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Unidata

20 September 2004

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Unidata Program Center
UCAR Office of Programs
Boulder, CO



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Mission



■ Mission Statement:

Provide data, tools, and community leadership for enhanced Earth-system education and research.

At the Unidata Program Center, we

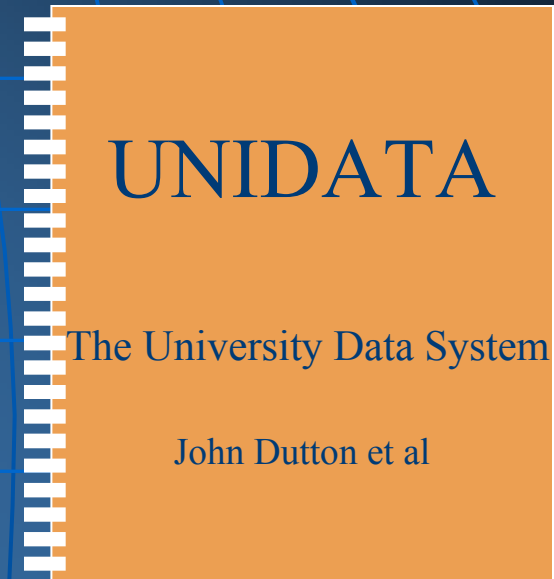
- *Facilitate [Real-time] Data Access*
- *Provide Tools*
- *Support Faculty and Staff*
- *Build and Advocate for a Community*



Unidata Program Center



- Conception: Circa 1983
- Current Funding Sources:
Primarily NSF/ATM, with additional funding from NSF/EHR and NASA.
- Governance:
 - Community governed
 - Policy Committee (Appointed by UCAR President)
 - Users Committee
 - Technical Committee(s) – as needed

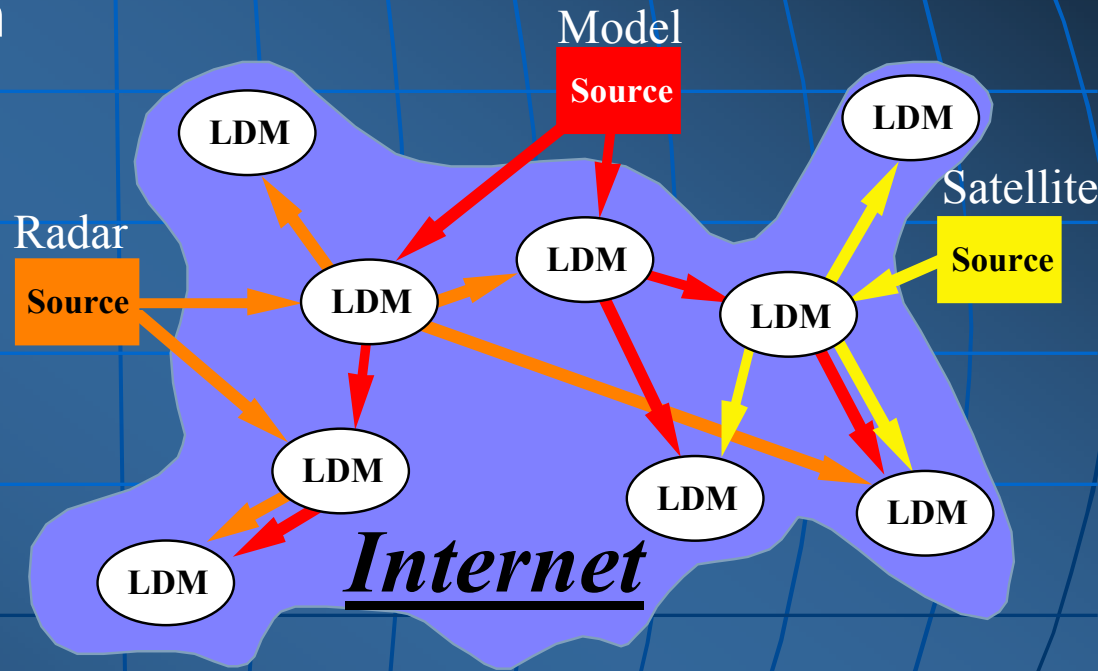




Internet Data Distribution



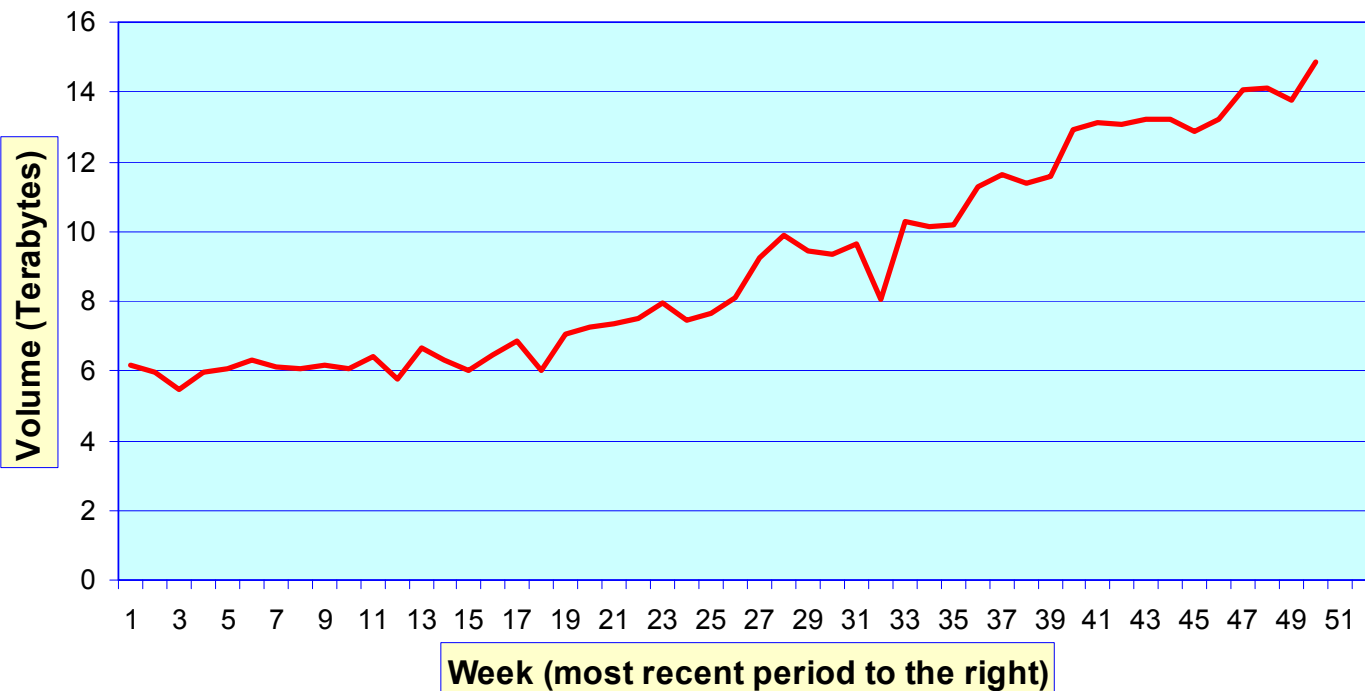
- About 150+ sites are participating in Unidata Internet Data Distribution (IDD) system
- Approximately 2 GB of data injected/hour *from distributed sources*;
- Unidata IDD/LDM uses more of the Internet2 than any other *advanced application*;
- Approx. 15 Terabytes of data transmitted each week (~4% of I2 traffic).





