

1. INTRODUCTION

In August 2006, the Unidata Program Center released version 2.0 of the Integrated Data Viewer (IDV). The IDV is a freely available, Java™-based framework for 2- and 3-D display and analysis of geoscientific data. This release included a revamped user interface, better performance and access to new data archives. A subsequent release (2.1) in December 2006 adds additional performance enhancements as well as an improved plugin mechanism for customizing the IDV.

2. COMMUNITY CENTERED DEVELOPMENT

The IDV is developed at the Unidata Program Center in support of its mission to provide tools and data for educators and researchers in the Earth Systems science. Guidance for the development comes from the IDV Steering Committee (a subcommittee to the Unidata User's Committee) which assists in defining features and testing new releases. Active users in the IDV user community provide input for new features as well as constant refinement of existing features. The IDV developers use their domain knowledge in meteorology and computer science to prioritize features and user requests into the architecture. These structures and mechanisms ensure that development of the IDV meets the needs of the user base and the Unidata community at large.

3. IMPROVED USER INTERFACE

The most significant difference in the user interface in these recent versions is the IDV Dashboard (Fig. 1) which was created to alleviate the problem of the IDV opening numerous popup windows. The response to this new feature is overwhelmingly positive. The Dashboard is a dock for the Data Chooser, Field Selector, and the Display Control windows. It also provides quick access to users' favorite bundles, history menus, and saved data sources.

One of the goals for IDV development is to create a framework that allows end-user assembly

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and integration of IDV components. The plugin framework in the IDV allows users to add in new features (e.g. color tables, data choosers, as well as custom Java classes) or create custom user interfaces. Much of the IDV is customizable through eXtensible Markup Language (XML) files so users can customize the IDV without knowing how to program in Java. The 2.1 release added tools that facilitate the management and creation of plugins (Fig. 2). Users can install pre-existing plugins or create their own to share with the IDV user community.

4. IMPROVED PERFORMANCE

In response to requests from the Unidata User's Committee and the IDV Steering Committee, much of the work on the IDV before the 2.0 release focused on improving performance. There are several bottlenecks that affect performance – system configuration, software performance, dataset size and network latency. While a solution for system configuration is to upgrade to the latest and fastest configurations, even the best configured desktop systems are not going to handle the large datasets being produced on multi-processor clusters. One of the new features in the latest releases is the ability to spatially subset these large datasets on the fly. This allows users to select sub-regions of model and observed data from the large collections. Users on slow network links can reduce the amount of data through this subsetting capability (Fig. 3). The 2.1 release adds the capability for subsetting on specific levels on multidimensional datasets.

Another focus of the latest IDV development was improving the performance of the underlying VisAD library which is used for rendering and data manipulation. In some cases, rendering speed doubled through enhancements to that software layer.

5. ACCESS TO MORE DATASETS

One of the strengths of the IDV is its ability to access large data holdings on remote servers through a variety of access protocols. The 2.0 release added remote access to NEXRAD Level II and Level III data on THREDDS Data Servers

(TDS) located throughout the Unidata community. The TDS and associated catalogs are being implemented at national centers such as NCDC making these data available directly into the IDV. The IDV can also access images from the increasingly popular Web Map Servers (WMS) located across the internet.

6. AN EXPANDING USER COMMUNITY

In addition to the traditional Unidata university setting, the IDV is being used as an analysis and visualization tool for several high-profile projects in the geosciences. It is the main visualization tool in the Linked Environments for Atmospheric Discovery (LEAD) project for displaying output from localized modeling experiments. The GEON project is making use of the IDV for displaying geophysical data such as earthquake epicenters, GPS velocity vectors and mantle convection models. The Space Science and Engineering Center (SSEC) is using the IDV and VisAD as the underpinnings for the next version of McIDAS which will have tools for accessing and manipulating hyper-spectral satellite data.

7. SUMMARY

The IDV continues to evolve into a powerful tool for the geosciences. Recent improvements in response to community input have greatly improved the usability and versatility of the system.

8. WEB SITES

Unidata Integrated Data Viewer:

<http://www.unidata.ucar.edu/software/idv>

GEON-IDV:

http://geon.unavco.org/unavco/IDV_for_GEON.html

VisAD

<http://www.ssec.wisc.edu/~billh/visad.html>

9. REFERENCES

- Murray, D., J. McWhirter, S. Wier, S. Emmerson, 2003: The Integrated Data Viewer: a Web-enabled application for scientific analysis and visualization. Preprints, 19th Intl Conf. on IIPS for Meteorology, Oceanography and Hydrology.
- Hibbard, W., C. Rueden, S. Emmerson, T. Rink, D. Glowacki, T. Whittaker, D. Murray, D. Fulker, and J. Anderson, 2005: Java distributed components for numerical visualization in VisAD. *Communications of the ACM*, **48**(3), 98-104.

