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Unidata Users Committee Meeting

15-16 September 2014

Unidata Program Center
FL4-Room 1201
Boulder, Colorado

Agenda

Members
Users Committee Summary April 2014
Action Items April 2014
Acronyms list and glossary of terms

Monday, 15 September 2014

8:00-8:30 Continental Breakfast

8:30-9:00 Administrative Items

- Introduction: New Members
- Date for Spring meeting
- Review of Action Items

9:00-9:15 Strategic Advisory Committee Report - Mohan Ramamurthy and Kevin Tyle

9:15-10:15 Director's Report & Questions - Mohan Ramamurthy

10:15-10:30 Break

10:30-11:00 Around-the-table reports from UserComm members

11:00-11:30 AWIPS II Demo - Michael James

11:30-12:00 CONDUIT & AWIPS II - Becky Cosgrove

12:00-1:00 Lunch

1:00-1:45 Status Reports - (Users Committee should review status reports prior to the meeting) - staff will be available for questions

- ACADIS - Arms, Ramamurthy
- Equipment Awards - Mitchell, Ramamurthy
- AWIPS II - James
- Cloud Computing Activities - Fisher, Arms, Caron, Ho, James, Schmidt, Yoksas
- Community Services - Young, Dirks, Weber
- IDV with RAMADDA - Ho, Chastang, Arms
- International Activities - Yoksas
- IDD - Schmidt, Weber, Yoksas
- LDM - Emmerson, Schmidt, Yoksas
- McIDAS - Yoksas
- NetCDF - Rew, Fisher, Heimbigner
- GEMPAK - James
- Python - Arms, Chastang, Domenico, Fisher, May, Rew
- Rosetta - Arms, Oxelson, Weber
- Support - Yoksas, Oxelson
- THREDDS - Caron, Arms, Davis, May, Ward-Garrison
- Unidata Outreach Progress - Domenico
- Comprehensive Metrics Data

1:45-2:00 Steering Committee Reports

2:00-2:15 Break

2:15-3:45 2015 Users Workshop - Josh Young, Steve Lazarus, Michael Baldwin

3:45-4:00 Transition to Auditorium

4:00-5:00 2014 DeSouza Award Lecture

5:00 Adjourn

7:00 Collaborative discussion on the day's proceedings over dinner

- Dinner at Rio Grande (Map)

Tuesday, 15 September 2014

8:00-8:30 Continental Breakfast

8:30-8:45 User Committee Site Visit Surveys - Josh Young

- 2011 Responses
- 2014 Draft Questions

8:45-9:15 Teaching Resources Update and Demonstration - Jeff Weber

9:15-9:40 UPC Presentation on Cloud-related activities - Ward Fisher

9:40-10:15 Blue Sky Session

Topic: Smartphone Sensor Data; Does it have a future?

Entities such as PressureNet are retrieving data from smart phone users across the world, can we imagine a scenario where we are interested in this data? If so, for what variable, with what level of accuracy?

This discussion is not meant to focus on this one company's data but if you would like to learn more (including accessing their data) please visit http://pressurenet.io/

10:15-10:25 Break

10:25-10:50 UPC Presentation on Python-related activities - Ryan May

10:50-11:15 Wrap-up session, review/assign Action Items - Kevin Tyle

11:15-12:00 Executive Session

12:00 Adjourn

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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*

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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.

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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.

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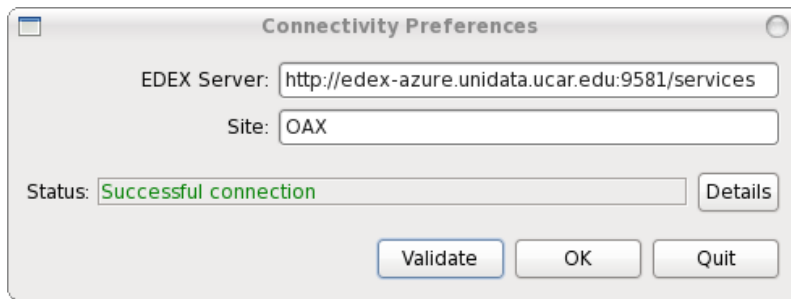
3. **Provide cyberinfrastructure leadership in data discovery, access, and use**

   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:

Connectivity Preferences

EDEX Server: `http://edex-azure.unidata.ucar.edu:9581/services`

Site: `OAX`

Status: Successful connection   [Details]

[Validate]   [OK]   [Quit]

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

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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

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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

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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

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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

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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

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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.

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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

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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

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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

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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.
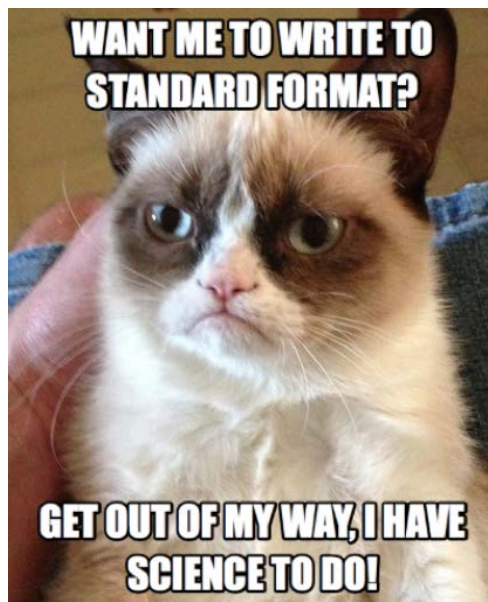
Activities Since the Last Status Report

