal of pyCDM is to construct a geoscience focused data model in Python, based heavily on the netCDF-Java implementation of the Common Data Model (CDM). pyCDM is anticipated to provide a simple, pythonic API to the higher level functionality of the FeatureType layer of the CDM.

4. **Build, support, and advocate for the diverse geoscience community.** Based on grassroots interest from the geoscience community, Unidata, as part of its annual training workshop, will host a two day session to explore "Python with Unidata technology". Also, to try to help the use of NetCDF in Python, Unidata has promoted Jeff Whittaker's NetCDF4-python project, including hosting its repository under Unidata's GitHub account.

Activities since last spring

SciPy 2014

Ryan May and Julien Chastang attended the SciPy 2014 conference in Austin, TX. The atmospheric and oceanic sciences community continues to grow its presence, which is promising to see. Another common thread throughout the conference was the use of IPython, especially the notebook interface. It is clear that this technology is a vital and vibrant platform for development. Other notes:

- The IRIS and Cartopy projects continue to be active and well-supported. Cartopy seems to be an excellent replacement for Basemap, with an API that better fits in with matplotlib. IRIS seems promising for working with data, but we lack experience with it in-house to fully evaluate and understand its capabilities.
- The IPython project has been rebranded as "Project Jupyter" (Julia, Python, R). The goal of the rebrand is to place emphasis on its language-agnostic capabilities (many different languages can actually be used for computational kernels) and try to foster a greater community around the concept fundamental to the project: a distributed, collaborative, and reproducible research environment. Part of the short-term work on this project will be to separate any remaining python-specific parts of the core from the IPython kernel itself.
- coLaboratory is based on Project Jupyter and provides an environment to collaborate on IPython notebooks through Google Drive.
- With scientific reproducibility as a goal, "Conda" technology is meant to solve the somewhat bleak Python packing problem. It is a system level package manager that is cross-platform (Linux, OS X, Windows). Conda is Python agnostic. It does not require administrator privileges. Conda installs binaries (no compilation required).
- Binstar is the mechanism by which users and organizations share Conda packages.
- Biggus is another Scitools project (e.g., IRIS and Cartopy) that has emerged from the British Met Office. Biggus is for lazily handling very large arrays that cannot fit exclusively into memory.
- Julien Chastang presented a birds of a feather (BoF) on emacs and Python.

Unidata Python Workshop

Organizing the Unidata Python Workshop . This workshop aims at geoscience analysis, and visualization centered around Unidata technology and in particular, netCDF and THREDDS. In addition, the workshop tries to introduce important concepts from the scientific Python stack, such as git version control, numpy, and matplotlib. We continue to refine the materials used in the last workshop to make improvements and adjust their scope.

Cloud-based collaborative python development

Wakari is a software vendor that provides web-based Python data analysis. As part of Unidata's first training workshop on software development using Python, we began to experiment with the Wakari cloud-hosted development solution. The objective here to enable server-side data-proximate analysis as well as to facilitate the Python software installation process for our user community. This work has continued albeit at a slower pace due to the departure of one of the main contributing software engineers.

2014 Student Summer Internship

The Unidata Student Summer Internship program concluded its second year in August 2014. This year, two students participated in the program. One student, Florita Rodriguez from Texas A&M University, focused on using python and the interactive widgets from IPython to interact with current and archived tropical storm and hurricane data from the National Hurricane Center. The project is open source, and can be found under Unidata's github account. More information can be found in Florita's blog post on the Unidata Developers Blog.

Planned Activities

Ongoing Activities

We plan to continue the following paths of development and community engagement:

- netcdf4-python
  - Continue to supplement Jeff's user support as resources allow.
  - The move to GitHub has continued to yield increased community participation in terms of issues reported and submitted pull requests.
  - Help develop full support of the netCDF-4 data model.
  - Expose the ability to access data from the TDS using the CDM Remote access protocol.
- OWSlib and Brokering
  - Since the training workshop, the cloud-based development has been focused on using community supported OWSlib tools for accessing data from OPeNDAP servers via a brokering layer that makes the data available via other standard interfaces, especially Web Map Service (WMS) and Web Coverage Service (WCS). Very recently, experimentation has begun with SOS in the context of the ncSOS extension to TDS.
  - This collaborative effort continues as resources allow.
  - Unidata has been invited to participate in the Research Data Alliance (RDA) as a member of the brokering middleware governance working group.
- matplotlib
  - Previously contributed code to enable Skew-T plots has been released with 1.4.0.
  - Plan to enhance animation support in matplotlib to add control toolbar. This request has been made by many in the matplotlib community, including Dr. Alex DeCaria of Millersville.
- MetPy
  - Completed Nexrad Level 2 / Level 3 decoders in support of testing these formats in netCDF-java
  - Need to develop consistent internal data model (PyCDM?) for library