Unidata and Internet 2

Volume of Data Moved by LDM each week via Internet 2 for the past year



The LDM is now ranked #3 (behind HTTP and NNTP) in Internet 2 usage.

It recently surpassed FTP.



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Technology Portfolio



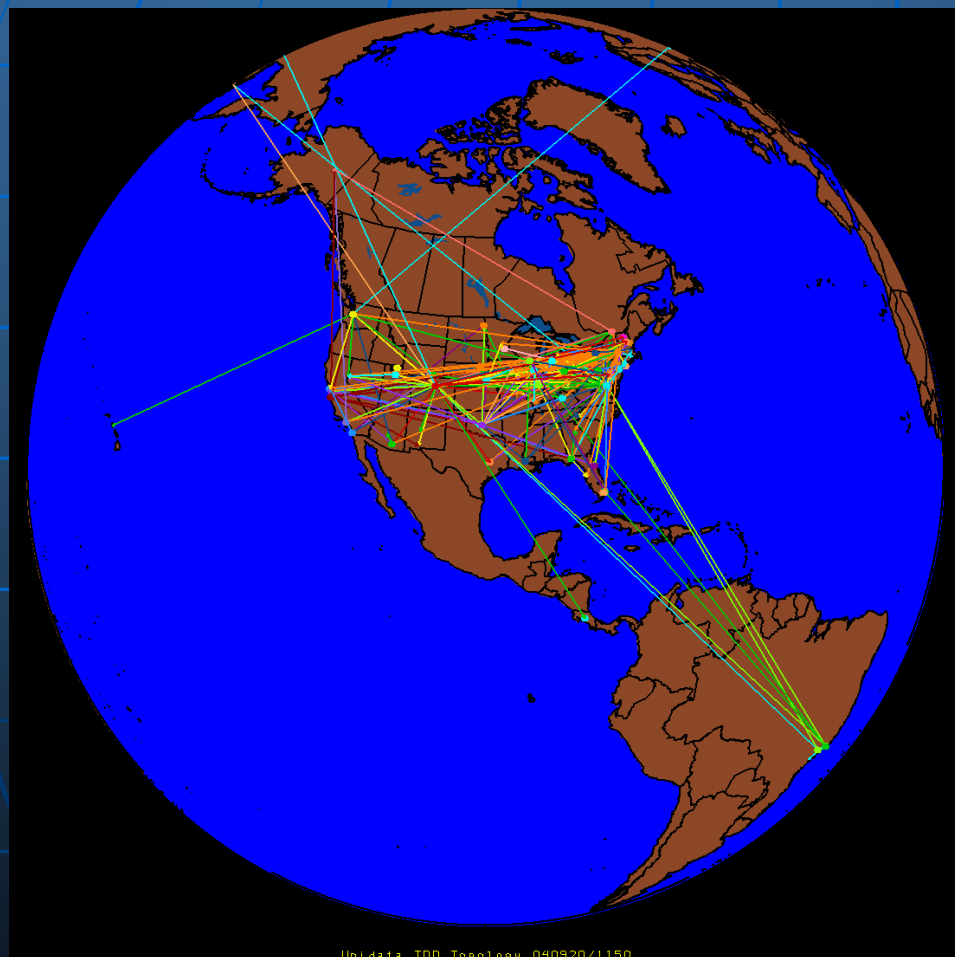
- 1) **McIDAS:** A client/server analysis and display package that emphasizes image processing of data from satellite-borne sensors;
- 2) **GEMPAK:** An analysis, display, and product generation package for meteorological data;
- 3) **Integrated Data Viewer:** Java-based, platform-independent data analysis and 3D visualization tools;
- 4) **NetCDF:** A software interface for platform-independent access to self describing datasets;
- 5) **Local Data Manager:** Software for capturing, disseminating, and organizing data in near-real time; It is the heart of the Internet Data Distribution (IDD) system;
- 6) **THREDDS:** A project to facilitate remote access to thematic, distributed, interdisciplinary data servers;



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Real-Time Monitoring



Unidata IDD Topology 040920/1150

Unidata's reach is now global.

There are sites in South America, Europe, and Asia that receive real-time data via the IDD.

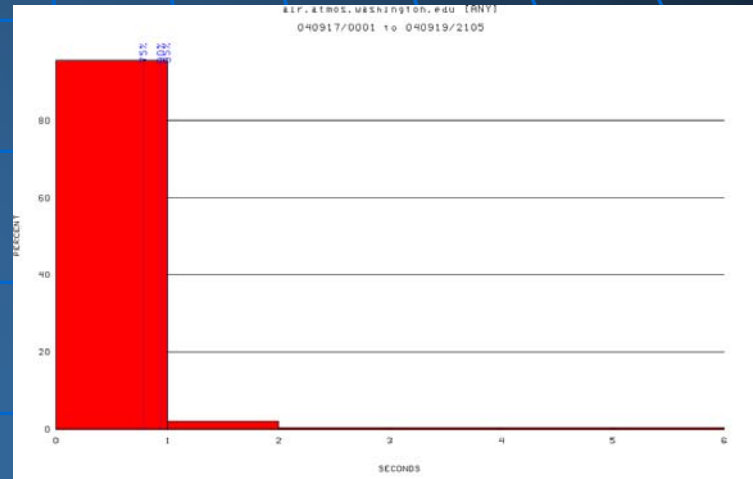


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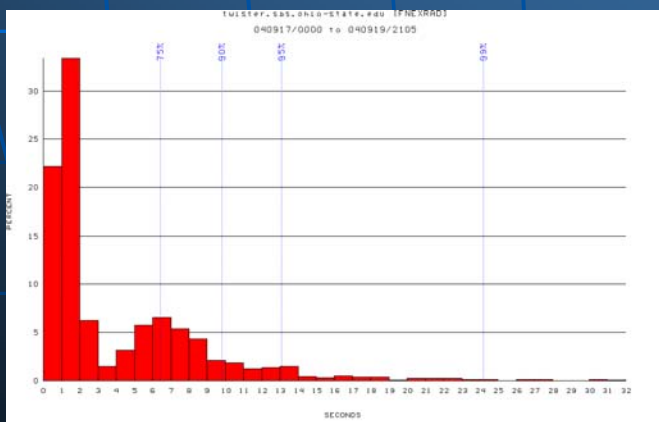
Real-time Statistics