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

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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.
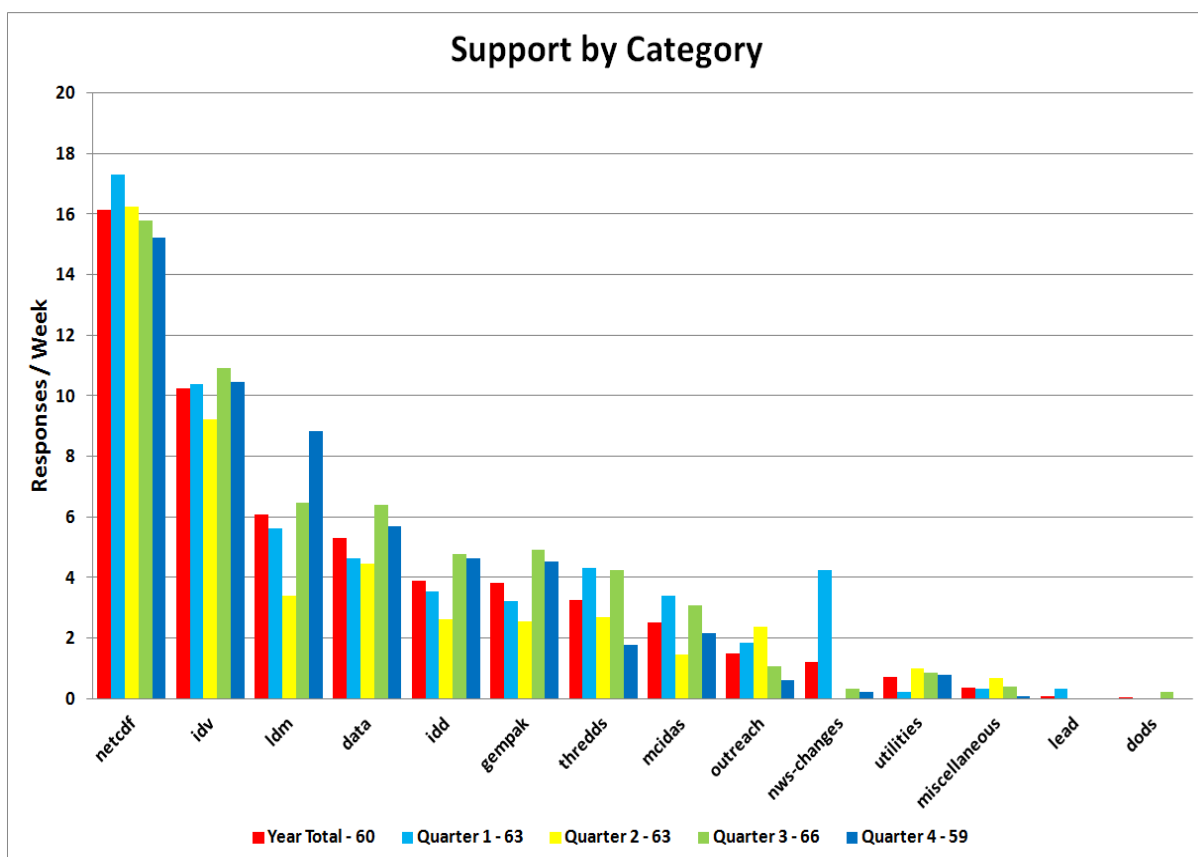
Support by Category

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

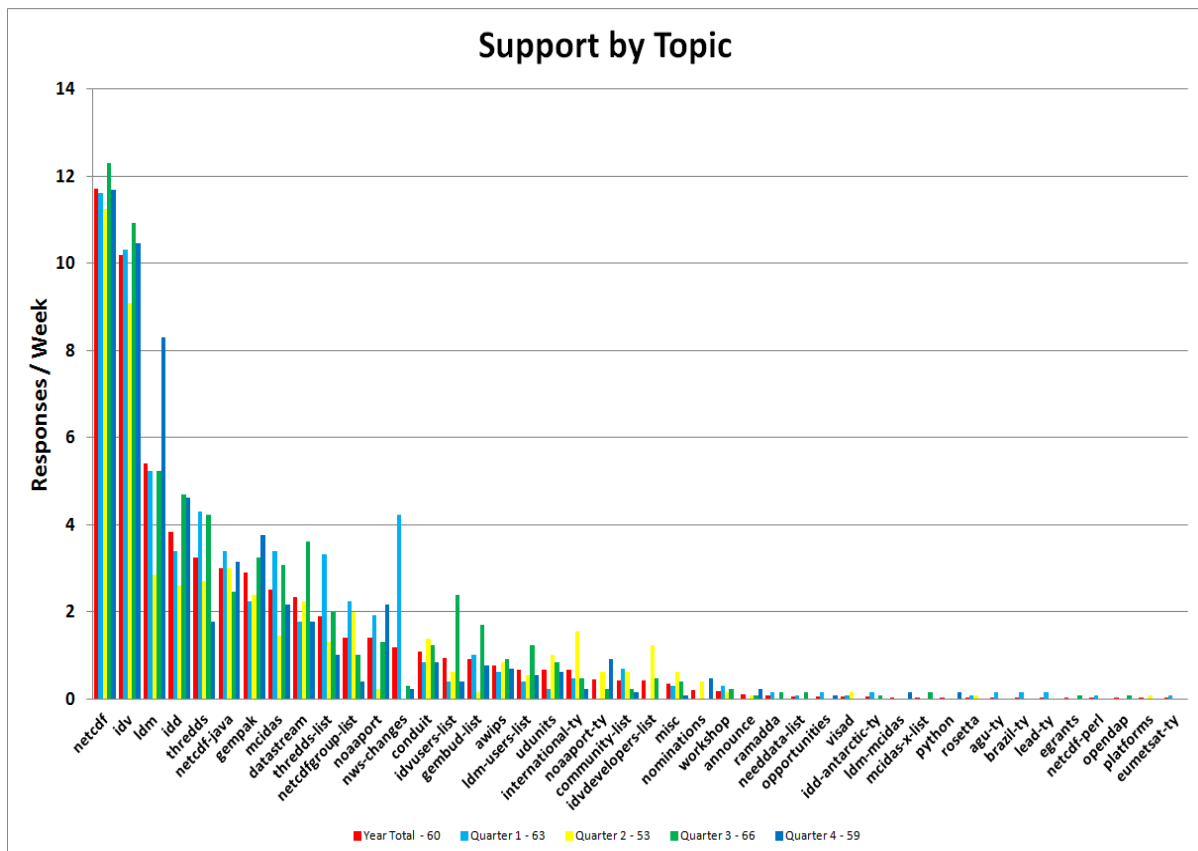| outreach	agu-ty, announce, argentina-ty, barbados-ty, brazil-ty, cbmet-ty, chile-ty, egrants, external, iai-ty, meteoforum-ty, mexico-ty, unidata, workshop
thredds	java-dev, java-dev-list, thredds
utilities	decoders, ldm-mcidas, udunits

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

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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.

