Unidata and Some of its International Cyberinfrastructure Activities

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Global partnerships are essential to making advances in the geosciences.
We have so much to learn...

Hurricane Catarina, 2004

Another “unusual” storm

Anita, 2010
Established in 1984, Unidata is an NSF-funded program that provides the data services and cyberinfrastructure leadership for advancing geoscience research and education.

It is a community driven program.

Unidata is an exemplar of what can be achieved through sustained investments in cyberinfrastructure.
Facilitate data access

Develop and provide software for data management, analysis, and visualization

Provide comprehensive support, including training

Engage in community building and advocacy
From its modest beginning in meteorology, the Unidata community now includes users in more than 1500 academic institutions and 7000 organizations in ~150 countries, spanning every sector and every geoscience discipline.

Build it. Give it away. Support it. Engage your users.

• Developing interoperable software based on broadly applicable frameworks;
• Exploiting technological advances (e.g., Internet, Java, and GIS);
• Having a “free and open” philosophy;
• Workings closely with and engaging users;
• Leveraging partnerships at every opportunity;
A Snapshot of Services

Data:
Over 30 data streams provided
Data collection, cataloging, and distribution
Both push and pull technologies are used

Software:
Data Distribution: LDM
Remote Data Access: THREDDS, ADDE, and RAMADDA
Data Management: netCDF and UDUNITS
Analysis and Visualization: GEMPAK, McIDAS and IDV
GIS support via TDS (WCS, WMS) and KML and Shapefiles

User Support & Training:
Direct email support
Community mailing lists
Annual Training Workshops, Triennial Users Workshops, and Regional Workshops as needed.

Community:
Equipment Awards to universities; Seminars; Information Commons; Advocacy;
Real-time Data Distribution

About 30 different streams of real-time weather data from diverse sources are provided to a global community.

Unidata systems move more data (~30 Terabytes/week) via Internet 2 than any other advanced application.
The IDD has nearly 500 nodes in over 260 unique network domains. About 10% of those institutions are outside the U.S.

**Unidata IDD**: North American data delivery and sharing network

**IDD-Brasil**: South American peer of North American IDD

**IDD-Caribe (a work in progress)**: Central American peer of North American IDD

**Antarctic-IDD**: Support of US Antarctic research community
Remote Data Access

- Complements the IDD/LDM push system
- Made available via THREDDS Data Server, RAMADDA, and ADDE data servers that support several protocols

The Unidata Program Center operates an operational server at motherlode.ucar.edu that provides the above services.
The TDS can be accessed from many clients, including the IDV, ArcGIS, IDL, and Matlab.
RAMADDA is a web-based, content repository, a publishing platform, and a collaboration environment. Below is a RAMADDA server in operation.
Workshops

- We conduct training workshops both here in Boulder (annually) and in other locations (e.g., Sao Paolo, Cyprus, Iguassu Falls).

- Participants come from many countries, including Asia, Africa, Europe, and Latin and Central America.

- They bring fresh perspectives and an eagerness to participate, enriching our community.
The IDV is a multiplatform visualization and analysis tool that brings a wide range of data within a unified interface. These images were created using GEON-IDV, a version of the IDV.

Source: Unavco
Unidata’s technologies are used by universities, government agencies, research institutions, and research and operational projects worldwide.

Most major data centers use netCDF and many have implemented THREDDS middleware.

Many weather services around the world, federal agencies and companies, including NWS, NOAA, NASA, The Weather Channel, Raytheon, use LDM to send/receive data.
Google Project

A prototype Earth-gauging system integrating weather and health data to manage meningitis

Team: UCAR/NCAR/Unidata
International Research Institute
North Carolina State University
Navrongo Health Research Center
Scientists in Africa
Meningitis cases have been observed to occur in the dry season and end with the onset of higher humidity that accompanies the rainy season.
Vision: An Information System

Open access* to current, historic, and forecasted epidemiological, environmental, political, and socio-demographic data in a geo-referenced framework that enables research, supports decision, and facilitates collaboration.

Unidata-developed CI like netCDF, CDM, RAMADDA, and the IDV, provide a framework for developing such an information system.

*At least open to MERIT members and
Example: View of West Africa looking from the northeast, with precipitable water in blue and meningitis reports by district -- no report (gray), alert (yellow), and epidemic (red).
The increased globalization, enabled by global networks and a new generation of data and information services, is creating new partnerships that are accelerating scientific discoveries and creating new knowledge.

Unidata is keenly interested in enhancing its ties to the international community. We would welcome opportunities to leverage and enhance NSF’s investments in Unidata in order to help build capacity and partnerships.