Director's Report

Unidata Users Committee Meeting

4 October 2007

Boulder, CO

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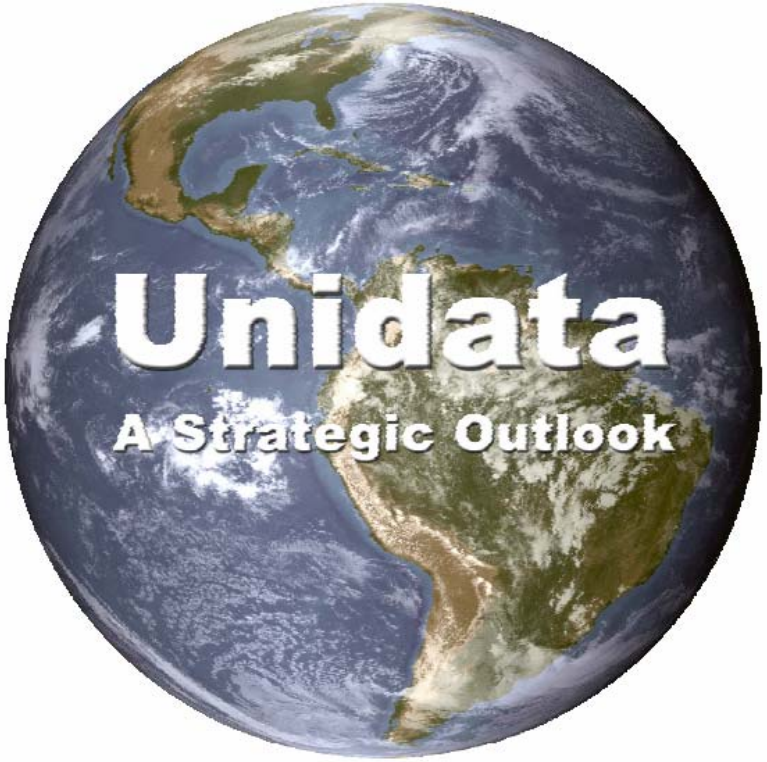
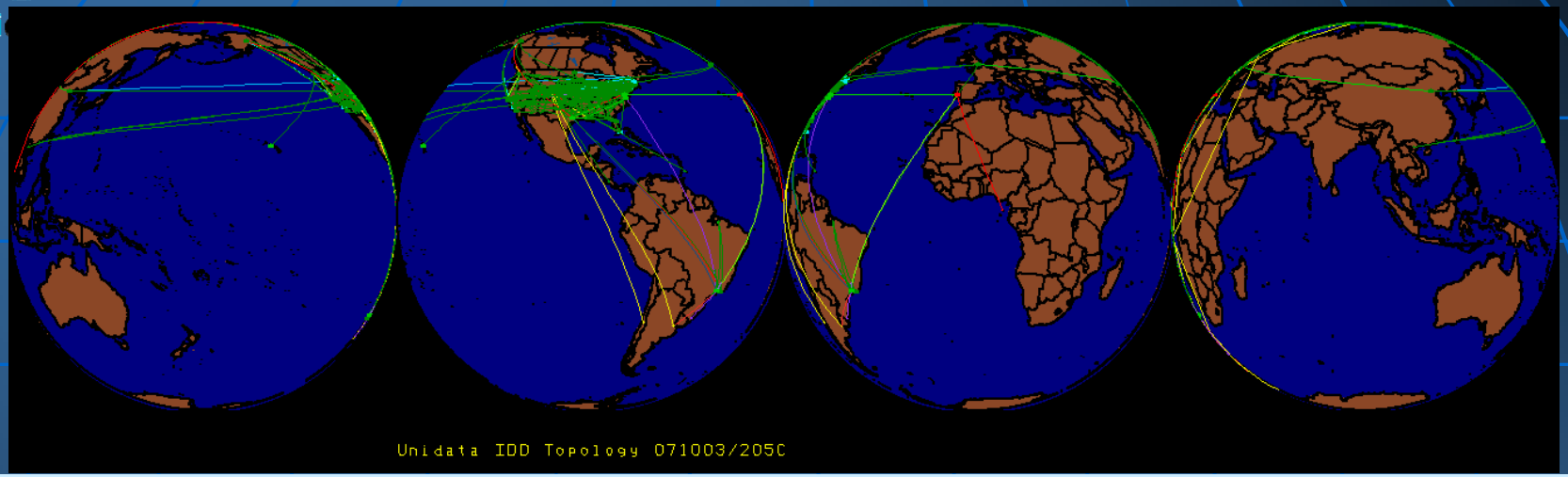
UCAR Office of Programs
Boulder, CO