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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?

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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 at http://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

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Unidata Users Committee Meeting Summary

31 March - 1 April 2014
Boulder, Colorado

[Action Items](#)
[Committee Members](#)
[Acronym List](#)

Committee Members:

Kevin Tyle, University of Albany, Chair
Michael Baldwin, Purdue University
Martin Baxter, Central Michigan University
Sen Chiao, San Jose State University
Jennifer Collins, University of South Florida
Bart Geerts, University of Wyoming
Steve Lazarus, Florida Institute of Technology
Sam Ng, Metropolitan State University of Denver
Russ Schumacher, Colorado State University

Student Representative:
Kimberley Hoogewind, Purdue University

NCEP Representatives:
Becky Cosgrove (CONDUIT) (**absent**, Justin Cooke filled in)
Michelle Mainelli (GEMPAK-NAWIPS/AWIPS II) (**remote**)

USGS Representative:
Richard Signell

UPC Staff Attending

Sean Arms	Ryan May
John Caron	Terry Mitchell
Julien Chastang	Jennifer Oxelson
Ethan Davis	Mohan Ramamurthy
Doug Dirks	Russ Rew
Ginger Emery	Sheri Ruscetta
Steve Emmerson	Mike Schmidt
Ward Fisher	Christian Ward-Garrison
Dennis Heimbigner	Jeff Weber
Yuan Ho	Tom Yoksas
Michael James	Josh Young
Lansing Madry	

Meeting agenda

Monday 31 March 2014

Administrative Items

Josh Young introduced himself in his role as the new Community Services manager. Introductions around the room.

Next Meeting: Per a surprisingly unanimous result in a poll of the committee, the next Users Committee meeting is scheduled for 15-16 September 2014.

The Russell L. DeSouza award ceremony, which has previously been associated with the Spring Users Committee meeting, will now take place during the Fall meeting. Selection of the nominee will still take place in the spring, but moving the award

itself to the Fall meeting will give the awardee more time to prepare.

Discussion of Fall 2013 Users Committee Action Items

Previous ACTION 1: Committee members will submit observational data sources amenable to conversion by Rosetta to Sean Arms.

Russ Schumacher has submitted a sample data set to Sean. The committee decided to make this an on-going action, and will continue forwarding suitable data sets.

Previous ACTION 2: Hydrometeorological classification radar composite to be added to IDD. Other desired composites should be sent to Tom Yoksas for consideration.

Michael James reported that the HHC (Hybrid Hydrometeor Classification) radar composite is now being generated on Unidata's Amazon EC2 instance and has been added to the IDD. Display examples are available on the GEMPAK page (High-resolution NEXRAD national composites).

Previous ACTION 3: Request RAMADDA developers to push federated servers back out so IDV community sites catalog will be up-to-date.

Kevin Tyle has spoken with Jeff McWhirter about enabling federation. Federation is configured on individual RAMADDA servers; the process is currently not completely transparent. Until we can get more detailed info, Kevin asks that Sean add Central Michigan University and the University of Miami to the IDV data source catalog (New **ACTION 1**).

Previous ACTION 4: Kevin Tyle will send one more reminder about 2012 Workshop follow-up survey to workshop participants.

Mohan noted that we must make it clear to NSF that Users workshops are useful. There was limited response to the 2012 Users Workshop surveys; Kevin will work with Josh to try to get additional feedback from attendees. Defer until fall meeting (New **ACTION 2**).

Previous ACTION 5: Unidata will draft a document explaining Open Weather and Climate Services, and will distribute it to the community to assess interest/concerns, after feedback from Usercomm.

An OWCS Project page is online on the Unidata web site.

Previous ACTION 6: Contact OU to request they make their multi-radar composite available in netCDF.

Ryan, Sean, and Jeff have been pursuing this. We have the composites coming from OU to one of our machines at Unidata, where we have some converters in house to aggregate the tiles that come from OU servers and package in a useful format.

Previous ACTION 7: Create a space on Unidata RAMADDA server for lab/tutorials/teaching resources.

Jeff has created an example/template for a teaching resource RAMADDA site on Motherlode. Discussion and demo took place Tuesday morning.

Previous ACTION 8: Unidata will publish best practices for creating netCDF files of a manageable size on web site.

Russ has published information on compression in this blog post, and has plans to incorporate the information into official documentation.

Strategic Advisory Committee meeting report - Kevin Tyle and Mohan Ramamurthy

The most recent Policy Committee meeting was October 10-11, 2013. At that meeting, the committee decided to rename itself the Strategic Advisory Committee (Stratcom?), to better reflect the committee's activities (providing advice, long-term strategy, and "vision"). The fall meeting was also the last meeting at which Steven Businger served as chair; Bill Gallus begins a new three-year term as chair of the committee with the Spring meeting, which will be May 20-21 in San Francisco.

One topic was the growing sense in the community that Python is an important development in scientific computing and a good way to bring students into the programming community. FORTRAN skills are not necessarily practical outside the WRF community. Kim Hoogewind volunteered that she is involved with a new course in which Python and FORTRAN are taught/used in parallel, with students doing assignments in both languages. The class is currently working on netCDF data access. Kim offered to share the class web site with the committee.

Sen Chiao noted that San Jose State has a class with lots of hands-on exercises using Python code. His experience was that students took computer science courses but didn't use those skills, and ended up forgetting them by senior year. Python seems to be more widely used and less quickly forgotten.