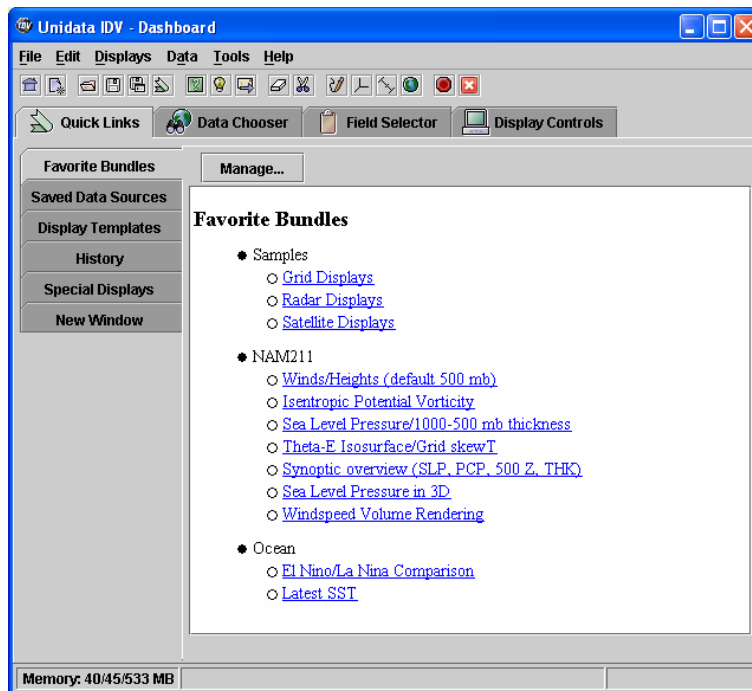


Figure 1 The IDV Dashboard

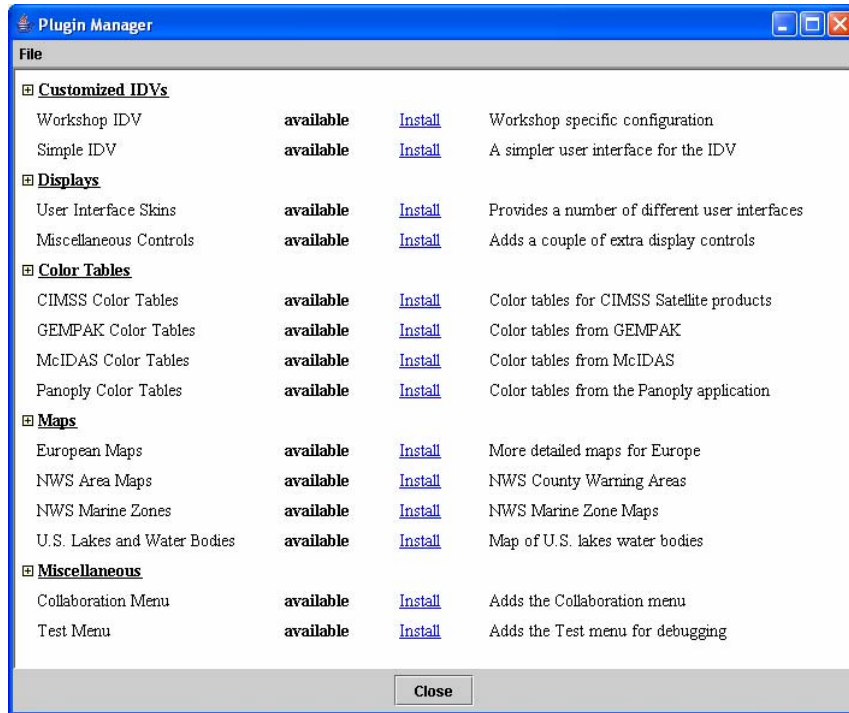


Figure 2. The Plugin Manager allows easy installation of available plugins.

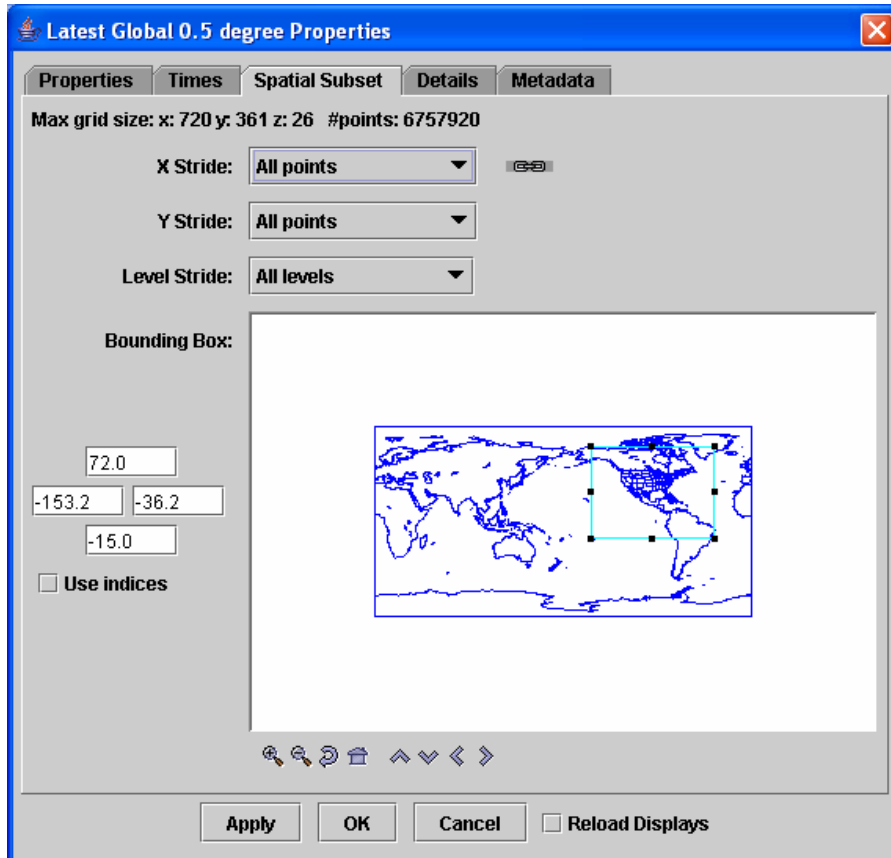


Figure 3. Large grids can be subset spatially and/or temporally