Strategic Plan



September 2007

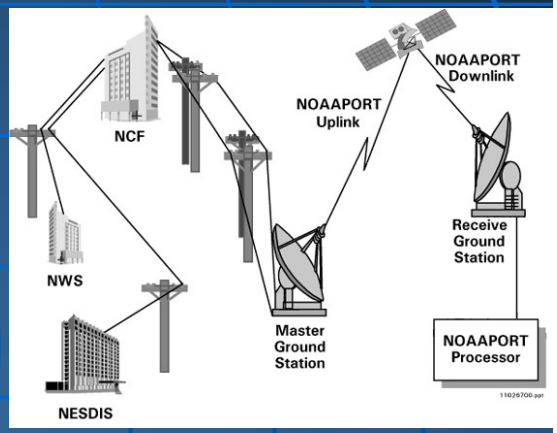
Data Flows



- The number of sites participating in the IDD continues its steady growth. As of yesterday, 451 hosts in 238 unique network domains were running LDM-6 and reporting real time statistics.
- The average volume of data flowing through the IDD has remained steady over the last several months, except for TIGGE and CONDUIT.
- TIGGE data volume is about 12-13 GB/hour, but in bursts up to 23 GB/hour. Data now flowing to and from CMA, Beijing, and from CPTEC, Brazil.
- We are in discussions with COSMIC to distribute their GPS data to the community in real-time, via the LDM. There are some data policy issues to work through before that can happen.

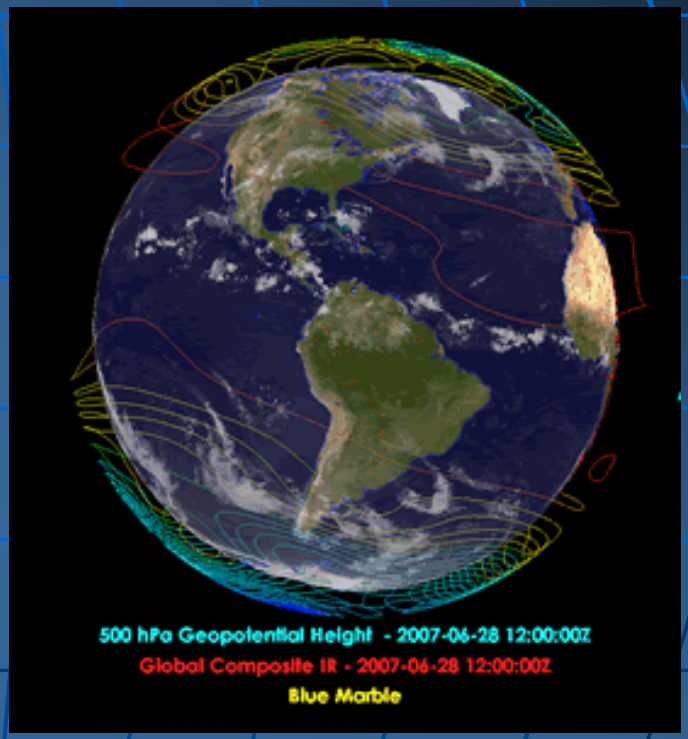
NOAAPort-related Meeting with NWS

- In June, Linda and I met with a group from NWS to see if NWS will implement an LDM-based terrestrial back up for NOAAPort.
- A draft letter from Unidata and the Users Committee was presented to NWS.
- We generated a draft a white paper that described possible approaches for distributing the data to the community.
- Separately, there is considerable interest in using a CRAFT/Radar Level II type arrangement to distribute other NWS data to all sectors, augmenting the Family of Services. Discussions are underway with NCEP and others in the NWS as well as at the University of Oklahoma.
- A meeting of the principals and CONDUIT users is planned during the next AMS Annual Meeting in New Orleans in January 2008.