Kevin Tyle wondered about the status of adding SkewT and other relevant plot types to the Python matplotlib package. Ryan is involved in this effort and has some example scripts available.

Rich Signell pointed out that the UK Met Office uses Python extensively, and has a package (Iris, part of the SciTools

program) that handles CF-compliant data sets in the way that Unidata's CDM does. There is currently a problem with using UDUNITS in this context. There was also some discussion about the fact that Iris is licensed with the GPL3; Rich suggested getting in touch with the Met Office developers about the issues; they might be amenable to a different license. Rich also noted that Khan Academy has a good Python course.

The Stratcom also had a demonstration of the new adaptive resolution feature in the IDV, which turned into a discussion on making polar orbiting satellite (POS) data available to the Unidata community. Stratcom resolved that:

The committee recommends that Unidata continue to investigate making Polar Orbiting data and visualization tools available to the community. We recommend that the Users committee further define what the community interest is.

Marty Baxter wondered whether the IDV could visualize the POS data? Steven Lazarus said that Yuan had helped him display some in the IDV.

Mohan pointed out that it is also possible to use the POS data in GEMPAK and McIDAS, and that it's possible to use hyperspectral data in McIDAS-V via the Hydra package. Unidata wants to work with the University of Wisconsin to integrate the Hydra functionality in the IDV. Mohan then asked for a show of hands regarding who is currently using POS data? Kevin and Steven currently do, but using derived products rather than raw hyperspectral data. Sense of the committee was that access to POS data could be useful, but not sure how they would take advantage. Committee members agreed to talk with colleagues in their departments who specialize in remote sensing to gauge interest (new **ACTION 3**). Bart Geerts noted that many people use MODIS and various NASA products, but not in real time and may not be looking for push data service for POS products.

Director's Report - Mohan Ramamurthy

Mohan's slides 🗎.

Mohan ended his report by announcing that the committee had chosen Rich Signell as the recipient of the 2014 Russell L. DeSouza award.

Questions and comments following the Director's Report:

Any plans for a 30th year event?

Probably not, as the NSF audit for 25th anniversary event raised a number of concerns. No more "anniversary" or "celebration" events.

Kevin Tyle notes: I was at an EarthCube user group meeting, and we talked about flipping the 4-1 ratio of managing data to doing research. At that meeting the idea for a wiki page for folks who want to do modeling arose. Can Unidata ease the road to make tools/data available for modelers? Perhaps a user contribution RAMADDA page to document data sources and processes, also maybe a Yelp-type infrastructure to gather community feedback about the value of different methods?

Can you give a brief summary of building blocks projects?

There are three:

1. A collaboration with IRIS (Incorporated Research Institutions for Seismology; note, this is not the same IRIS that was mentioned above; the former is part of the UKMET Office) to bring together a half-dozen data facilities to create coherent REST-based access to data and services and standardize documentation for how to access data. Looking for ideas about how to solve long-tail data access problems for PIs.
2. A collaboration with OPeNDAP to develop server side processing tools. The goal is to figure out how to do analysis on the server (reprojection, etc.) and to extend protocols to allow this type of processing.
3. A collaboration with David Maidment at the University of Texas, involving the THREDDS Data Server & Rosetta, creating a mapping between WaterML and netCDF, with the goal of being able to return WaterML through a subset service.

Around-the Table reports

Kevin Tyle:
Using Python, integrating with netCDF. Creating some image loops to display forecast reflectivity from HRRR (Ryan helped with this), I can send the link around. Also been working on some IDV ISL scripts with good success — have been able to create some publication-quality graphics using this method! Some things are missing from the ISL language, but I got some help from Don Murray. Interested in advancing the ISL language.

Tom Yoksas noted that the University of Wisconsin does not like the ISL language, so they are trying to make all ISL features available in jython. Rich Signell pointed out that when generating video loops, if you use multiple processors you can speed things up a lot.

Sam Ng:
At Metro State we're weaning students/faculty off of GARP; 95% are using the IDV now. We've installed a RAMADDA server but it's not live yet. Students have been complaining about IDV slowness, but I believe it's related to lack of dedicated graphics cards in the machines used in our lab. We do have a hardware refresh coming up, and I hope to get machines with discrete graphics cards. Introducing IDV to Intro to Meteorology students; it is useful to be able to incorporate GIS shapefiles

into the IDV workflow.

Martin Baxter:
I am still on sabbatical at NC State. I gave a talk at AMS on how to put together a case study using IDV and RAMADDA; several Unidata folks assisted with that. (I can send that around.) I'm collaborating with NOAA ESRL, using Python to read in GRIB and netCDF files, hosting data on CMU's RAMADDA so students can view them in the IDV. Rich Signell's posts on StackOverflow have been useful.

Steven Lazarus:
I am also on sabbatical. I've been using IDV for research purposes, and I used it in some of the work that went into my AMS poster. I'll be teaching a remote sensing class in the Fall, and I'm thinking about using a week at the beginning of the class to spin students up on IDV. Looking forward to using the adaptive resolution stuff.

Jennifer Collins:
Our department has gone through some changes in past years. It is more stable now, and has been merged with the Geology Department. Our department is also now associated with the Alliance for Integrated Spatial Technologies (AIST). I recently worked with Sean to get access to some NCDC reanalysis data. Steven Lazarus and I are still interested in hosting a workshop in Florida in Spring 2015.

Sen Chaio:
I've been using IDV and GEMPAK in my regular teaching, and I'm starting to see senior student thesis projects using the IDV. We also set up an AWIPS II EDEX server and two client machines using Unidata equipment award grant. The AWIPS II learning curve is large; switching to a different location is not straight forward.

Russ Schumacher:
We also received an equipment grant last year. Our students wanted a central repository for real-time and archive data; this is up and running. We are also looking to set up a TDS in addition to the local mounted disk access we created. I participated in a second national ensemble workshop; Josh Hacker, Gretchen Mullendore, Carlos Maltzahn and I created a whitepaper for NSF. I've started using NCSS for point data from model output.