New Activities

We plan to contribute to the Python ecosystem with the following effort:

- pyCDM
  - Create an implementation of the Common Data Model (CDM) in python.
  - Starting work on a proposal in anticipation of future RFPs.
  - Looking for collaborators.
  - In June, we met with Martin Schultz and Snehal Waychal from Forschungszentrum Julichas. They wanted to share with us their beginning development of a pyCDM library to facilitate their project. They graciously shared their code with us.
- IPython webGL-based visualization
  - Using IPython (without the notebook interface) we can interface Python analysis code on the server with javascript (and WebGL) code for visualization in the client.

Relevant Metrics

33 issues and 22 pull requests created for netcdf4-python since 1 April 2014.

Prepared August 2014

Rosetta

Status Report: March 2014 - September 2014

Sean Arms, Jen Oxelson, Jeff Weber

Strategic Focus Areas

The Rosetta group's work supports the following Unidata funding proposal focus areas:

1. **Enable widespread, efficient access to geoscience data**

   The initial goal of Rosetta is to transform unstructured ASCII data files into the netCDF format; once in this format, standard tools, such as the THREDDS Data Server, IDV, Python, and other analysis packages, can take advantage of these datasets with relative ease.

2. **Develop and provide open-source tools for effective use of geoscience data**

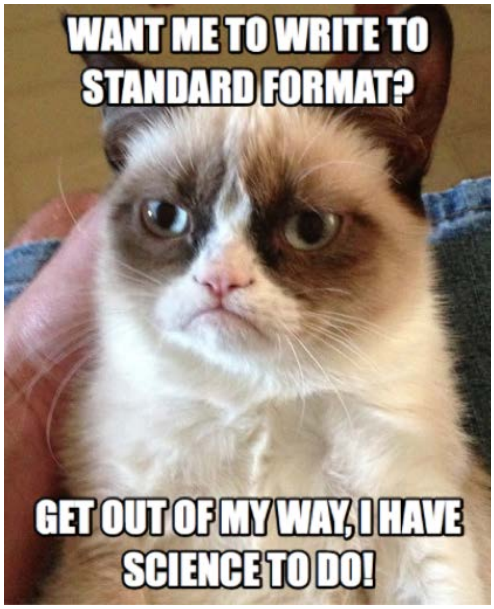
   Although the primary goal of Rosetta is to get data into the netCDF format, the transformation process does not stop there. The Rosetta group realizes that not everyone knows how to work with netCDF files, and may feel more comfortable working with other formats. Therefore, Rosetta includes the ability to transform from one format to another (e.g. netCDF to .xls), thereby reducing data friction.

3. **Provide cyberinfrastructure leadership in data discovery, access, and use**

   Metadata contained in netCDF format file (no longer locked away in a separate README file) can be automatically extracted, facilitating the discovery of data in these files. Additionally, the Rosetta development plan includes the creation of a standard ASCII and spreadsheet representations of the CF-1.6 DSGs.

4. **Build, support, and advocate for the diverse geoscience community**

   Promote the use of standard formats in the dissemination of data, while allowing flexibility to transform into other formats, as needed, to enable users to "do science". For commonly used formats, such as User Defined ASCII format or an unstructured spreadsheet, create and advocate for the use of a standard representations based on the CF-1.6 DSGs.



Activities Since the Last Status Report

Live demos to various groups

AMS 2014 Presentation

Arms, S. C., J. O. Ganter, J. Weber, and M. K. Ramamurthy, 2014: Rosetta - Unidataâ€™s Web-based Translation Tool: Progress and Future Plans. 30th Conference on Environmental Information Processing Technologies, 94th AMS Annual Meeting, Atlanta, GA, A.84. Available online at https://ams.confex.com/ams/94Annual/webprogram/Paper240011.html

Basic Documentation

Transitioned to using Doxygen for user and developer documentation:

http://www.unidata.ucar.edu/software/rosetta/dox/html/index.html

Accomplishments of Note

- Added the ability to publish converted files directly to RAMADDA and the ACADIS Gateway
- Live instance of Rosetta hosted at Unidata for testing
- Released the Rosetta source code on github
- Transitioned to Doxygen for documentation