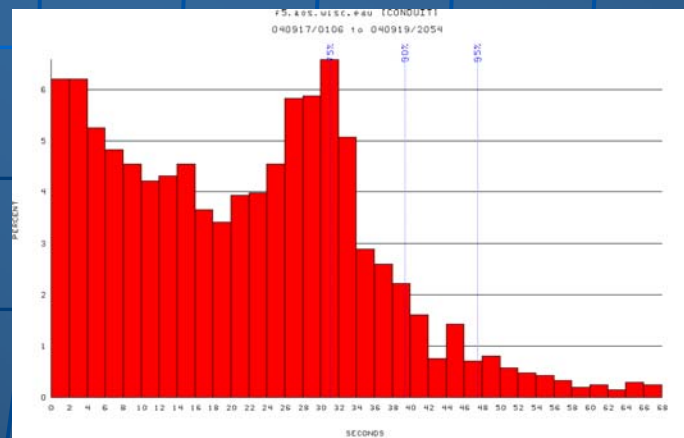
Hong Kong Univ. - HDS



Univ. Washington - ALL



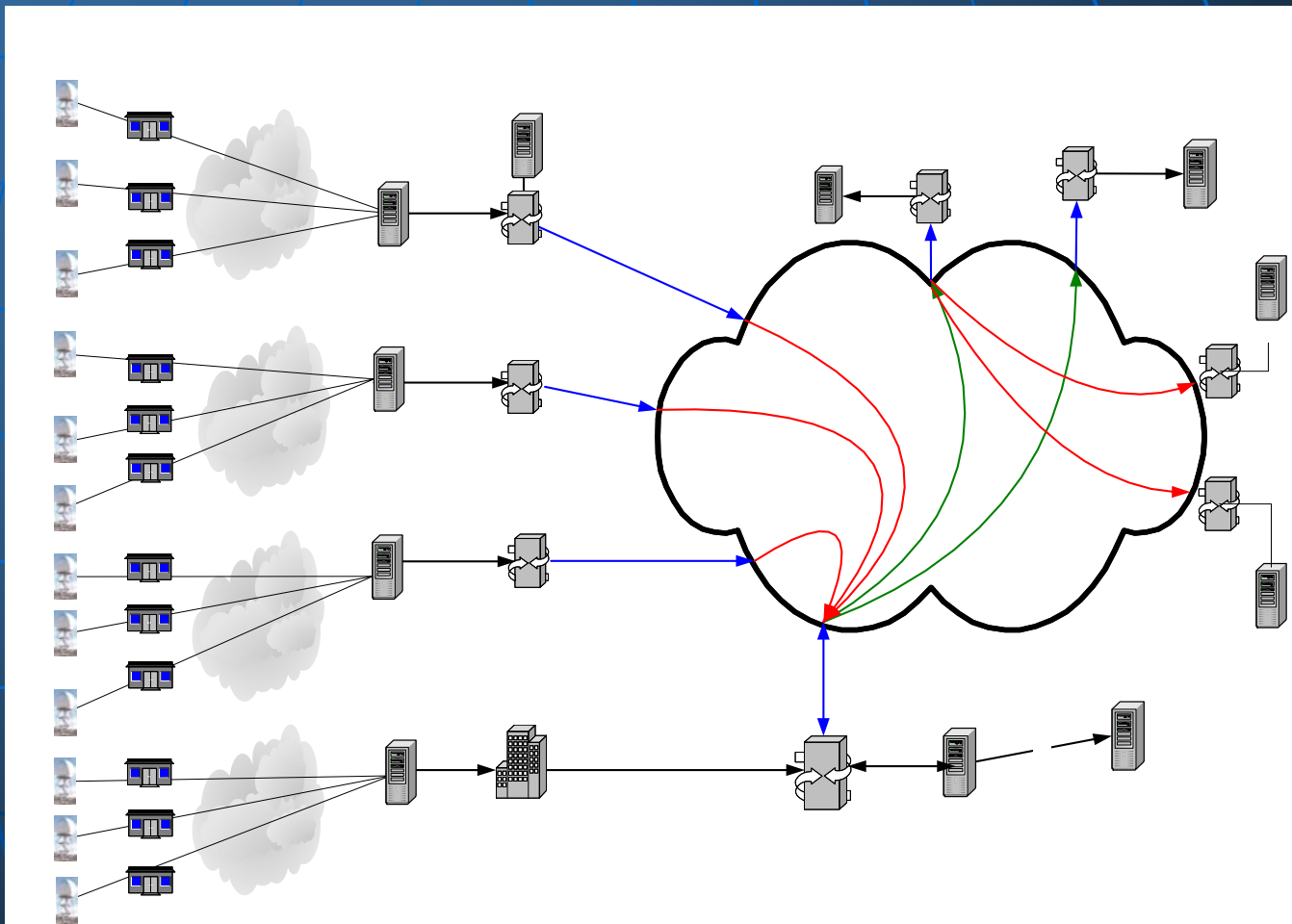
Ohio State Univ. - FNEXRAD



Univ. Wisconsin - CONDUIT



Technology Transfer: Operational LDM Use in the NWS



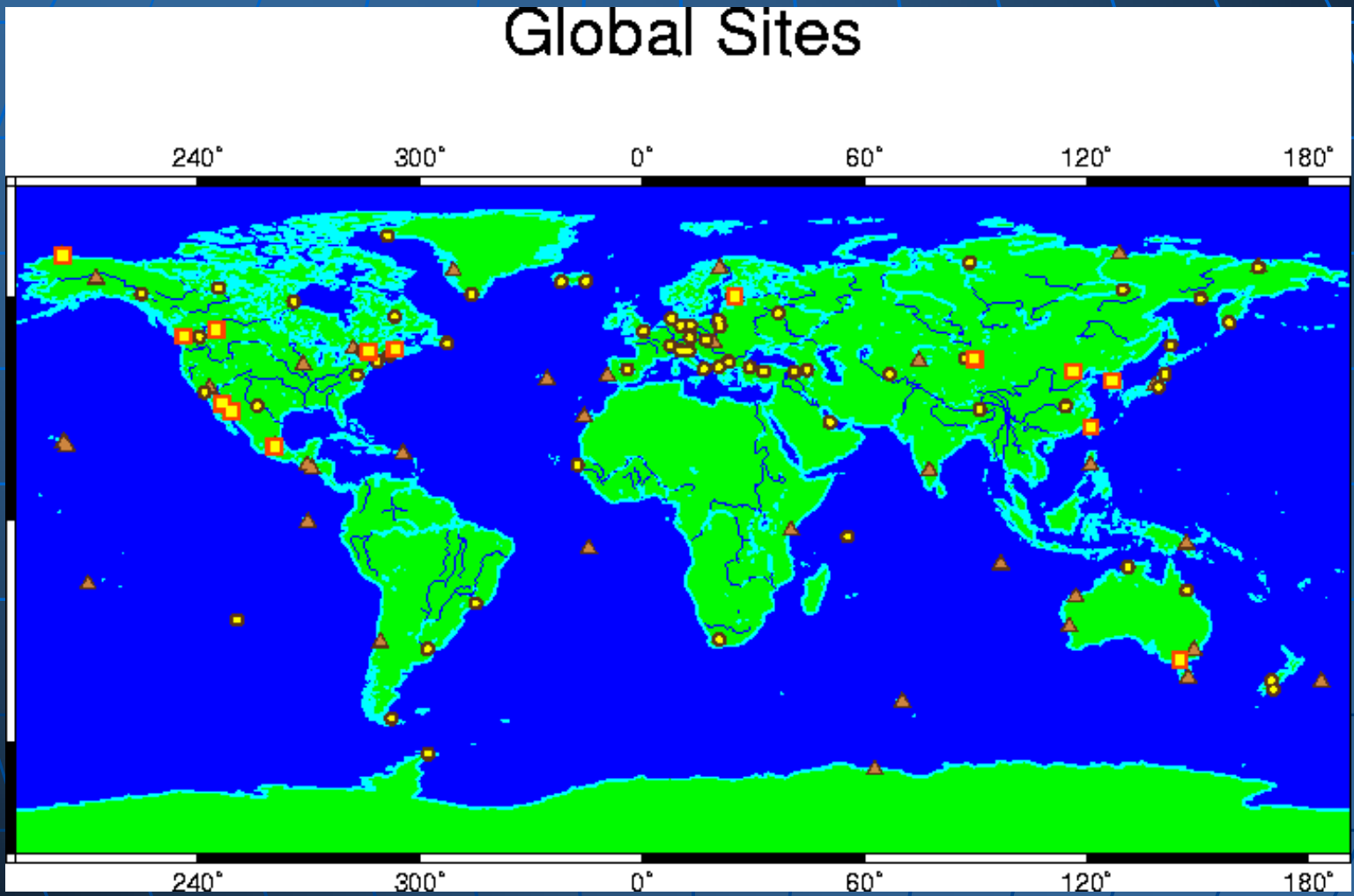
The U. S. National Weather Service is now using the Unidata LDM technology *operationally* to distribute NEXRAD Level II data.

The Korean Meteorological Administration has started using the LDM for some of their internal data distribution to/from nearly 40 weather service offices.



Sites

Global Sites



Unidata's LDM is used for real-time data transport