Mike Baldwin:
I'm still using GEMPAK and NAWIPS for my senior-level weather forecasting class. I had hoped to upgrade to Python and IDV, but haven't been able to make the switch. Our department hired an IT site specialist to help with internal tech. We need to train him in configuration of the LDM, *etc.* I did use some Python in a High Performance Computing class — I am just ramping up.

Rich Signell:
On the Python front: we recently did an IOOS system test, looking at Hurricane Sandy data. The question was can we find all the models producing water levels and all observed data and bring them together? Our system searches standard catalog services, gets OPeNDAP endpoints, all in Python. I will send out some info to the committee.

Kim Hoogewind:
I've been processing CMIP2 climate data, writing to GRIB2 for ingest into WRF. Sometimes I've used netcdf-java. I've also done some work (alongside a TA) with the IDV in a synoptic lab after GARP went away. I've also been dabbling with Iris and other new Python tools.

Bart Geerts:
We have a community-supported aircraft facility. We've used radar data in the IDV; it has been useful to access data and produce cross-sections. Polar orbiting data would be useful in this context.

NCEP Reports - Michelle Mainelli and Justin Cooke

Michelle and Justin's slides 📄. (Presented remotely via WebEx.)

Justin Cooke filled in for Becky Cosgrove, reporting on CONDUIT status.

Hardware update will be in place in College Park in May (2014). Once the new hardware is operational, NCEP will add some new datasets, but at first these will **not** be backed-up on NCEP's Boulder systems. At that point NCEP will reevaluate the list of products to be added or removed made as a result of the 2012 CONDUIT User Survey (see Becky's report 📄 from the Fall 2012 Users Committee meeting.)

Other CONDUIT data stream questions:

Justin asked if the committee wanted the HRRR 3km grids in CONDUIT?

The HRRR 2.5km grids are available on NOAAPort, but these are a subset of what is available in the model. Weather Forecast Offices use the 2.5km grids.

Russ Schumacher suggested that it would be nice to put the NAM nest output into CONDUIT. Data is available elsewhere, but not so easy to get as through the IDD mechanism. Kevin suggested that we survey to determine whether there is enough interest in the community to warrant inclusion in CONDUIT. (New **ACTION 4**).

Michelle noted that she and Becky missed the October meeting as a result of the federal government shutdown.

AWIPS II 14.2.1 Release is coming in April, including 64-bit RedHat 6 support. Raytheon's AWIPS II contract ends in Q4 of FY2015. 24 WFOs have made the transition to AWIPS II, as have the National Centers (although the Centers still have NAWIPS available). More frequent (~1-2 week) AWIPS II releases will be available during the summer months: NCEP-only updates will also be available.

GEMPAK 7.1 is due out week of 7 April 2014. An interface allowing GEMPAK to access the AWIPS II EDEX was included in GEMPAK 7 (see GEMPAK_AWIPSDB_Notes.pdf 📄 for additional information.

AWIPS II Thin Client testing also begins 7 April. Developers are working on a facility to launch scripts on the server via the thin client interface. Other thin client notes:

- Working memory for thin client: 12-16GB (not 6 as shown on presentation slide 10).
- Proxy server and CAVE thin client software must be on the same version.

There was some discussion about the nature of the AWIPS II thin client — currently it requires a workstation-class Linux machine. (Not exactly what one envisions a thin client to be.) Windows support is hoped for, mobile platforms not currently envisioned.

Lunch

Status Reports

Staff status reports were made available to the committee prior to the meeting. Committee members had comments or questions on a subset of the projects reported upon:

AWIPS II

Michael James asked how many committee members were interested in running *only* an AWIPS II client (no EDEX). All members said yes. Michael is looking into the feasibility of a community EDEX server. Tom Y noted that the normal CAVE client talks to the EDEX for some things that the thin client does locally. Tom also noted that at the AMS meeting, SAIC was demonstrating AWIPS II running in an Amazon EC2 instance.

Kevin Tyle wondered about the status of the National Centers Perspective (NCP) vs D2D. Older NCP was not very functional where D2D was. Michael said that NCEP had added a lot of functionality in the past year, 14.2.1 release should solve some of the problems.

Community Services

Kevin inquired about the NWS Changes mailing list. Josh Young will be taking over the responsibilities of that list.

IDV

Yuan said that the IDV 5.0 release is expected in a few weeks to a month. No real reason to rush it out before the end of the current academic term.

International Activities

Kevin wondered if there had been any progress on negotiations with EUMETSAT regarding access to the Meteosat data. Tom Y replied that there has been no "no" issued, which is positive. But nothing from Director General of Eumetsat so far.

IDD

Kevin wondered: Will added bandwidth on NOAAPort affect ngrid?

Steve E didn't know whether they had tested bandwidth upgrades against the LDM. Tom added that we'll have a testing phase when they switch (August/September 2014 timeframe), and there will be a roughly one-month overlap during which they'll broadcast both old and new data streams. UPC will repurpose the GOES-E dish at UCAR to point at the new NOAAPort satellite.

McIDAS

Tom mentioned that there have been monthly McIDAS-V/IDV meetings, and Yuan is participating. Yuan added that UPC has been urging the McIDAS-V team to adopt the new adaptive resolution feature quickly, which would make it easier to bring the Hydra module into the IDV.

NetCDF

Rich Signell pointed out that it would be a big win for the community to know more about netCDF-4 chunking and compression. Russ has written some nice blog posts, but chunking/compression techniques are not widely known by data providers.

Kevin noted that netCDF4-FORTRAN will begin using cmake, and wondered what that meant. Russ R told the committee that cmake is similar to autoconf, but also works on Windows. We're getting close to being able to build netCDF-FORTRAN on the Windows platform.

Rich wondered if the same technology could work for UDUNITS; not having a Windows build of UDUNITS slows progress on the Iris package (UK Met Office Python package). Steve E replied that UDUNITS can be built on Windows, but the process is environment-specific. Rich suggested Unidata could make a big contribution by having a repository for "all these binaries."