Planned Activities

Ongoing Activities

We plan to continue the following lines of development:

- Increase the number of CF-1.6 discrete sampling geometries handled by Rosetta
- Begin collecting metrics for the instance of Rosetta hosted at Unidata
- Continue documentation efforts, including the creation of screencasts for User documentation
- Solicit examples from the community (**hint, hint...that's you guys!**)

New Activities

We plan to enhance Rosetta in the following ways:

- Investigate csv and xls(x) representations of the CF-1.6 Discrete Sampling Geometries
- Enable Desktop (local) use of Rosetta
- Anyone who sees this and comments on it will get a free cookie, cheese and crackers, veggies, or fruit, to be delivered at the time of the meeting
- Incorporate TDS capabilities into Rosetta, allowing for TDS services (like point subsetting of grids) to easily be applied to local files
- Create infrastructure to collect use metrics for Rosetta
- We would like to move the Rosetta code into the THREDDS codebase. One reason is to keep the Rosetta code in lock-step with developments in the CDM (netCDF-Java) library with regards to Point Data. The second reason is that in addition to the ability to publish converted files into RAMADDA and the ACADIS Data Repository, we would like to enable Rosetta to publish files into THREDDS Data Servers (TDS). Not only would users be able to publish files into a TDS, Rosetta would also provide a way to customize THREDDS Catalogs for their datasets in a user friendly way.

We would love your input as to where our priorities should be in terms of these New Activities. Let's chat! And, yes, please...**send example ASCII data** :-) K THX BAI!

Relevant Metrics

We've received a handful of support questions regarding the availability of Rosetta, as well as requests for demonstrations.

Prepared August 2014

User Support

Status Report: April 2014 - September 2014

Tom Yoksas, Jen Oxelson, UPC Staff

Strategic Focus Areas

The Support group's work supports the following Unidata funding proposal focus areas:

1. Enable widespread, efficient access to geoscience data
   Unidata User Support enables access to geoscience data by supporting the use of tools created and/or supported by the UPC.
2. Build, support, and advocate for the diverse geoscience community
   The user support provided by the UPC is recognized throughout the atmospheric science community. Unidata's outreach efforts are routinely called out in surveys of the NCAR/UCAR community.

Activities Since the Last Status Report

Training

- The UPC participated in a regional workshop hosted by the University of Miami on April 18-19.

- The UPC conducted a 4-day training of Taiwanese Civil Aviation Authority (CAA) personnel in Boulder during the week of September 8. The CAA technical representatives are in Boulder for their annual meetings with and training by NCAR/RAL. RAL representatives (Jim Cowie and Gary Cunning) requested that Unidata conduct the training on Unidata technologies (netCDF, TDS, LDM, Python) that RAL is encouraging the CAA to adopt. RAL is funding Unidata staff members time for the training.

- The UPC will host its annual training workshop series from October 21 - November 6.

Relevant User Support Metrics

Since January 26, 2006 over 42100 user support "transactions" (new inquiries and follow-ups) have been processed through the Unidata inquiry tracking system.