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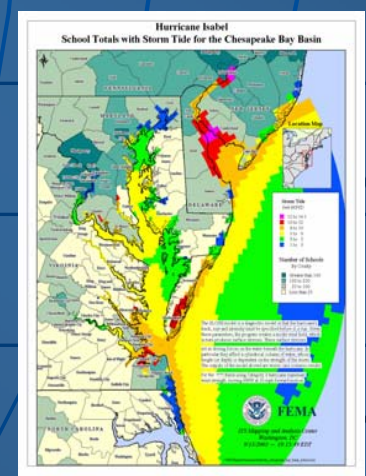
Unidata 2008: Shaping the Future of Data Use in the Geosciences



Unidata user community is interdisciplinary - 2/3rd of sites have users outside atmospheric sciences.

We are moving from an era of data provision towards one in which data- and related web-services are important;

Multidisciplinary integration and synthesis are emphasized.





■ ***Community and Support Services***

- ***Endeavor 1.*** Responding to a broader and more diverse community.
- ***Endeavor 2.*** Comprehensive support services

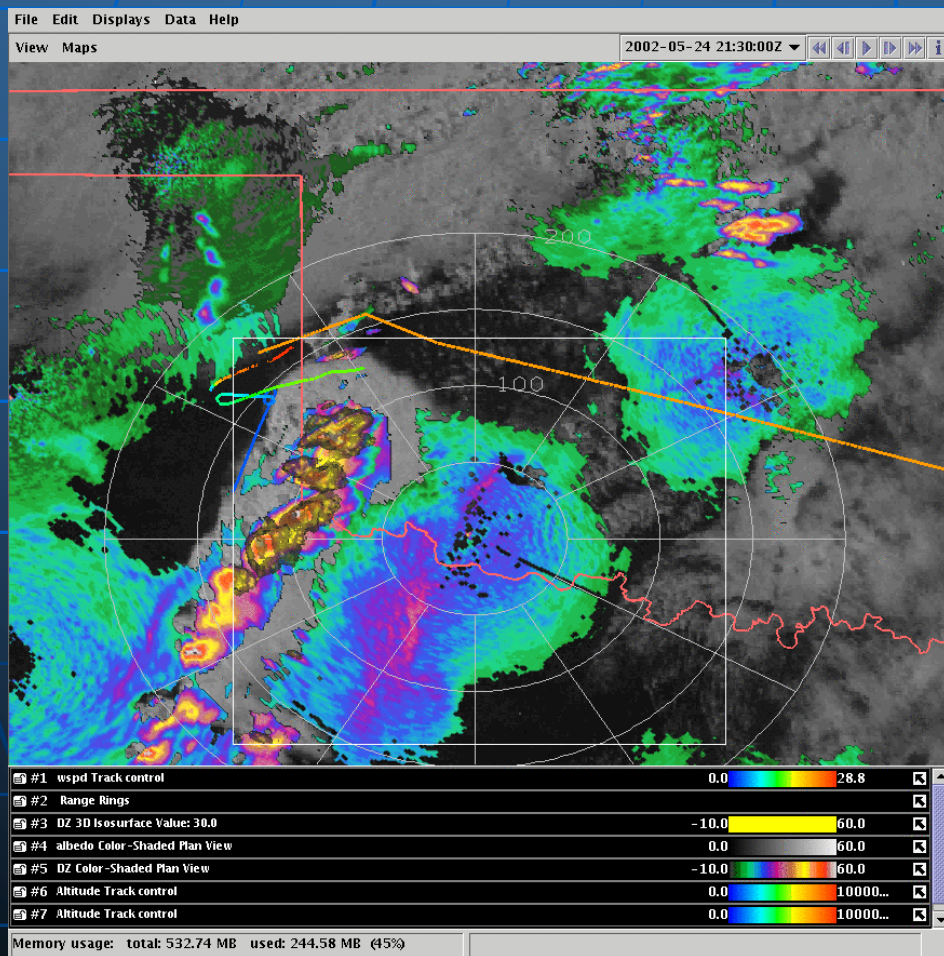
■ ***Data Services, Systems and Tools***