NAWIPS/GEMPAK

Kevin wondered if anyone can grab ASCAT data? Michael replied not currently, he's working on getting ASCAT/OSCAT data from NESDIS, with the end result of having the data on the IDD. They (NESDIS) are okay with UPC giving out the data, but they need to set up an LDM (New **ACTION 5**).

Kevin: How does one display scatterometer data in GEMPAK?
Michael: Use gpmap or gpscat (which Michael created specifically for this data)
Steven L: Can nmap2 display the data directly?
Michael: Yes, but it's specific to the ASCAT-high data format. It's not yet available to universities. (He'll say more on availability next meeting).
Russ S: What's the difference between n0R and dhr?
Michael: dhr is similar to a composite, and is visually similar to the N0Q product. An advantage of the dhr product is that it will eliminate a lot of the artifcats that appear in the N0Q product. There are four new high-res composite products.

Python

Marty B asked if the committee could have a more in-depth presentation about Python activities at the UPC at the Fall meeting (New **ACTION 6**). Rich suggested setting up a remote meeting with Python developers at the UK Met Office (New **ACTION 7**).

Russ S noted that SkewT plots are now available in matplotlib, and wondered if they are customizable. Ryan responded that Matplotlib 1.4 (next release) will have some enhancements, but as far as a "proper" SkewT class, he's looking for a place for that to live. He has plans for additional features (moist adiabats, etc.).

Rich noted that Googling `ext .ipynb` returns interesting resources.

Rosetta

Rosetta code is now on Unidata's Github site.

Marty B asks: if we had an on-campus weather station that gives us text format data, can Rosetta turn it into netCDF? Sean says Yes, the idea is to turn the text data into a machine-readable format with useful metadata.

Kevin asked if anyone had set examples of Davis Weather Station format files? Sean says No, please send them along.

THREDDS

Kevin: What's up with this big TDS upgrade?
Sean: There were some updates to the NCEP grib tables, which we try to use as they are provided. This surprised some folks. Second surprise was that thredds.ucar.edu was down this morning. Before security breach, we had test and dev servers on the live machine, but now the test and dev servers are on linux machines but main server is on a Solaris machine. An OS-specific difference caused the main server to run out of file handles. There were also slight changes to URLs for the netcdf subset service.
Kevin: The timing (mid-semester) was not particularly good.
Rich: Releasing on a Friday is not great form.
Sean: I have an IDV plugin that allows users to test a change to the TDS server. How long should community have to test? One week?
Kevin: One week is not enough. Maybe a month.
Ethan D: Who else beyond IDV users do we need to notify?
Mohan: We should review our practices, based on this incident.
Rich: Maybe a special "-Announce" mailing list?

Steering Committee reports

THREDDS

Rich: We could use additional members on the THREDDS steering team. We have been meeting infrequently. Some are trying to use the CF discrete sampling geometry, and want support for unstructured grids, triangular grids. There is money available from the Sandy supplement: a proposal to do the unstructured grid work outside Unidata but in cooperation with Unidata was floated.
Ethan D: the current committee is heavily weighted toward data providers and developers. User perspectives would be more than welcome…
No committee members (except Rich) are running a TDS currently. Russ S is planning to start one.

Mohan: We should build connection data into TDS so that we know where all the servers are.

IDV

Kevin: The last meeting was a few months ago.
Yuan: We recently had a discussion of naming for the adaptive resolution feature.

Open Weather & Climate Services ("Reston Project")

Mohan gave a very brief update of current status.

Rich: UK Met office is also interested in standards for server-side processing.
Ethan: UCAR and NOAA folks are involved in the Met-Ocean group at OGC.
Mike B: How will this be a benefit to our community? Is it just a mirror of the raw output? It will still need post-processing — how will that be different from what we get from NCEP?
Mohan: NCEP has agreed to put data out in standard form (GRIB2) and in standard lat/lon grid. We must tell NCEP what data we want, what resolution, etc.

Available Data: High Impact Weather Prediction Project model output
(Tim Schneider, Bonny Strong, Don Murray, NOAA)

Tim Schneider gave a quick presentation on the High Impact Weather Prediction Project (http://hiwpp.noaa.gov/). Tim's slides [WILL LINK HERE WHEN THEY ARE AVIALABLE].

Follow-up questions:

Bart G: Will there be some models that you don't go forward with?
Tim: We are evaluating several models; may not incorporate all.
Marty B: Will NCEP ever have the computational/personnel resources to run what comes out of this project?
Russ S: Is this primarily a model improvement project, rather than a forecast improvement project? (Better forecast means ensemble forecast?)
Tim: A bit of both, leaning more toward improving the models.
Marty B: How are you soliciting user input?
Mohan: Are you envisioning providing a platform where trusted partners can use your tools to create their own visualizations?

Tim: Yes, see the NOAA Earth Information System (NEIS)

Do an article about this project for News@Unidata (New **ACTION 8**).

IDV Discussion

There was discussion of an interface to load GEMPAK upper air files. Julien asked for feedback on how to configure which levels are included.

Next, Yuan gave a tour of IDV 5.0 features.
Bart G: Under User Preferences, let user range be "adaptive" so you can see variations as you move in (use the data range rather than fixed range).
Kevin: Scroll bar zoom does not use adaptive resolution, right?
Yuan: Yes, as a performance optimization.
Kevin: Can you explain memory usage? The old recommendation was 70% of total memory, now IDV maxes out at around 3GB.
Julien: JVMs are evolving; I encourage you not to look at the memory usage numbers at all. IDV tries to set memory preferences for you.
Yuan: For the 5.0 release we will make adjustments to the defaults.
Kevin: Brendon Hoch raised the ongoing issue of poor video performance on multiple monitors in the Plymouth State University electronic maproom. Based on his interaction with IDV and Mc-V developers, the problem is with Java3D when used on AMD video cards. Is this being addressed at all in the Java3D world?
(Discussion, but general consensus that AMD video hardware is not well supported, and there is really not a solution at this point.)
Kevin: Is there a way to allow IDV to access data using relative in addition to absolute time specifications when loading data from ADDE servers?
Marty B: Archive point data from SSEC ADDE servers is not handled cleanly in IDV. Other formats work properly. This should be a priority to fix. IDV team to investigate this (New **ACTION 9**).
Yuan: 5.0 formal release in the near term.
Julien: We are planning a screencast to document some of the 5.0 features.