Support by Category

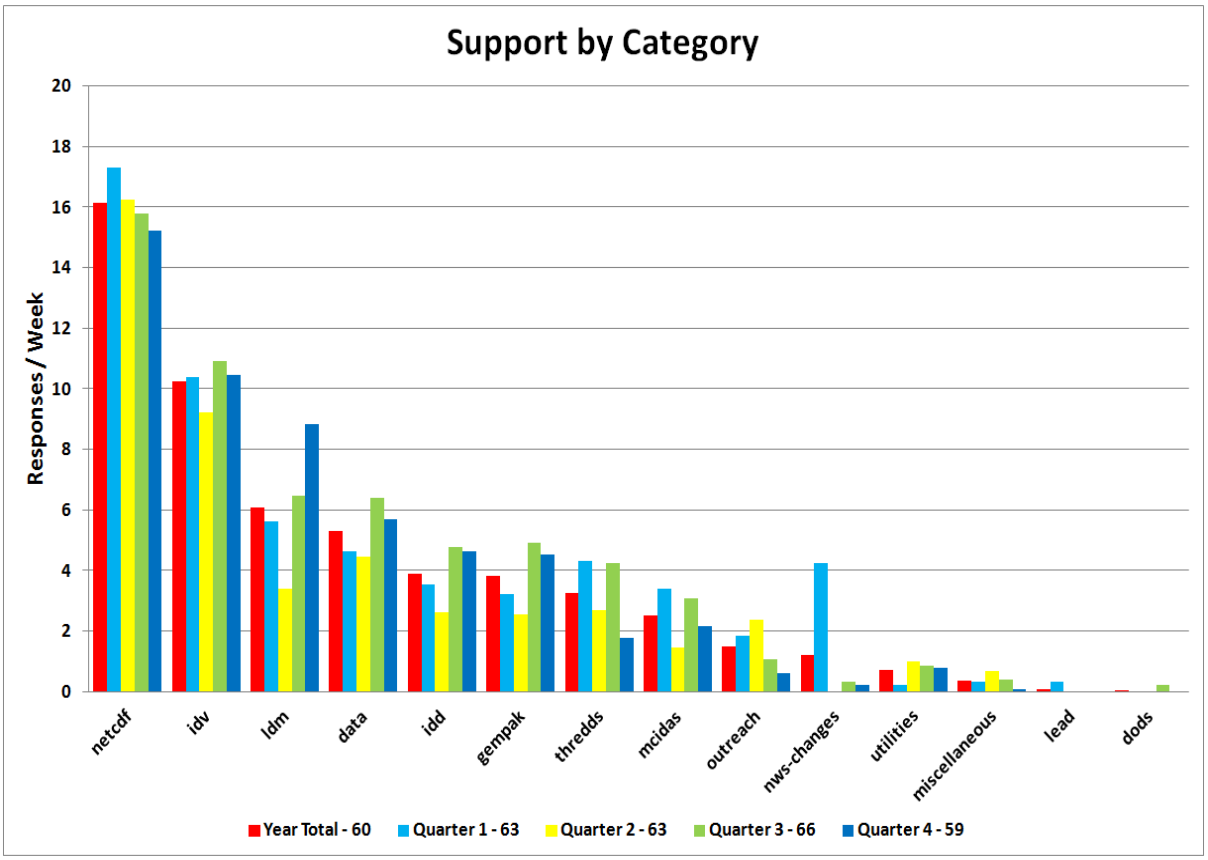


Fig. 1: Above are histograms that portray the number of Unidata email responses for categories of support for a one year period ending September 2, 2014. The histograms are arranged by yearly activity averages with the highest on the left and lowest on the right. Each quarter year within the period is depicted from oldest to newest from left to right. The number of responses has been normalized to weekly averages so that the support load over the various periods can be easily compared.

Individual support activities included in the categories depicted above are listed in the following table.

Category	Packages, Groups, and Lists
data	casestudies, casestudies-list, conduit, craft, craft-nws, craft-ty, datastream, difax, level2, level2-ty, noaaport, noaaport-ty, noaaportldm
dods	dods, dods-core, dods-list, dods-tech, dods-team, opendap, opendap-core, opendap-list, opendap-tech, opendap-team
gempak	gempak, gembud-list
ldm	ldm, ldm-users-list
lead	lead, leadusers
idd	cluster, idd, idd-antarctic, idd-brasil, idd-caribe, idd-inject, idd-status, scoop, suominet, tigge
idv	idv, idvlist, idvsteering, metapps, visad-list, visad-renderer
mcidas	mcdevelop, mcidas, mcidas-list
miscellaneous	esupport, fxlinux, license, misc, network, notrack, platforms, wxp, wxp-list
netcdf	data-models, libcf, ncml, netcdf, netcdf-misc, netcdfgroup-list, netcdf-hdf-list, netcdf-java, netcdf-perl
nws-changes	nws-changes

outreach	agu-ty, announce, argentina-ty, barbados-ty, brazil-ty, cbmet-ty, chile-ty, egrants, external, iai-ty, meteoforum-ty, mexico-ty, unidata, workshop
thredds	java-dev, java-dev-list, thredds
utilities	decoders, ldm-mcidas, udunits