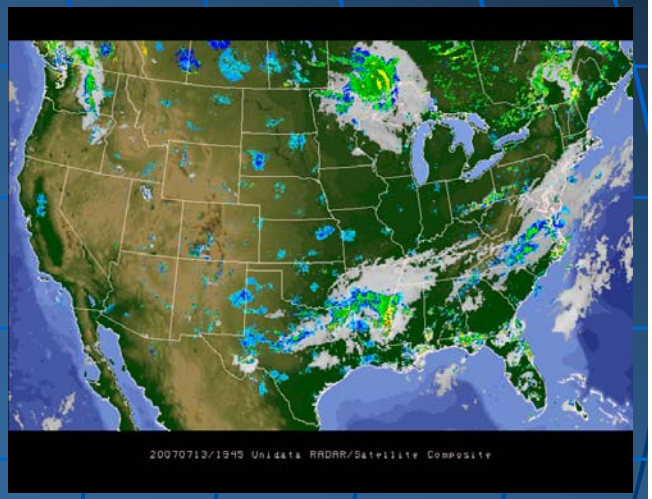
Integrated Data Viewer

- IDV use continues to increase steadily.
- IDV Version 2.3 was released on 15 August
  - Experimental Remote Level II Data Chooser
  - v2.2 features: For some data types, data can now be saved in a bundle.
  - There are new charting capabilities and support for meteorograms.
- An Advanced IDV (for Developers) training workshop was conducted in August. There were 14 participants



GEMPAK & McIDAS

- GEMPAK continues to be Unidata's most popular analysis and visualization tool.
- Between October 2005 and July 2007, 1735 unique users downloaded GEMPAK from the UPC.
- NWS/NCEP is migrating GEMPAK, a.k.a. N-AWIPS, toward a service-oriented architecture and integrating it into AWIPS-II. In the short term, this will not impact the Unidata community, but in the long term the migration to AWIPS-II has implications for Unidata.
- McIDAS-X/XCD v2007 was released on 16 August.



- McIDAS use is decreasing.
  - For longitudinal comparison, 102 sites downloaded version 2004, approx. 60 downloaded v2005, and 50 downloaded v2006.
  - The majority of new interest in Unidata McIDAS is coming from sites outside of the US.

NetCDF-4

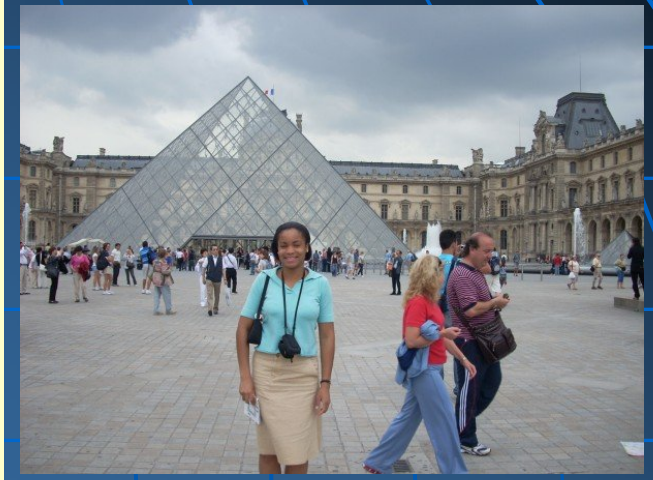
NetCDF-4, the next major upgrade to the netCDF standard, was released in beta in April 2007.

While supporting full backward compatibility, it allows users to read and write HDF files with the netCDF API, including support for groups, user-defined types, per-variable compression, and parallel I/O.

NetCDF-4 depends on HDF-5 version 1.8.0, which is currently in beta release.

The NetCDF for Developers and Data Providers training workshop had 38 participants, the largest attendees of all sessions in the 2007 Unidata Training Workshop.

A new C++ API was developed by Shanna Shaye Forbes, a returning SOARS protégé.



This spring Shanna received her B.S.E.E. degree from the University of Texas at Austin.

She is now going to grad school at UC-Berkeley.