2015 Users Workshop

The 2015 Users Workshop will be the week of June 21, 2015. Space is reserved at Center Green for the workshop. Usercomm members are expected to participate in the meeting itself, but also with planning, beginning with the current spring 2014 meeting. Also will need a subcommittee to contact speakers etc.

Discussion:

Mohan: We have been doing this since 1998 every three years. Do we still see the value in holding this workshop? It's a lot of work, we should be absolutely sure that this activity is truly useful. We must get funding from NSF specifically for the workshop.
Bart G: Perhaps the same amount of money could be spent for a remote conference every year rather than a physical one every three?
Kevin T: In 2012 there was limited time for one-on-one with developers and speakers. This was a downside.
Jennifer C: In my mind the next workshop should be much more hands-on.
Jeff W: There was not so much take-away in 2012. If we have hands-on activities people will take new knowledge home.
Tom Y: Knowing what to do with satellite data would be useful.
Marty B: Satellite data would be timely with GOES-R coming online.
Rich S: Anyone doing anything with software carpentry (http://software-carpentry.org/)? We could send a small team to software carpentry workshops to evaluate.
Russ S: If it is a hands-on thing, it's an experience that will make you a more efficient researcher or educator — maybe that's pitch to NSF.
Mohan: Am I sensing that there is broad consensus that these are valuable? (General agreement.)
Steve L: We need to be more meticulous about the outcome we desire. We should have a clear-cut template of expectations for the speakers. Make it very clear what we would like speakers to do.
Jennifer C: Would it be useful to ask presenters to work with developers to revise presentations in advance?
Mohan: Should we extend expectations to attendees as well?
Sen C: Perhaps we can be more selective about attendees — ask everyone the type of questions we ask students. What do you hope to get out of the workshop?
Josh Y: Aim to end up with some kind of cookbook after the workshop?
Steve L: Ask participants to take a questionnaire or read something before they arrive.
Mohan: Dave Dempsey said in a previous meeting that you should expect those who come to the workshop to come prepared.
Marty B: There is precedent for asking participants to prepare (COMET), although it is different for those who are required to attend.
Steve L: This all makes more work for us, but makes us think about what we want the outcomes to be.
Mohan: NSF has asked for documentation that these workshops are useful.
Marty B: How far do we want to go in making a rigorous assessment?
Mohan: NSF just wants to know whether the educators who attended implemented the ideas discussed.
Marty B: Pre/Post survey for comparison?
Figure out how to collect this type of data and do assessment. (New **ACTION 2**)
Steve L: We could divide up the list of attendees (of the previous workshop) and call them…
Kevin: End goal is for attendees to pass the expertise along.
Marty B: For 2015, fewer speakers, longer sessions.
Mohan: Figure out what you want attendees to take away, and work backward.
Marty B: Would it be reasonable to expect people to apply to attend?
Jeff W, Kevin: Don't want to raise too many barriers to attendance.
Jennifer C: How early can we advertise?
Russ S: How to best appeal to both novice and expert groups (vis-a-vis software carpentry)?

Specific ideas:
- Cloud computing topics
- Remote sensing / satellite data
- Expand to non-met fields (geology/oceanography/etc) (Remember that funding comes from AGS)
- Software carpentry

Break for Dinner

Tuesday, 1 April 2014

Unidata Community Infrastructure demos & discussion

Teaching Resources RAMADDA

Jeff W gave a brief demo of the Teaching Resources RAMADDA site. He emphasized that we're trying to gain some conformity between entries, and give some recognition to the individual schools for posting resources.

Sen C: Is there a limit on the amount of storage?
Jeff: Currently we don't have a hard limit on data uploads.
Marty B: So you envision us putting data up there?
Jeff: Yes, IDV bundles are an obvious choice, but other data could be stored too.
Kevin: But you could also point to your own RAMADDA or TDS?
Jeff: I would like to have a centralized copy at first, until the RAMADDA federation is more solid.
Jennifer C: I like the university organization rather than focusing on faculty. What about organizing by themes/types of

research?
Jeff: Search is quite effective for finding themes, etc. Whatever organization scheme works for you.
Marty B: My case studies hit ADDE servers. Can we add a data folder?
Sen C: In this way I don't need to run my own RAMADDA server?
Jeff: With luck if people find this useful they'll want to install their own RAMADDAs and federate with Unidata's RAMADDA.
Sen C: Could this link with COMET modules?
Jeff: You could include GCMD keywords in the free text fields for interoperability with other directories like COMET's.
Jeff: We have also considered trying to mint a DOI for each published case study.
Marty B: Can we tie a date to each case study?
Jeff: I'd like to require time and space metadata so people can search by space and time.
Mohan: This can be a launchpad for addressing NSF data management requirements.
Ethan D: DOIs are a promise that we will maintain the data *somewhere* — do we want to get into that?
Mohan: We have options to partner with other data archives.
Jeff: I think of DOIs as an incentive so that authors can get credit for this type of work.
Ethan: Thinking about partners makes sense.
Kevin: How do we upload data? If we don't have accounts talk to Jeff?
Rich S: Do you feel like you get credit for data citations?
Marty B: Not really … they're nice for the CV but…
Jennifer C: My students are starting to do this, but universities are not yet recognizing data citations.
Marty B: Having DOIs might increase confidence that the resource will not go away.
Mike B: As people cite the data in their papers this might become more valuable.