Support by Topic

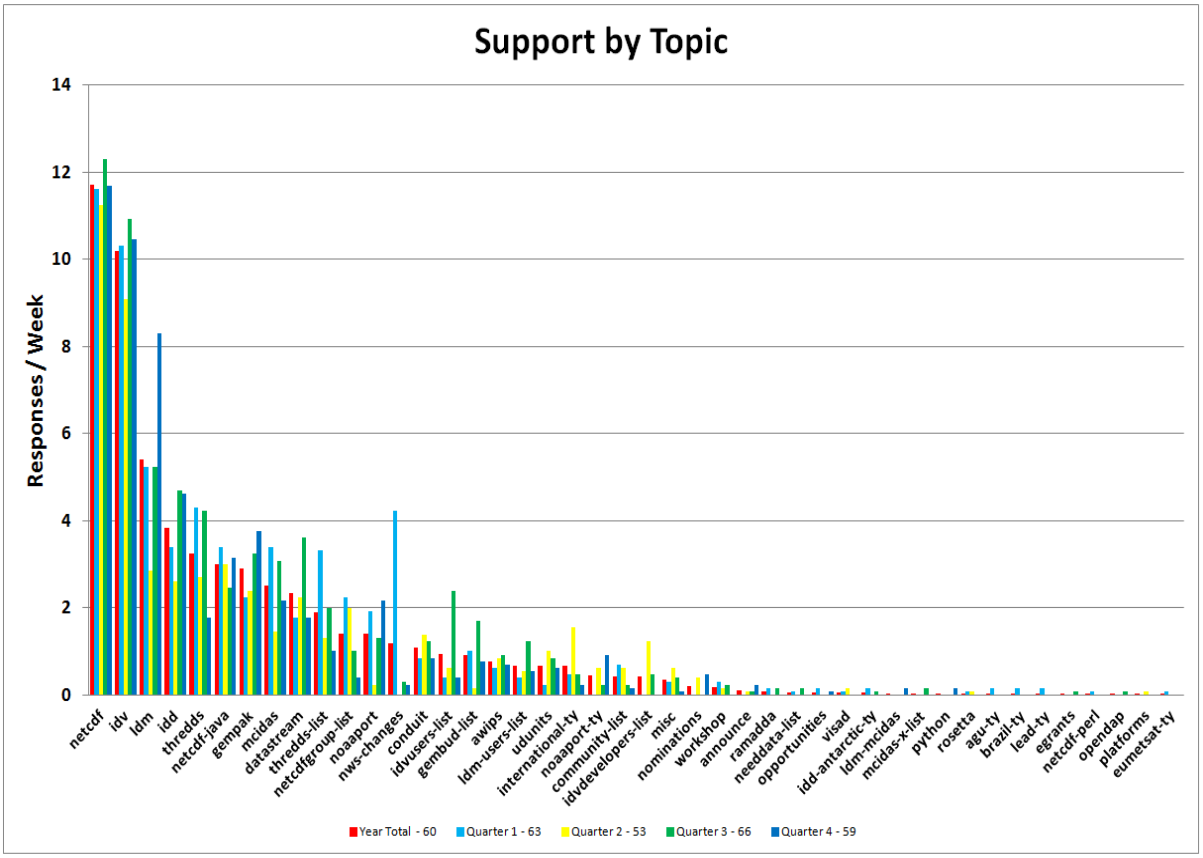


Fig. 2: Above are histograms that portray the number of Unidata email responses for individual topics of support for a one year period ending September 2, 2014. The histograms are arranged by yearly activity averages with the highest on the left and lowest on the right. Each quarter year within the period is depicted from oldest to newest from left to right. The number of responses has been normalized to weekly averages so that the support load over the various periods can be easily compared.

Comments

- The marked decrease in the average number of weekly support transactions reflects the decrease in outreach activities formerly performed by Linda Miller who retired in November, 2013, and in international activities that decreased significantly when the UCAR Africa Initiative Google Meningitis project ended.
- The total support provided by the UPC remains high, and yearly totals have been relatively constant for the past two years. Overall support activities vary by somewhat by quarter. Spikes in support for individual packages is largely correlated with the release of new distributions, and, for the IDV in particular, jumps after training workshops.
- Support for netCDF continues to be substantial, and is understandable given the **large** number of users of the package worldwide.
- The IDV support load is second only to that for netCDF; no large increases have been seen over the past 6 months.
- Support for netcdf-java continues to grow steadily.
- Support for the legacy visualization packages GEMPAK and McIDAS continues to be substantial.
- Support for LDM, IDD, and data continues at a high level and shows some variability throughout the year.
- Taken as a whole, the support required for visualization packages (GEMPAK, IDV, and McIDAS) is comparable to the support related to data reception (LDM, IDD, noaaport).

The high numbers for outreach reflect the high level of activity in a variety of activities including organizing sessions at various national meetings.

Notes

These numbers and conclusions should not be taken too literally, for several reasons:

- For some packages, multiple responses in the same thread may be bundled into a single archived email. Other packages have each response in a thread counted separately.
- After a new release of software, there may be a flurry of the same or similar questions, which can be answered in separate emails or in a single mailing list posting.
- The graph primarily represents support of end users and site administrators, not developers. Support for non-Unidata developers in projects such as THREDDS, IDV, GEMPAK, and McIDAS requires significant resources, but is difficult to assess.
- Not all support records were indexable for this report. Given this, the above numbers are an ***underestimate*** of the actual support being provided by the UPC.