A joint NSF proposal from Unidata and OPeNDAP.org was recently funded. The work seeks to improve OPeNDAP and netCDF Integration by

enhancing Unidata's netCDF C library to support the OPeNDAP protocol as the remote access protocol for netCDF data, and

extending the OPeNDAP protocol to support the Unidata Common Data Model on the server side as well as the client side.

2007 Training Workshops

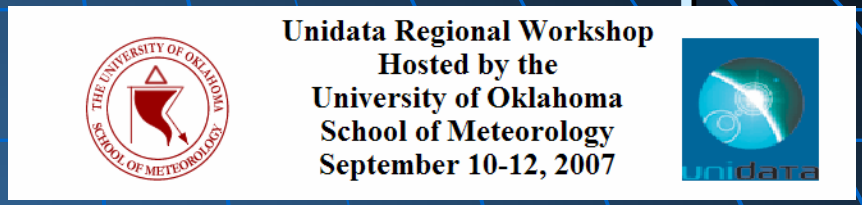
- The 2007 Training workshops were held 20 July – 10 August.
- 75 participants registered, 41 from academic and research communities, 28 from government organizations.
- There were several international participants. They came from Germany (2), Panama (2) and Portugal (1). Five Chinese registrants didn't get visas in time.
- For the first time, a session on Advanced IDV was offered. NetCDF for Developers attracted 38 participants.

Register Online

netCDF for developers	July 20
GEMPAK	July 23-25
LDM	July 26-27
THREDDS Data Server Administration	July 30-31
Introductory IDV	August 1-2
Advanced IDV	August 3-4
netCDF JAVA	August 6
McIDAS	August 7-10

Event Details

Unidata Regional Workshop



- The University of Oklahoma hosted a Unidata Regional Workshop during 10-12 September at their new National Weather Center.
- The main purpose of the workshop was to provide training in the use of Unidata's Integrated Data Viewer (IDV).
- Sessions on THREDDS and LEAD were included.
- There were about 25 participants. A few participants presented posters on the use of Unidata applications at their institution.

2007 Community Equipment Awards

- A solicitation was issued to the community in January and advertised at the AMS Annual Meeting.
- Thirteen proposals were submitted.
- A total of $100K (with UCAR overhead) was available for 2007 awards; Total requested funding (with UCAR OH) was $276K.
- This year's themes:
  - Furthering the use of the IDV in education settings
  - Increasing the use of Unidata systems and tools in other geoscience disciplines like hydrology and oceanography
- The review panel met in May to rank and recommend awards; Six proposals were funded at varying levels.
- Award notifications were made in early June.

2007 Community Equipment Awards

1. Central Michigan University, Dr. Martin Baxter - "Enhancing the Use of IDV and GEMPAK in Undergraduate Research and Education at Central Michigan University"
2. Florida Institute of Technology, Dr. Steven M. Lazarus – "A Multidisciplinary Computer Lab for Meteorological and Oceanographic Applications at the Florida Institute of Technology"
3. University of Missouri-Columbia, Patrick S. Market, Anthony R. Lupo and Neil I. Fox – "Increasing Use of the Integrated Data Viewer (IDV) in the Atmospheric Science Curriculum at the University of Missouri-Columbia"
4. Plymouth State University, Brendon Hoch – "Enhancement of Meteorology Technology at PSU"
5. San Francisco State University, Dr. Dave Dempsey – "Upgrading SFSU's Weather Graphics and Simulation Laboratory"
6. University of Utah, Dr. John Horel – "Enhancing Use of Surface Observations in IDV"