- ***Endeavor 3.*** Real-time, self-managing data flows
- ***Endeavor 4.*** Software to analyze and visualize geoscience data
- ***Endeavor 5.*** Distributed, organized collections of digital material
- ***Endeavor 6.*** Improved data access infrastructure



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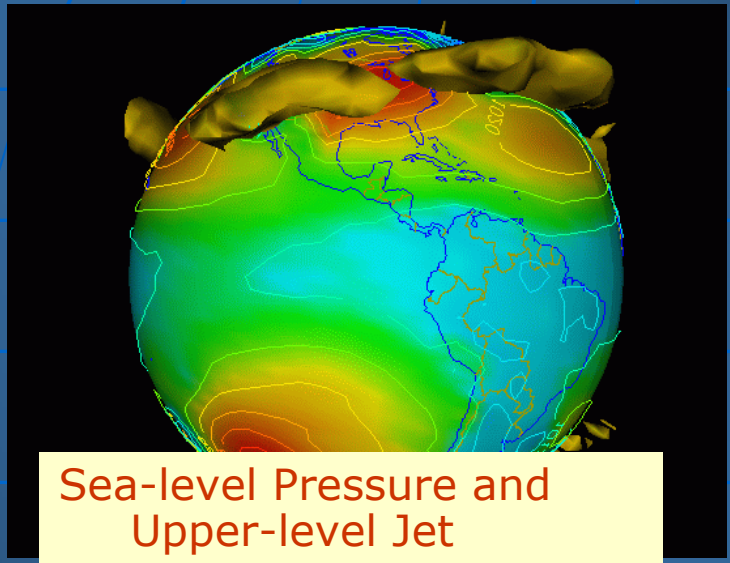
Integrated Data Viewer



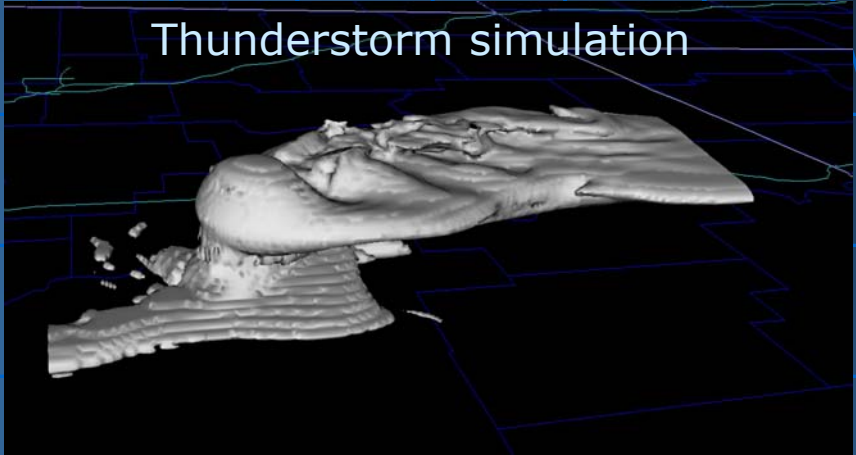
- IDV testing in the IHOP field project
- S-POL 3D radar reflectivity from NCAR
- Albedo (color-shaded)
- Aircraft Track
- Different sources, protocols, resolutions and time-scales
- IDV will be used in RICO



Examples of Remote Visualizations

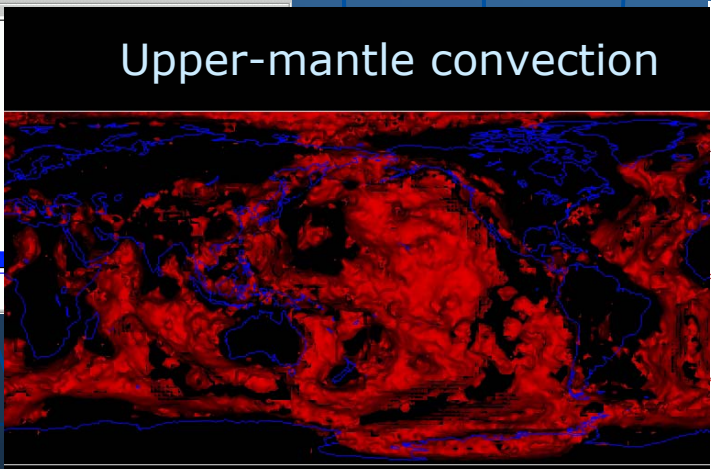
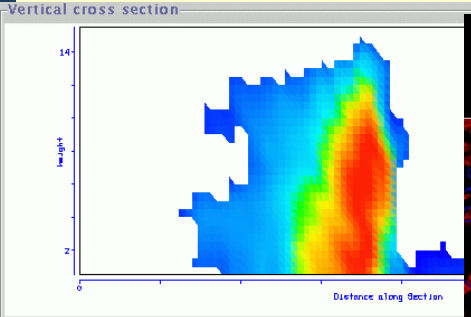


