UNIDATA COMMUNITY EQUIPMENT REQUEST

TITLE: INSTALLATION OF AWIPS II EDEX SERVERS FOR SHARING OF PRESENT DATA AND FUTURE DISTRIBUTION OF ARCHIVED DATA WITH COMMUNITY

by

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1 Project Summary

Iowa State University's Meteorology and Agricultural Meteorology programs have a long history of successfully archiving Unidata weather products, traditionally in gempak format, and making them available to the larger community. For at least five years, these data have been accessible at the web site http://mtarchive.geol.iastate.edu. Using a Unidata Equipment grant during the 2010-2011 period, we established a THREDDS server to enhance access to our current data and the archive, which extends back nearly 80 years. The data collection includes textual information (severe weather statements and other National Weather Service products), numerical model output in gempak format, and gif images of weather maps created daily since 2006, along with gempak-format surface and upper air data back to 1933, much of which was provided to us by NOAA's National Severe Storms Laboratory. We have been told by users across the country and by Unidata staff that this archive is frequently used.

With the recent development of AWIPS2 and anticipated rapid expansion of use of AWIPS2 by the academic community in the near future, we would like to maintain our role as a helpful provider of weather data to the community by establishing EDEX servers that would allow us to not only use AWIPS2 locally and assist with distribution of current data, but also to position ourselves to be able to make the long-term archive available to the community if conversion techniques are created to allow AWIPS2 to function with the gempak format archived data. Because NCEP has huge archives of data in gempak format also, we believe there is a reasonable potential for such conversion codes to be created. At a minimum, our establishment of an EDEX server through this funding will allow us to immediately begin creating a new archive of data that can already be distributed as these data should already be accessible via AWIPS2. This proposal seeks funding for three machines to allow EDEX to work efficiently for the sizes of classes in which it will be used at Iowa State, and with the amount of data with which it may be working.

2 Project Description

For the last 6 years, the meteorology program at Iowa State University has been archiving many of the products it receives through the Unidata datastream. On the web and THREDDS sites mentioned above, users can find three types of data. Raw gempak-format model output is available for RUC211 grids every 3 hours, and AVN211, AVN213, AVN-THIN, ETA211, and ETA212, along with MOS, profiler, surface and upperair data. Text data is present and includes climate summaries, public information statements, severe weather statements and warnings, MOS data, record statements, hourly METARs, and raw upperair information. In addition, images created in real time using gempak are available. With a gift from NOAA's National Severe Storms Laboratory, our archive was extended back to 1933 for surface data in gempak format, and back to 1946 for upperair data in gempak format.

Because we actively use Unidata products in our teaching and research and have become known as a go-to place for others to find archived products that generally work better in synoptic and mesoscale laboratory exercises, we are especially excited to begin adjustment to the AWIPS2 framework, and both begin a new archive using formats that will work in AWIPS2, and preparing ourselves to hopefully be able to transition the existing archive into formats that can be viewed via AWIPS2. An advantage of the proposed funding is that it would allow us to be one of the first universities already providing an archive of weather data that could be used in AWIPS2, which should be helpful to the many community members that already know about our previous archive. Based on the size of our undergraduate meteorology program (over 100 majors) and the amounts of data that would be handled by the server, we have been told by Unidata personnel that the purchase of three machines would be best. Although it is too early to know when or how previously archived data in gempak format might be accessible through AWIPS2, we believe the purchase of these machines will position us to be able in the future to offer these archived data to the community once conversion routines have been developed.

2.1 Motivation

As universities increasingly rely on AWIPS2 as the primary vehicle for their students to access weather information and use in laboratory exercises, a need will arise for archived weather data in formats that can be used in AWIPS2. This proposal will benefit both Iowa State in allowing us to quickly become an AWIPS2 shop, and will benefit the entire community by allowing us to gradually make our historical archive available to all AWIPS2 users. We eagerly await the ability to use AWIPS2, since we have long felt the ideal situation for students is to use the same display systems that would be used in the National Weather Service. As evidence of this desire, at several times in the past, we investigated the use of FX-Net and also the Weather Events Similator (WES) as one method of exposing students to an AWIPS-like environment. However, these approaches were cumbersome and not sustainable. Thus, we do not plan to hesitate to switch as many of our teaching activities as possible to use of AWIPS2.

The **educational and research benefits** of this proposal are large. The existing archive has been helpful at Iowa State in the design of weather lab exercises used in synpotic and mesoscale courses, and with a desire for students to use AWIPS2 to have a more authentic experience similar to what they would encounter at National Weather Service offices, it will be imperitive to begin an archive that will work with AWIPS2. As stated earlier, there has been some indication that NCEP may work at developing methods to allow older gempak-format files to be accessible to AWIPS2, and thus it is likely our state-of-the-art existing archive will eventually be accessible to users of AWIPS2 worldwide.

2.2 Serving the Unidata community

Unidata has made a concentrated effort to expand its access to a broader community. This has been evidenced in the past through the development of THREDDS servers, RAMADDA, and IDV. We likewise have made concentrated efforts to help get valuable Unidata products to the community in the past. Our installation of three machines to act as EDEX servers will help us continue the tradition of serving the community despite the rather large challenges that will likely be faced by the switch to AWIPS2.

2.3 Importance of this project

This proposal directly addresses Unidata's current mission and its desire to broaden its community, and it fits with one of the core areas emphasized in this year's call for proposals. As mentioned earlier, we would like to expose our students as soon as possible to the most authentic, National Weather Service-like, environment and thus would like to establish an EDEX server. More importantly, we'd like to continue to be known for the quality of our archive and to see it help the community, which requires sufficient power in the machines purchased to be dedicated to EDEX.

3 Computing Facility Overview

The machines requested would fit nicely into our dedicated computing facility. The computing room provides dedicated air handling and gigabit ethernet access with a direct link to Internet2 providing high speed access to the IDD. Iowa State University's commitment to Red Hat Enterprise Linux provides a stable platform for these systems to run on for many years to come. We believe the $19,500 we are requesting allows us to have enough memory and data storage to allow AWIPS2 to be used successfully by our students, and to allow smooth access to our data archive for many years to come.

4 Budget

Iowa State University will not provide direct funds for the purchase of the equipment proposed. ISU will provide the support infrastructure for the successful development of these systems. Staff time will be provided by ISU for the installation and administration of these systems.

4.1 Hardware Justification

Because of the expected amounts of data to be handled by the EDEX servers, we have configured machines appropriately below, based on discussions with Michael James at Unidata. We estimate that our proposed system will work well for these needs. One machine will host the EDEX JVMs. Another will host the LDM and QPID. The third machine will host Postgres and PyPies. The cost per machine is an estimate based on a recent quote.

	Item Description	Price
(3)	dual Intel Xeon E5620 quad core R510 machines with 12 TB hard drives 48 GB memory	$6,500
	Total	$19,500

5 Project Milestones

Assuming that this project was funded on 1 June 2012:

Date	Task
1 Jul 2012	Purchase and delivery of the three machines dedicated to EDEX.
1 Aug 2012	Testing and deployment of the servers completed.
1 Aug 2012	Archival of weather data in real-time begins.
15 Aug 2012	AWIPS2 system ready for testing in fall semester courses
TBD	Conversion/transfer of past 80 year archive to format accessible to AWIPS2 as technology becomes available