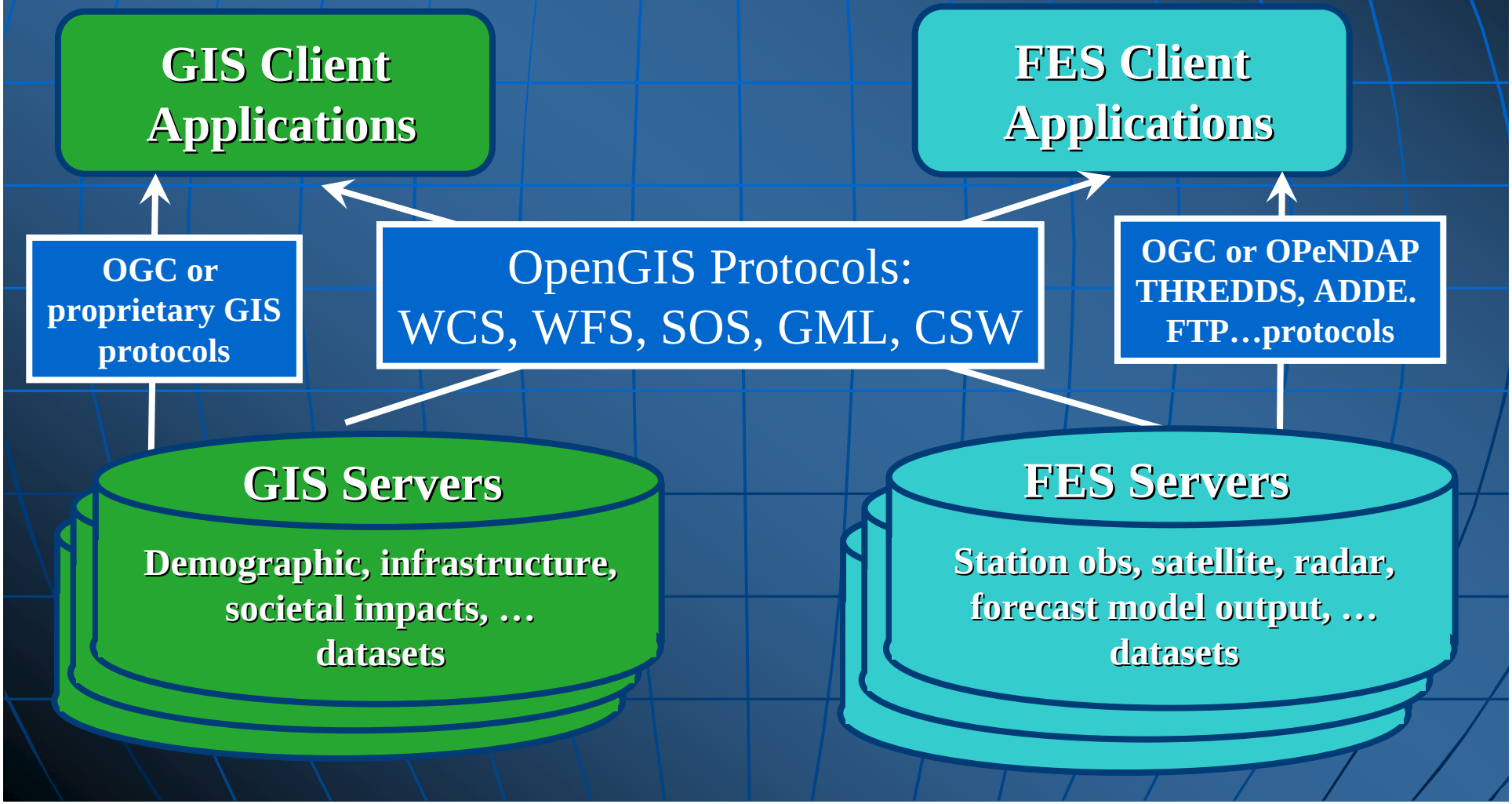
Users Committee Action Item: Unidata should explore seeking additional equipment awards funding from other NSF GEO divisions, due to the broadening efforts and collaborations

We discussed this idea with Cliff Jacobs and Bernard Grant in June. They advised us to work initially with ATM in seeding such community broadening grants with ATM funds. Once those efforts are successful, we will be in a stronger position to approach other GEO divisions.