Sea-level Pressure and Upper-level Jet

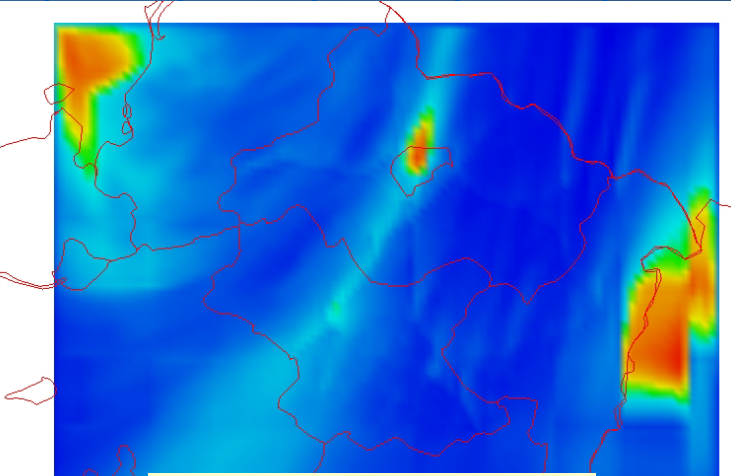


Thunderstorm simulation

S-POL Radar Cross-section of a thunderstorm



Upper-mantle convection



NO₂ concentration

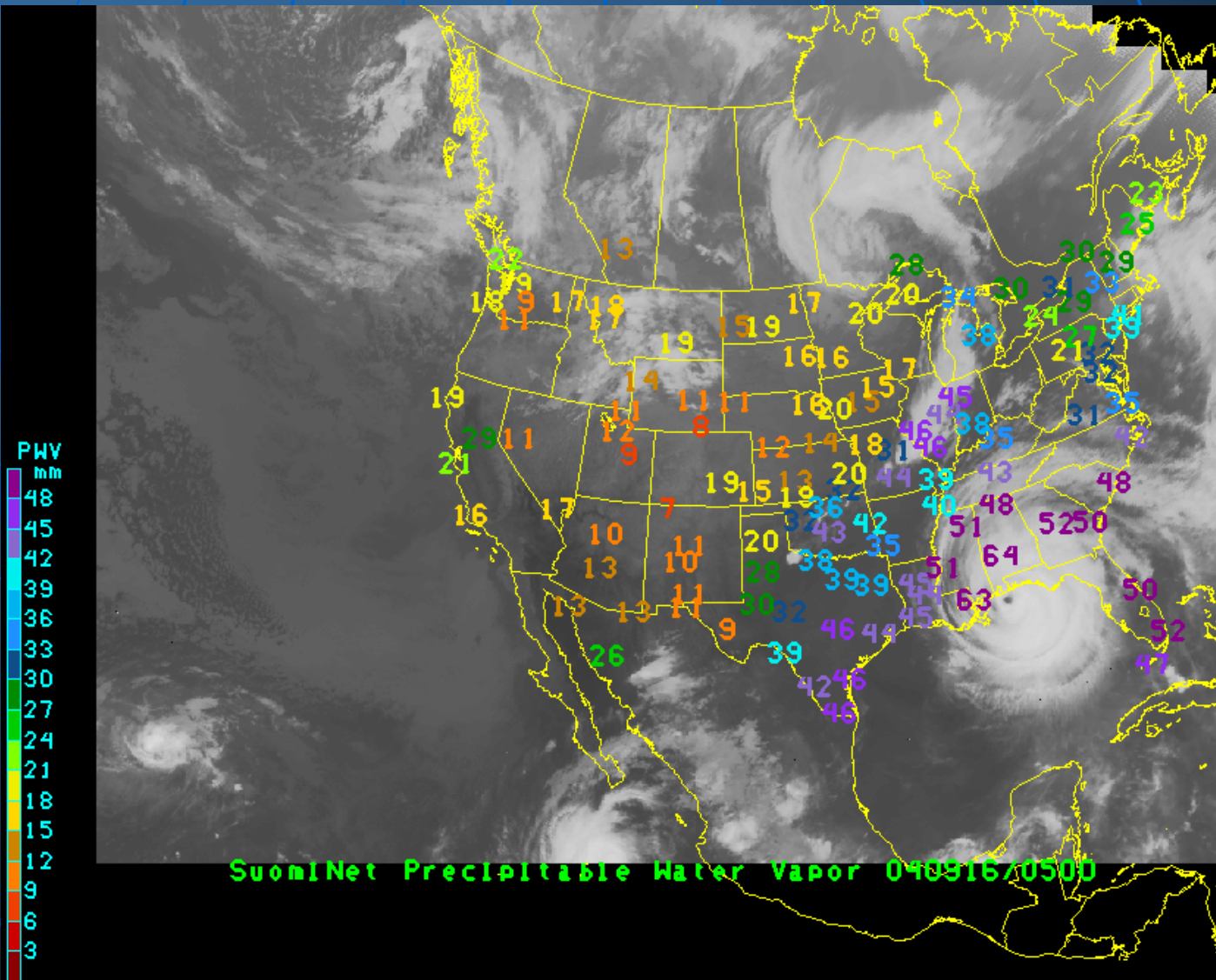


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Hurricane Ivan



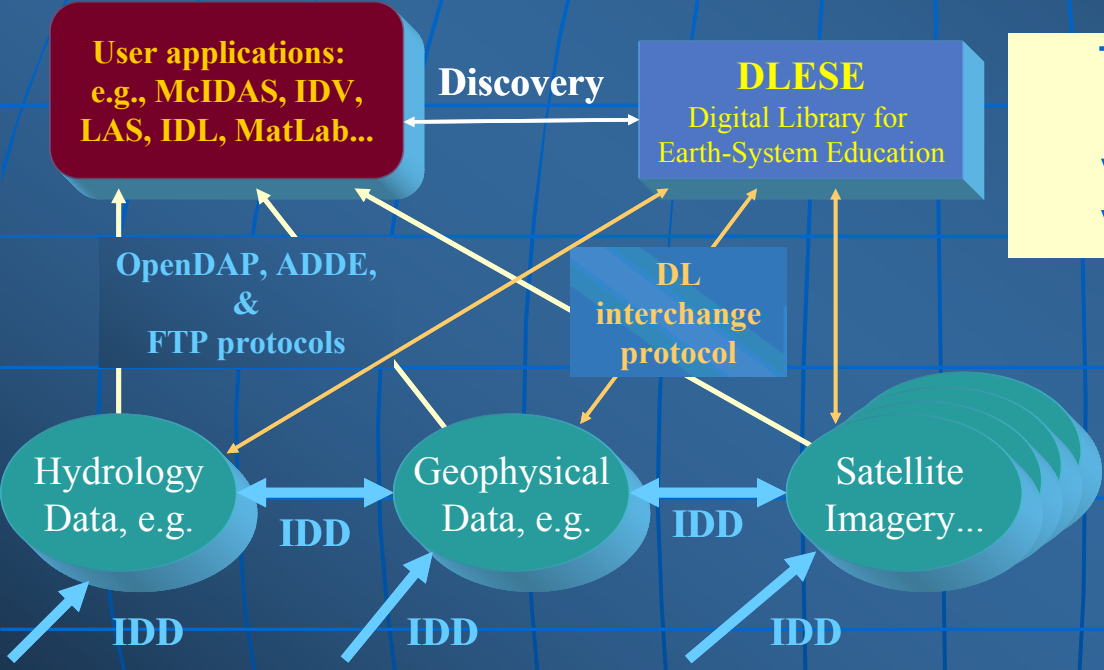
SuomiNet Precipitable Water