Site contacts interface

Additional possible standard questions:

- Would you be interested in serving on the users committee?
- Find out generally if they know about Unidata and what it can offer.
- Find out what people need from Unidata.
- What are you using to generate graphics to present met information? Get concrete URL info?
- Are people using Unidata tools? Have they tried them? What is missing?
- Ask the community about the cloud vision -- what types of data services are desired? What do they think "cloud" means?

Doug D to return to committee with revised topic list, Jen to create Google doc with the list of sites to contact.

Security issue discussion

Mohan: are there RAMADDA vulnerabilities we need to think about? (None known.)
Kevin: Can we remove "change your password" message if the password has been changed? (Yes)
Sen C: Is there any liability issue related to security breach? (No, no private data like SSN or credit card info was compromised.)

BlueSky Session

Steve Lazarus:
Python is really taking off. Thinking about how to integrate Python projects with what Unidata is doing. Not just visualization but data processing. I'm not all that familiar with this, and I'd appreciate a way to get up to speed on how this all fits together.

Bart Geerts:
It would be cool to have a web site where you can do vertical cross sections as a web service (GARP as a web service).
Russ S: I had a student who built something like that but abandoned it. I'll try to find a link and forward it to the committee.

Mohan: It would be a good project to use Python to create such an interface.

Kim Hoogewind:
I'd like improved documentation for netcdf4 chunking/compression, including some best practices. It would be nice to be able to access the netCDF-Java ToolsUI directly from Python.

Rich Signell:
Unstructured grids! It would be nice to be able to drive inquiry through a catalog search that ends up hitting web-based services. What are the best practices for getting info from my datasets into the catalogs? Demos in something simple (like iPython notebook) to show people how things fit together. Maybe Unidata could be a sponsor of scipy?

Mike Baldwin:
I see a lack of software engineering / computer science knowledge in the academic community. I think this is hampering our progress.
Can we set up an ensemble in the cloud, maybe using WRF? Get it running on Amazon or wherever, then teach students how to process that data and get results back. That kind of ensemble prediction could allow broader participation. Is this a possible workshop topic: "geoscience data programming?"

We need to create a pool of lectures, demonstrations, etc. that we can share. Met Undergrads need additional computer science training to be prepared for current workplace. Need to build expertise with new computing paradigms.
Mohan: So the goal is to "increase IT and software engineering literacy among geoscientists?"
Marty B: We need a use case example of how cloud computing can benefit us as atmospheric scientists.
Rich S: Wakari is a good example — someone can reproduce your science easily, without installing software, in just a web browser.
For Fall meeting have a live demo/example of how to leverage the cloud with science examples (New **ACTION 10**)

Kevin Tyle:
Can someone write a netcdf-Python book for O'Reilly? (Russ R has an O'Reilly proposal in the works.)

Russ Schumacher:
I'd like to see a community ensemble in the cloud. I'm also intrigued by the "real-time research" idea — how can I/we take advantage of things like the Reston project in terms of using more immediate data? To do publication-quality research we need archives of the data — how does this fit into the idea of using "real-time" data from NCEP or elsewhere?

Sen Chaio:
I would like an IDV-lite on a mobile device. This would promote users using Unidata stuff. Creating an app could be a higher priority.
IDV fonts are a stumbling block — can't create a publication-quality image or video currently.

Jennifer Collins:
I'd like to see more emphasis on teaching resources, videos. Don't think desktops; big cpus will not be around in the classroom much longer. Need access via mobile devices. This could also expand community.

Marty Baxter:
Next spring I am teaching a forecasting class based on work I've been doing. I anticipate using IDV. I'm looking for ways to integrate IDV technologies into the classroom to improve students' knowledge. I'm trying to create some best practices for case studies — how to create them, what format to use, how to get them into RAMADDA, how to use them in the classroom. Are there partnership opportunities for Unidata? I'd be interested in working on this with Unidata — maybe there could be a special session at AMS to figure out how people are using these tools?
Yuan H: Your first request is something like a weather simulator — we need to better understand this workflow.

Sam Ng:
I'm just starting with Python but want to get into it. I'm still a bit sketchy about cloud computing so I don't yet feel I can understand the capabilities. I would like a RAMADDA tutorial. So many models out there, students don't know which to look at; it might be good to winnow the model choices (in IDV).

Open discussion/Wrap-up

Rich S did a short demo of Wakari.

Executive Session

Steve Lazarus and Michael Baldwin agreed to serve as co-chairs for the 2015 Users Workshop.

Adjourn

Josh Young and *Doug Dirks*
Community Services - Unidata
University Corporation for Atmospheric Research
P.O. Box 3000
Boulder, CO 80307-3000
303 497-8646 fax: 303 497-8690

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providing innovative data services and tools to transform the conduct of geoscience

Unidata Users Committee Meeting

31 March - 1 April 2014

Action Items

Meeting Summary

ACTION 1: Include Central Michigan University and University of Miami servers in the IDV data chooser catalogs. (Sean Arms)

ACTION 2: In preparation for 2015 Users Workshop, get more feedback on the 2012 Users Workshop before fall meeting. Figure out how to best collect data on whether the educators who attended implemented the ideas discussed. (Kevin Tyle and Josh Young)

ACTION 3: Talk to people in home departments who specialize in remote sensing about desirability of Unidata getting polar orbiting satellite data. (Committee)

ACTION 4: Find out if community members want native resolution (3km) NAM grids in CONDUIT. (Committee, UPC)

ACTION 5: Get ASCAT/OSCAT data from NESDIS flowing through the IDD. May include helping them get an LDM set up. (Michael James and ??)

ACTION 6: Create a more in-depth presentation about Unidata's python activities for the Fall meeting. (Ryan May)

ACTION 7: Investigate potential for collaboration with UK Met office on python projects. (Rich Signell)

ACTION 8: Article about HIWPP for News@Unidata. (Doug Dirks)

ACTION 9: Investigate better handling of archive point data from SSEC ADDE servers by the IDV. (Yuan Ho)

ACTION 10: For Fall meeting, have a live demo/example of how to leverage the cloud with science examples. (Ward Fisher, Rich Signell)

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