Unidata-OGC Interoperability Workshop

- *Theme: Standards-based Web Services Interfaces to Existing Atmospheric/Oceanographic Data Systems*
- *Organized by Unidata on 19 September 2007*
- Related to the GALEON (Geo-interface for Air, Land, Earth, Oceans NetCDF) effort
  - Foster interoperability between data systems of FES and GIS communities
  - Provide standard interfaces to existing netCDF/THREDDS services, e.g.,
    - Web Coverage Service (WCS)
    - Web Feature Service (WFS)
    - Sensor Web Enablement (SWE)
    - Catalog Services for the Web (CSW)
- The workshop had a large turn out: 63 people attended!
- The workshop resulted in a productive discussion and a few specific steps to enhance interoperability across scientific and GIS data services

GALEON (Geo-interface for Air, Land, Earth, Oceans NetCDF)



EGU ESSI Division

The 2007 General Assembly drew 8037 participants from 90 countries

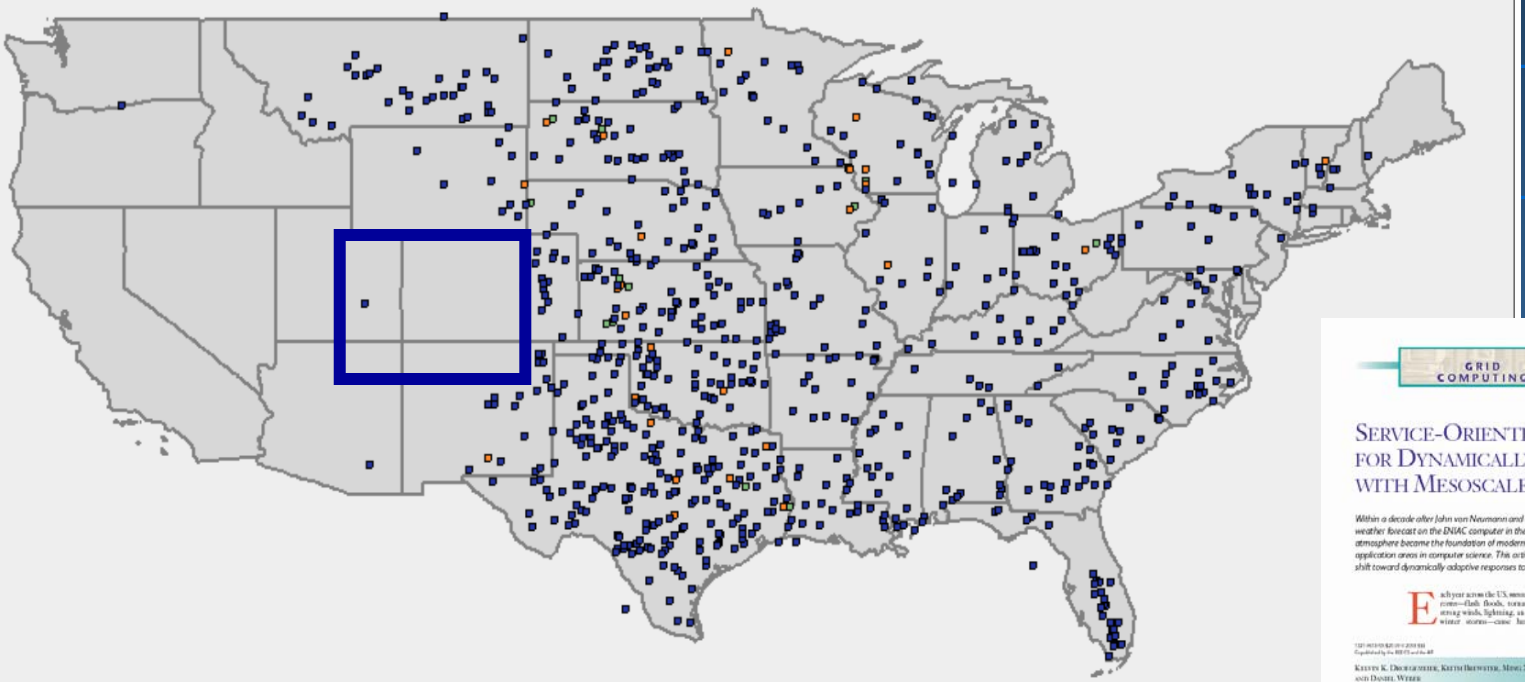
- A proposal to start a new ESSI Division within EGU was favorably received.
- Proposers: Stefano Nativi, Peter Fox, Mike Jackson, Mohan Ramamurthy, Bernard Ritschel, and Charles Barton
- EGU has approved a standalone program for the EGU 2008 meeting. About 12 sessions are being proposed on a range of cyberinfrastructure topics for the 2008 meeting.