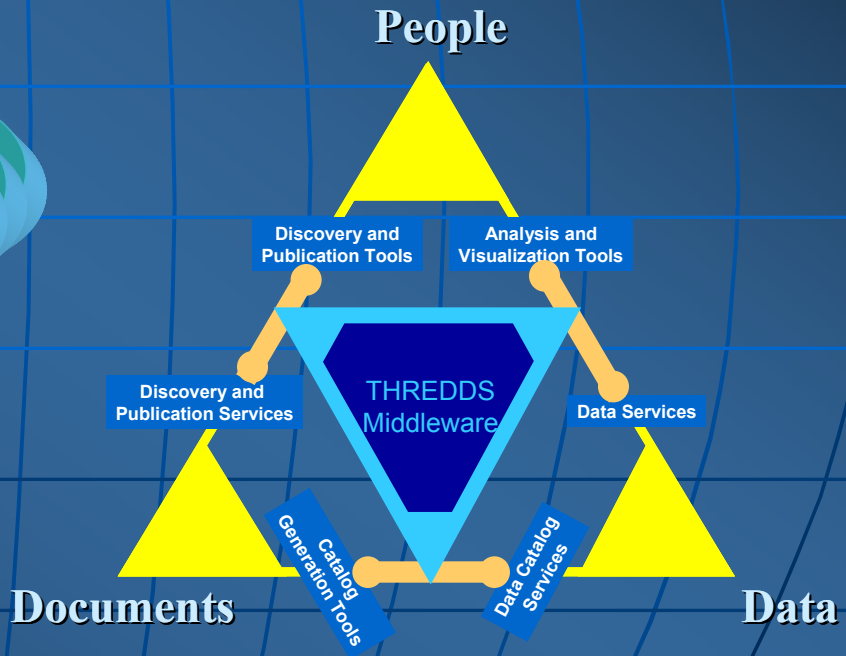


Thematic Real-time Environmental Distributed Data Servers (THREDDSS)

To make it possible to publish, locate, analyze, visualize, and integrate a variety of environmental data



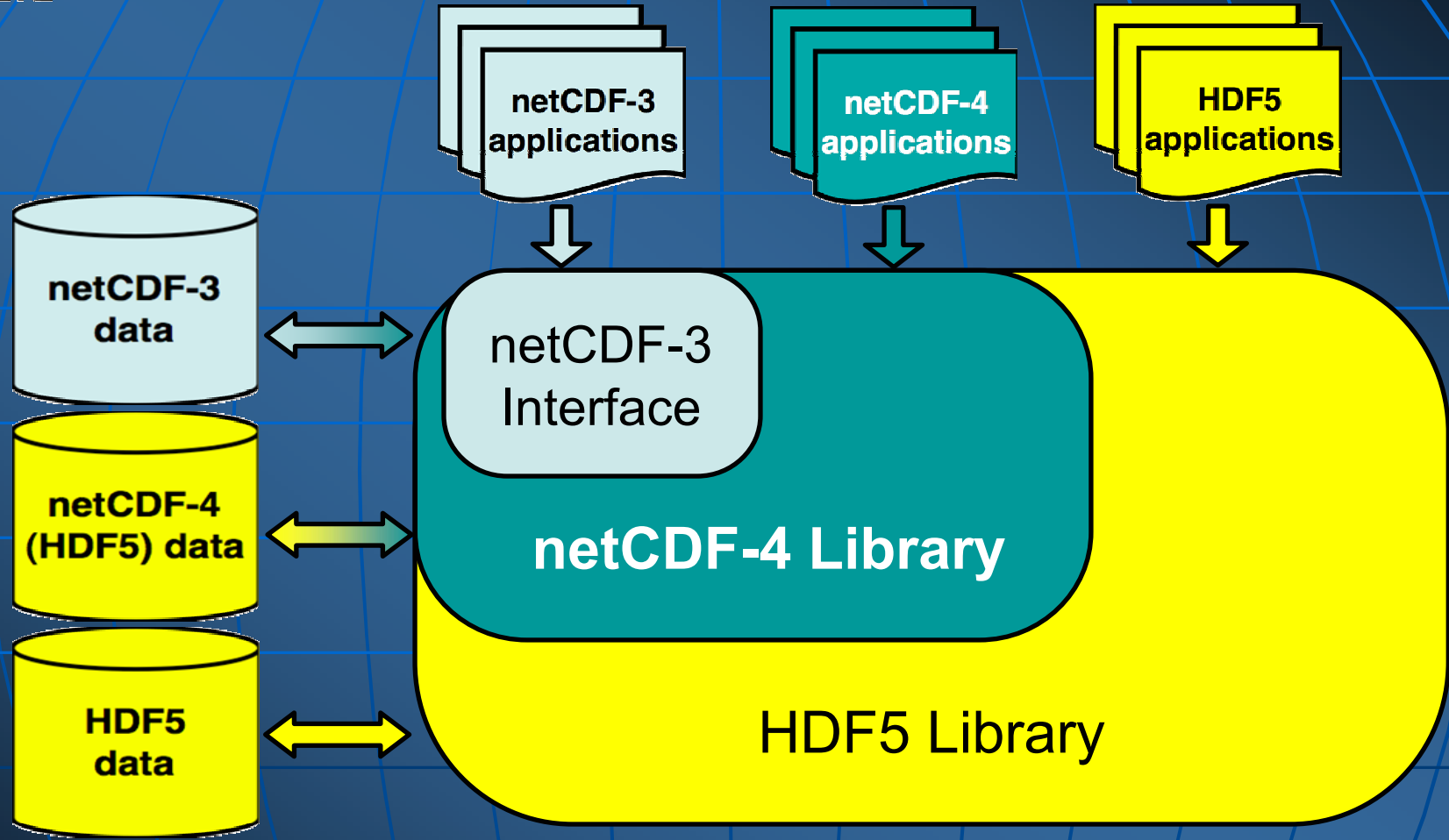
- Combines IDD "push" with several forms of "pull" and DL discovery
- About 25 data providers are partners in THREDDSS