Additional User Support Inquiry Metrics

Updated: September 8, 2014

THREDDS

Status Report: April 2014 - Sept 2014

John Caron, Ethan Davis, Dennis Heimbigner, Sean Arms, Christian Ward-Garrison, and Ryan May

Strategic Focus Areas

The *THREDDS* group's work supports the following Unidata funding proposal focus areas:

1. **Enable widespread, efficient access to geoscience data**

   The work of the THREDDS group is comprised of two main areas: the THREDDS Data Server (TDS) and the Common Data Model (CDM) / netCDF-Java library. The TDS provides catalog and data access services for scientific data using OPeNDAP, OGC WCS and WMS, HTTP, and other remote data access protocols. The CDM provides data access through the netCDF-Java API to a variety of data formats (e.g., netCDF, HDF, GRIB). Layered above the basic data access, the CDM uses the metadata contained in datasets to provide a higher-level interface to geoscience specific features of datasets, in particular, providing geolocation and data subsetting in coordinate space. The CDM also provides the foundations for all the services made available through the TDS.

   The data available from the IDD is a driving force on both the TDS and netCDF-Java development. The ability to read all the IDD data through the netCDF-Java library allows the TDS to serve that data and provide services on/for that data.

2. **Develop and provide open-source tools for effective use of geoscience data**

   Unidata's Integrated Data Viewer (IDV) depends on the netCDF-java library for access to local data, and on the THREDDS Data Server (TDS) for remote access to IDD data. At the same time, the CDM depends on the IDV to validate and test CDM software. Many other tools build on the CDM / netCDF-Java library (eg ERDDAP, Panolpy, VERDI, etc) and on the TDS (LAS, ncWMS, MyOcean, etc).

3. **Provide cyberinfrastructure leadership in data discovery, access, and use**

   The Common Data Model (CDM) / netCDF-Java library is one of the few general-purpose implementations of the CF (Climate and Forcast) metadata standards. Current active efforts in CF that we are involved with include draft Satellite and Radar Conventions.

   The TDS has pioneered the integration of Open Geospatial Consortium (OGC) protocols into the earth science communities. Strong international collaborations have resulted in WCS and WMS services as part of the TDS.

   The CDM and TDS are widely used implementations of the OPeNDAP DAP2 data access protocol. Unidata is working with the OPeNDAP group to design, develop, and implement a new version of the DAP specification, DAP4.

Activities Since the Last Status Report

Release Status of CDM and TDS

- CDM and TDS 4.3.23 are the current stable releases.
- CDM and TDS 4.5 is available as a Beta release. (See below for a list of major changes.)
  - TDS 4.5 is running on Unidata's demonstration TDS server (thredds.ucar.edu).

Collaboration Activities

- Active non-core awards that involve THREDDS development:
  - EarthCube Building Blocks award: "Integrating Discrete and Continuous Data" with Univ of Texas, Austin and others. Period of performances: Oct 2013 - Sept 2015.
  - EarthCube Building Blocks award: "Specifying and Implementing ODSIP, A Data-Service Invocation Protocol" with OPeNDAP, Inc.
  - EarthCube Building Blocks award: "Deploying Web Services Across Multiple Science Domains" with IRIS, UNAVCO, and others. Period of performances: Oct 2013 - Sept 2015.
  - NASA ROSES ACCESS award: "High Performance Multidisciplinary Open Standard Data Services to Serve Terrestrial Environmental Modeling" with USGS CIDA. Period of performances: 1 Jan 2014 - 31 Dec 2015.
- Two non-core funded projects have finished project:
  - OPULS (OPeNDAP-Unidata Linked Servers): Project with OPeNDAP to develop and implement the DAP4 data access protocol. Both groups have implemented client and server code. DAP4 capabilities will be available in CDM and TDS 4.5 before it is declared the stable release.
  - The "Project to Improve Model Data Access under Unidata's THREDDS Data Server (TDS) in support of NOAA's National Climate Model Portal (NCMP)", funded by NOAA/NCDC, focused on scaling-up the TDS to handle large collections of GRIB files continues,
  -
- Submitted two NASA ROSES AIST proposals that involve THREDDS development:
  - The first one, with SSEC, adds capabilities to CDM/TDS and IDV/McIDAS-V to handle GPM (Global Precipitation Measurements) data.
  - The second, with PO.DAAC/JPL, to improve CDM/TDS handling and aggregation of polar orbiting satellite data.
- Continuing work with NCAR/CISL DSS group to make some of their large GRIB model collections available using the new TDS 4.5 Feature Collections.
- Renewed effort with NOAA/ESRL/GSD to check the GRIB tables used with HRRR and FIM data.
- Working with US IOOS to distribute the ncSOS plug-in with TDS (version 4.5 or 4.6).