LEAD Deployment: Weather Challenge and NOAA Hazardous Weather Test Bed

- In a pilot effort, a limited number of students at 10 universities used the LEAD system during the Spring Weather Challenge. The goal of this pilot project was to make available LEAD technology to users and enable them to use a high resolution WRF model as a tool in preparing forecast for WxChallenge.
  - We learned a great deal from this experience and the LEAD Gateway team has already begun to incorporate user suggestions (and bug discoveries) into the next release of the Gateway.

- LEAD was also used by NOAA/Storm Prediction Center to create…
  - 10-member ensemble CONUS forecast at 4 km grid spacing
  - 2 km CONUS forecast at 2 km grid spacing
  - 2 km forecasts launched automatically over tornado watches
  - 2 km regional forecasts launched by forecasters on demand

Centers of On-Demand Forecast Grids Launched at NCSA During 2007 Spring Experiment



■ Launched automatically in response to hazardous weather messages (tornado watches, mesoscale discussions)

■ Launched based on forecaster guidance

GRID COMPUTING

Service-Oriented Environments for Dynamically Interacting with Mesoscale Weather

Within a decade after John von Neumann and colleagues conducted the first experimental weather forecast on the ENIAC computer in the late 1940s, numerical models of the atmosphere became the foundation of modern-day weather forecasting and one of the driving application areas in computer science. This article describes research that is enabling a major shift toward dynamically adaptive responses to rapidly changing environmental conditions.

Each year across the U.S. mesoscale weather events—flash floods, tornadoes, hail, strong winds, lightning, and localized winter storms—cause hundreds of deaths, routinely disrupt transportation and commerce, and lead to economic losses averaging more than US$13 billion.[1] Although mitigating the impacts of such events would yield enormous economic and societal benefits, research leading to that goal is hindered by rigid IT frameworks that can't accommodate the real-time, on-demand, dynamically adaptive needs of mesoscale weather research, its disparate, high-volume data sets and streams, or the tremendous computational demands of its numerical models and data-assimilation systems.

In response to the increasingly urgent need for a comprehensive national cyberinfrastructure in mesoscale meteorology—particularly one that can interoperate with those being developed in other relevant disciplines—the U.S. National Science Foundation (NSF) funded a large information technology research (ITR) grant in 2003, known as Linked Environments for Atmospheric Discovery (LEAD). A multidisciplinary effort involving nine institutions and more than 100 scientists, students, and technical staff in meteorology, computer science, social sciences, and education, LEAD addresses the fundamental research challenges needed to create an integrated, scalable framework for adaptively analyzing and predicting the atmosphere.

LEAD's foundation is dynamic workflow orchestration and data management in a Web services framework. These capabilities provide for the use of analysis tools, forecast models, and data repositories,

Kelvin K. Droegemeier, Keith Brewster, Ming Xue, and Daniel Weber
University of Oklahoma
Dennis Gannon and Beth Plale
Indiana University
Daniel Reed and Lavanya Ramakrishnan
University of North Carolina
Jay Alameda and Robert Wilhelmson
US National Center for Supercomputing Applications
Tom Baltzer, Ben Domenico, Donald Murray, Mohan Ramamurthy, and Anne Wilson
University Corporation for Atmospheric Research
Richard Clark and Sandra Yalda
Millersville University
Sara Graves, Rahul Ramachandran, and John Rushing
University of Alabama in Huntsville
Emrette Joseph and Vernon Morris
Howard University