Connecting People with Documents and Data



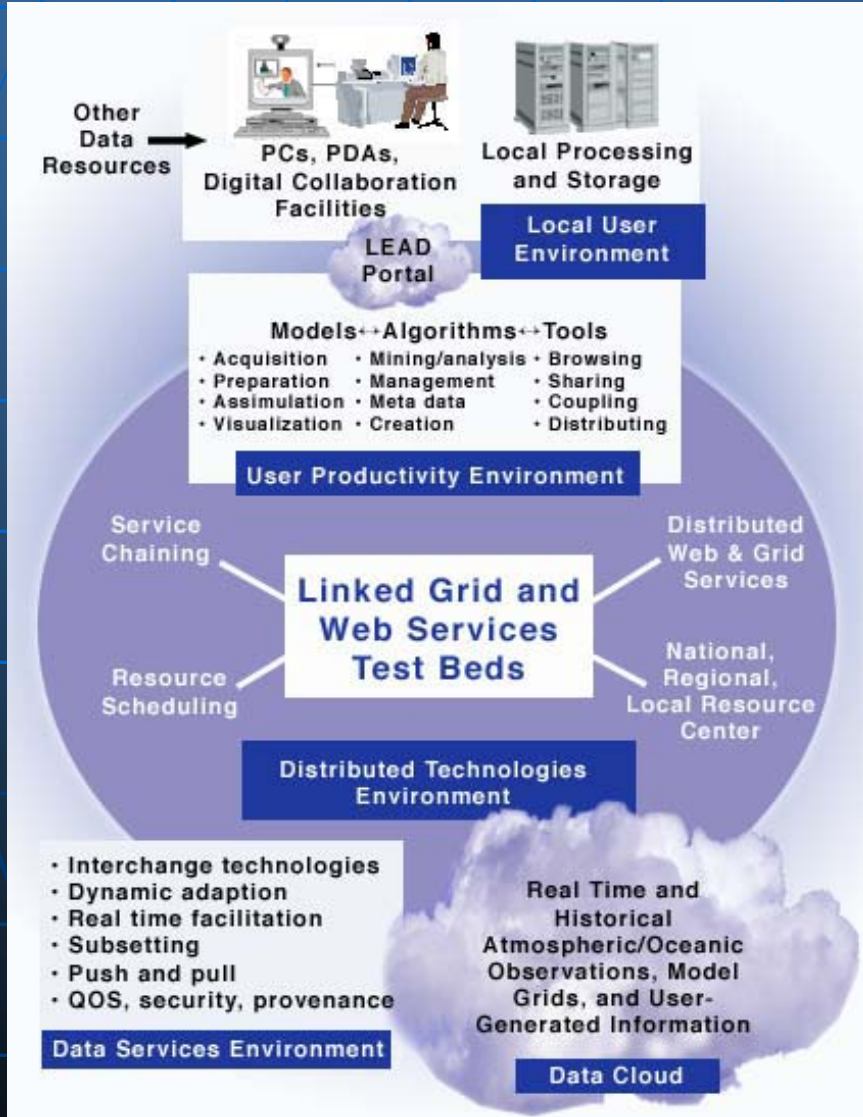
NetCDF/HDF5 Merger



Access to netCDF-3, netCDF-4, and HDF5 data created through netCDF-4 interface



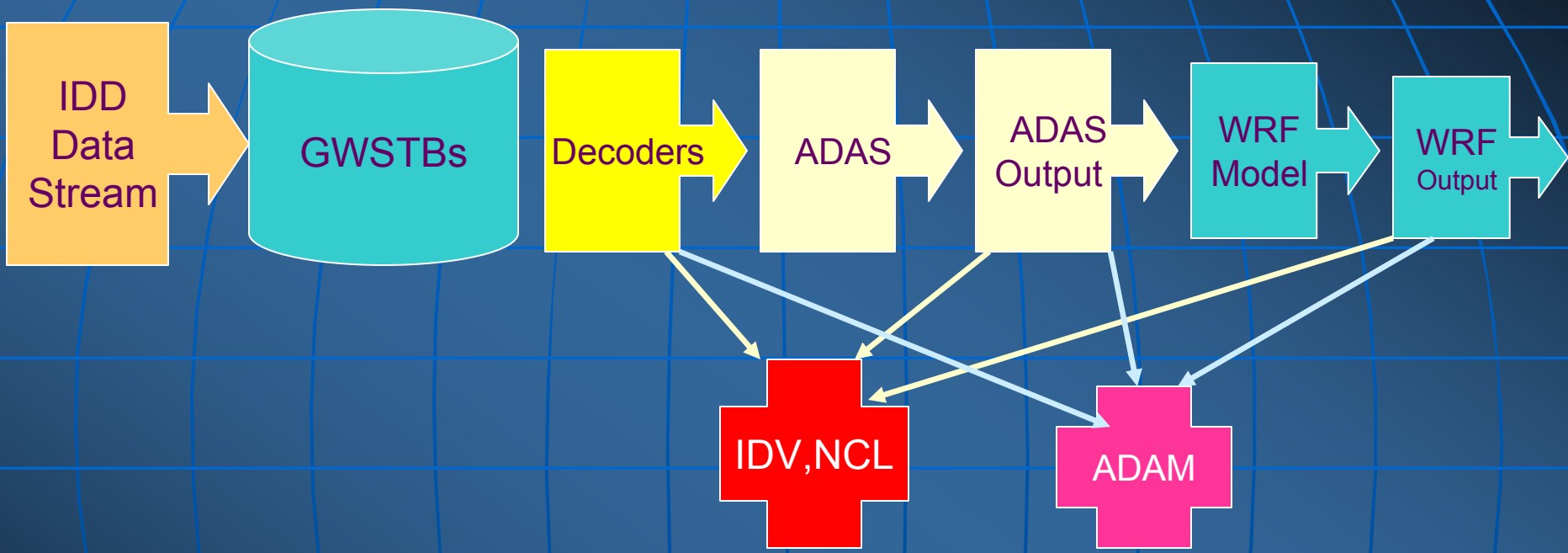
LEAD: A Large Grid Computing Project



- Linked Environments for Atmospheric Discovery
 - Identify, Access, Assimilate, Predict, Manage, Mine, and Visualize a broad array of meteorological data and model output, independent of format and physical location
 - A range of Grid and Web Services will be developed for dynamic, on-demand, end-to-end weather prediction
 - Institutions: U. Oklahoma, Unidata, U. Alabama, U. Illinois, U. Indiana, Millersville U., Howard U. and Colorado State U.



LEAD Prototype 4



Employ components of WRF prediction as a series of linked web services in a Grid Environment.