International Standards Development

- Track and participate in OGC MetOcean Working Group discussion.
- Track and participate in OGC WCS development.
- Track and participate in OGC CF-netCDF development.

THREDDS Team

- Lansing Madry left Unidata in early July 2014.

Planned Activities

CDM/TDS 4.5 Development (underway)

- Further improvements to the TDS for handling of GRIB collections, including a return of the two time dimension view for forecast models.
- Improve the TDS handling of collections of point, station, and sounding data. Move (and harmonize) the resulting services under the NCSS interface.
- Add WaterML as output format from NCSS point service
- Include in the TDS an alpha version of the DAP4 service.
- Ugrade CDM/TDS use of HttpClient from 3.x to 4.x (3.x is end-of-life)
- Refactor TDS catalog caching for Earth System Grid (ESG).
- Require Java 7 and Tomcat 7 (start using java.nio.file)

CDM/TDS 4.5.x Development

- Improve the TDS RadarServer services and harmonize it with the NCSS interface.

Simplify process for adding new TDS web services. Document simplified process so third-party development groups can more easily add new web services to the TDS.
- Work with ncWMS group and others to add features to the version of ncWMS used by TDS.
- Add WRF initialization service to NCSS

CDM/TDS 4.6 Development

- Grid Feature Collection (assimilate FMRC?)
- Experiment in TDS with various server-side processing capabilities.
- Experiment in TDS with Asynchronous responses
- Work on providing FMRC Constant Forecast Offset/Hour funtionality for large datasets. (Possibly as NCSS-like service rather than as index based access.)
- Provide NCSS access for all CF-DSG feature types.

CDM / TDS 5.0 Development

- Catalog 2
- TDS configuration refactor (ease of use and support dynamic re-init)
- Refactor GridDatatype to Coverage
  - Swath/Image
  - Unstructured Grid
  - Time-dependent coordinate system
  - Cross-seam lat/lon data requests
- Improved metadata harvesting support
- Search/discovery service?

Unidata Outreach Accomplishments and Challenges

Ben Domenico, August 2014

Relationship to Current Unidata Strategic Plan and Proposed Work

Below are a few excerpts from the current Unidata Strategic Plan that highlight the importance of the outreach activities summarized in this status update?

- ... to build infrastructure that makes it easy to integrate and use data from disparate geoscience disciplines
- Data formats like netCDF, together with community-based data standards like the Climate and Forecast metadata convention and the Common Data Model are enhancing the widespread usability and interoperability of scientific datasets.
- Advance geoscience data and metadata standards and conventions
- ... our experience shows us that robust solutions arise from community and collaborative efforts
- ... close partnerships and collaboration with geoscience data providers, tool developers, and other stakeholders, and the informed guidance of our governing committees

Summary of Recent Progress and Near-term Goals

Cloud-based Collaborative Python Development

As part of Unidata's first training workshop on software development using Python, experimentation began with the Wakari cloud-hosted development environment. This work has continued since then but at a slower pace due to the departure of software engineer, Marcus Hermida. Since then, the work has been focused on the use of the community supported OWSlib tools for accessing data from OPeNDAP servers via a brokering layer that makes the data available via other standard interfaces, especially Web Map Service (WMS) and Web Coverage Serviced (WCS). If time allows, it will be good to fold in the work on ncSOS into this effort.

This work will continue as resources allow. To be honest, this project has been on the back burner recently.

Progress on OGC standardization of CF-netCDF

As the official UCAR representative to the OGC Technical Committee, Unidata participates in 3-4 technical committee meetings per year to ensure that Unidata and UCAR needs are met in the emerging international standards.

Since the March 2014 report, Unidata has negotiated for UCAR a renewed five year Memo of Understanding with the Open Geospatial Consortium (OGC) which provides voting membership for UCAR on the OGC Technical Committee. Unidata has also agreed to host a set OGC Technical Committee meetings in June 2015.