LEAD: A Way Forward

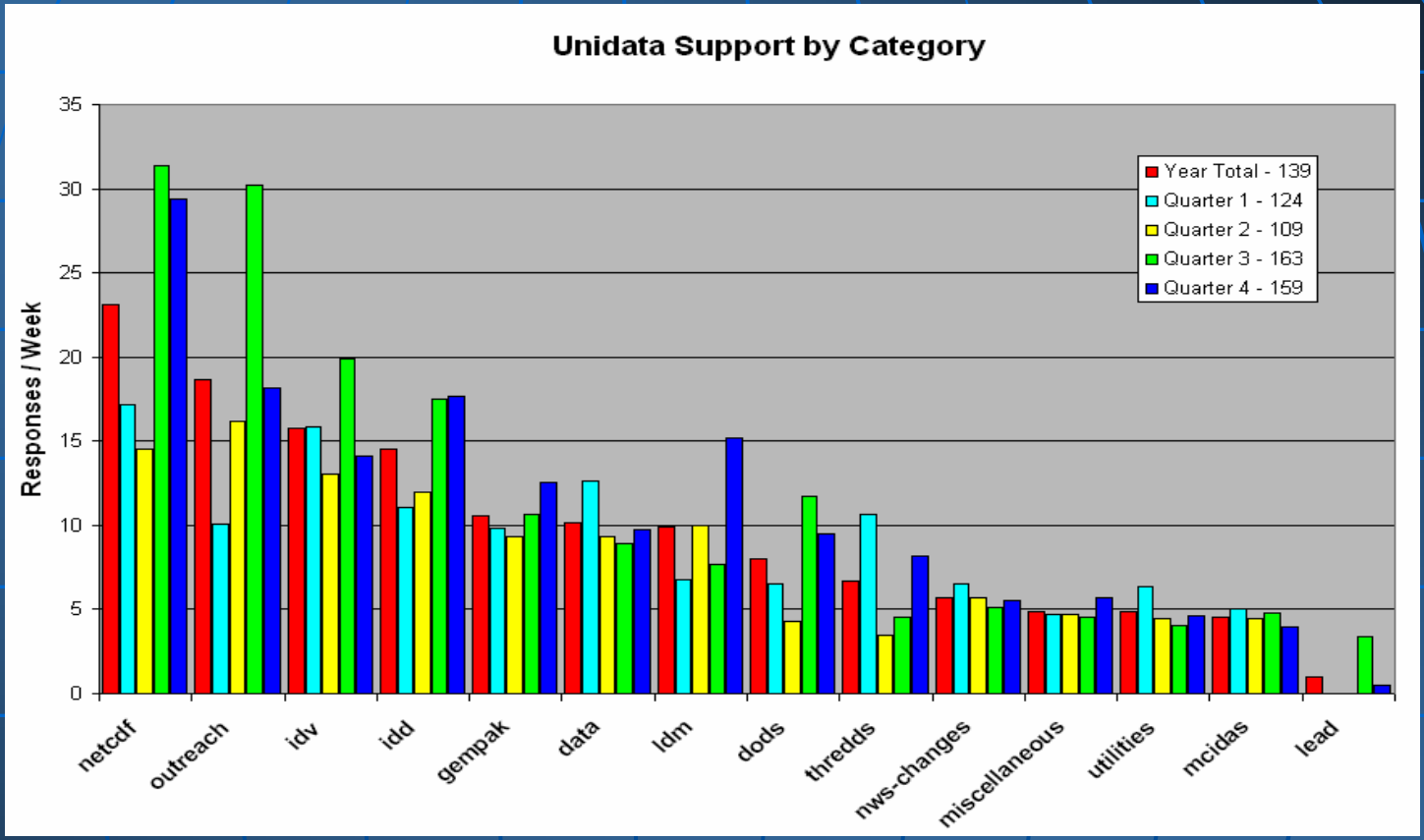
LEAD PIs visited NSF on 30 August to discuss the future of the project. The PIs met with officials in ATM, OCI and CISE. An invited seminar on LEAD was given to NSF staff. A possible approach to LEAD-2 was presented.

- Community Deployment of LEAD as a facility (through Unidata, but in partnership with a couple of other LEAD institutions)
- Advanced Meteorology Research
- Computer Science Research
- Integrated Educational Activities

The above individual elements are highly inter-related, but they will be proposed separately to different NSF programs and solicitations.

NSF is very interested in LEAD and has encouraged the PIs to continue the dialog with NSF officials

Email Support



- The total support load at the UPC is high and has grown in the last two quarters.
- Since 26 January 2006, over 7700 user support inquiries (new and follow-ups) wer processed through the Unidata inquiry tracking system. The system allows non-UPC experts to assist other community users.

State of the Program: A Snapshot

- Community relations : Green
- Data flows : Green
- Software development : Green
- Partnerships : Green
- Staffing : Yellow
- Support : Green
- Finances : Yellow

Questions?