IDD-BRASIL: Implementation and Progress

Guilherme Oliveira Chagas[1], Waldenio Gambi de Almeida[2], Tom Yoksas[3], Elen Cutrim[4], David Garrana[1]

[1]Universidade Federal do Rio de Janeiro, Meteorology Department
Rio de Janeiro, RJ – Brazil

[2]National Institute for Space Research – INPE, Center for Weather Forecast and Climatic Analysis - CPTEC
Cachoeira Paulista, SP – Brazil

[3]University Corporation for Atmospheric Research – UCAR, Unidata Program Center - UPC
Boulder, CO – USA

[4] Western Michigan University, Department of Geography
Kalamazoo, MI – USA

ABSTRACT

In response to the academic meteorological community's demand for real-time weather data, and access to datasets not readily available, the Unidata Program of the University Corporation for Atmospheric Research (UCAR) developed the Internet Data Distribution, IDD system. With a modest beginning in the early 1990's, IDD has grown to become the leading Internet2 advanced-application by delivering over 20 terabytes of data per week to over 160 institutions in the US and around the world. Meteorological and related real-time data, model output, and a vast amount of experimental products are delivered at no cost to the Unidata participating institutions. In 2004, through a collaboration among three leading universities and research centers in Brazil, the Centro de Previsão de Tempo e Estudos Climáticos (CPTEC/INPE), the Universidade Federal do Rio de Janeiro (UFRJ), and the Universidade de São Paulo (USP), the Unidata IDD has expanded into Brazil creating a data sharing peer, the IDD-Brasil. Throughout a series of outreach initiatives, the IDD-Brasil is extending its reach, providing data to universities in Argentina, Chile, Africa and Portugal. By lowering the barrier between distant institutions, participants are now cooperating and sharing many datasets that were not generally available outside their organizations. Future plans include the deployment of a new data-relay node in cooperation with Universidade de Aveiro, Portugal in order to provide a local source of data for institutions in Portugal and Africa, and the distribution of products derived from the GOES-10 satellite, which covers mainly South America, through IDD in real-time. Jointly, the IDD and IDD-Brasil are fostering new collaborations among universities, WMO Regional Meteorological Training Centers, and national meteorological agencies, empowering the Atmospheric Sciences across several countries.
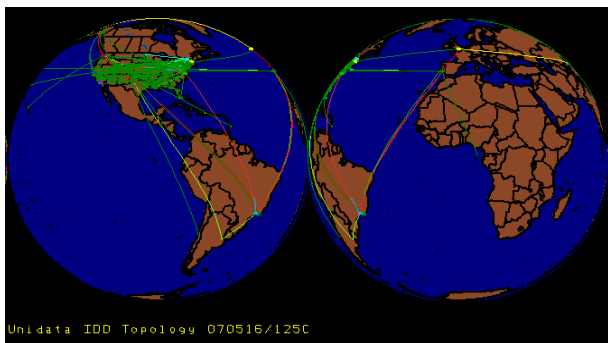
DATA DISTRIBUTION

Ever since the foundation of IDD-Brasil in 2004, with only four institutions at that time, a fast-paced international expansion of this network has occurred. This system has proven that data sharing is extremely valuable for Meteorology, and through the usage of state-of-the-art tools for analysis provided by Unidata, several users in South America have benefited from gains in both operational and educational activities.
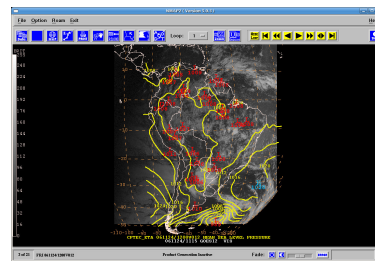
One of the key reasons for such a scalable network lies in the Local Data Manager (LDM) software. By using an advanced protocol to transfer information, the data delivery is distributed among the various peers on the network, thus creating an reliable method to share data.

IDD topology, displaying links of data transfer among it's members.

EXPANDING COOPERATIONS

The IDD has been designed from the very beginning as a platform for academic cooperation, and it's Brazilian counterpart is forging several links across various institutions.

Outreach activities include annual training courses at CPTEC, UFRJ. On a similar initiative, CPTEC is working with universities in Portugal on SICLIMAD (Climate Information System for the support of Sustainable Development) project, envisioning the expansion of data delivery and training for African communities.

PRODUCTS

Through a series of continuous policy changes in major Brazilian data providers, several products started to be distributed on IDD. On an operational basis, CPTEC is distributing it's ETA model output, automated stations (PCD's) observations, and satellite imagery. CPTEC is also taking part on TIGGE project, thus sending it's global forecast model output to NCAR, CMA (China Meteorological Agency) and ECMWF (European Centre for Medium-Range Weather Forecasts), accounting for a major data transfer in a near-real-time basis.

Sample plot of CPTEC ETA model output over a GOES-12 visible satellite image, on GEMPAK.
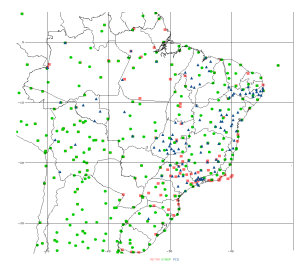
Plot of surface stations distributed in real-time through IDD-Brasil.

CONCLUSIONS

Two years after the creation of IDD-Brasil has been observed a fast growth of the number of systems connected, and more important, the number of users using it's tools on a daily basis, for both operational, research and education purposes. Nowadays, Brazil has the greatest number of users interacting with Unidata outside the US, an effect that is expanding this network borders to Portugal and Portuguese speaking countries in Africa.

The facilitated access to meteorological data, and the inclusion of several locally held data, is providing to several universities an unprecedented access to information, gearing an evolution in the manipulation of data.

As a cooperative venture, IDD has created a greater integration among universities and research centers both in Brazil and in foreign institutions, an important step to facilitate access to real-time data and strengthen Meteorology.