The CF-netCDF Standards Working Group (SWG) has been dissolved and replaced by the NetCDF SWG. This reflects the fact that some of the conventions extensions under consideration (e.g., netCDF-uncertainty) are not yet CF conventions. A new OGC NetCDF Core and Extensions Primer has been written to incorporate the change. The OGC-adopted standards documents are available athttp://www.opengeospatial.org/standards/netcdf

The primary focus of the NetCDF SWG now is:

- NcML specification and NcML-Gml (draft discussion paper has been submitted)
- Extension to OWS Common for CF-netCDF data exchange
- Extension to WCS 2.0 core DescribeCoverage for CF-netCDF data description
- NetCDF-Uncertainty. Focus on netcdf-u proposal for this discussion. Broader discussion taking place in other OGC venues (ESS, Coverages, UncertML andCF communities) as well.
- How does WCS2.0 Extension for Met Data fit with proposed OWS Common extension and WCS DescribeCoverage
- NetCDF Search Conceptual Model
- Conventions for netCDF4 enhanced data model (e.g., use of hierarchical groups and user-defined data types)

ODIP

The ODIP (Ocean Data Interoperability Platform) is entering the third and final year of the proposed work. Unidata's technologies (especially

THREDDS and netCDF) are part of the project and we also maintain a liaison role and serve on the steering team. Unidata has participated in the ODIP workshops and steering team meetings and is helping to develop a proposal for a second phase of the project. More details on ODIP, the workshops and plans can be found at:

http://www.odip.org/

CUAHSI Hydrological Information Systems (HIS) Standing Committee

The CUAHSI HIS Standing Committee is roughly equivalent to the Unidata Strategic Advisory Committee (USAC). Jeff Weber and Ben Domenico participated in several teleconferences for this group and Ben attended the face to face meeting last month. As Unidata's Policy Committee in the past and more recently with USAC, there are difficult decisions about what to focus on in a era of limited resources.

EarthCube

Discrete Continuous Building Block Project.

Unidata continues an active role in the Discrete Continuous Building Block initiative led by the University of Texas.

From the project description:

> Geoscience information is defined on both discrete and continuous spatial domains. **Discrete spatial domains** include point locations of observations at measurement sites and GIS coverages of point, line and area features used for observation and data interpretation. **Continuous spatial domains** are used in geophysical fluid sciences such as for the atmosphere, oceans, and land subsurface to describe arrays of measured or modeled variables defined on a mesh of uniformly spaced points. Data defined on either discrete or continuous spatial domains **may also vary discretely or continuously in time**, ranging from one-time samples, to samples at random points of time, to samples at regularly spaced intervals of time. This proposal builds upon previous work called “Crossing the Digital Divide” focused on integrated discovery of common information themes including precipitation in discrete data from the **CUAHSI hydrologic information system** and continuous data from the **Unidata THREDDS data server**. This project will advance that work by investigating **in the first year** creating new technologies for publishing and discovery of information through the **Global Earth Observation System of Systems (GEOSS)** Common Infrastructure, the definition of a **Common Information Model for discrete and continuous data**, development of **shared software tools** for using this Common Information Model, and extension of the concepts to similar information in the **Polar, Ocean and Solid Earth Sciences**.

CyberConnector Building Block Project

From the project description:

> This project proposes to build an EarthCube building block, called CyberConnector, for facilitating the automatic preparation and feeding of both historic and near-real time Earth Observation (EO) customized data and on-demand derived products into Earth science models (ESMs). CyberConnector will free scientists from the laborious preparation of model inputs and release of model outputs. It will automatically process the EO data into the right products in the right form needed for ESM initialization, validation, and inter-comparison. It can support many different ESMs through its standard interfaces under a unified framework.

Unidata's main role in this project will be to assist in the installation of a Unidata IDD/LDM node at the main site at George Mason University.

Active and Ongoing Collaborations:

- NCAR GIS Program
- Collaboration with ESSI Labs to experiment with their brokering layer in conjunction with THREDDS Data Servers
- UCAR wide representative to OGC Technical Committee
- ODIP Steering Committee
- CUAHSI Hydrological Information System Standing Committee
- EarthCube Discrete/Continuous Building Block
- EarchCube CyberConnector Building Block
-
- Wakari Cloud-based Collaborative Python Development Environment

Areas of Reduced Commitment

- Marine Metadata Interoperability (MMI) Project Steering Team
- NOAA Climate Prediction and Projection Pilot Platform (NCPP)
- AGU ESSI Focus Group Board
- ESIN Journal Editorial Board
- Liaison to OOI Cyberinfrastructure Project

U of Texas EarthCube Building Blocks project