

In the spring of 2019, Northern Illinois University (NIU) applied for and received a Unidata Equipment Award. The project titled, “Bringing back weather.niu.edu: A multifaced server at Northern Illinois University” was supported in full through a UCAR subcontract and allowed PI Gensini (NIU) to purchase a server (**Figure 1**). The significant server specs include 2x Intel Xeon 3.1 GHz 18 core CPUs, 192 GB of RAM, a 10 GB ethernet network card, 2x 256 GB SSD drives for running the OS in RAID 10 configuration, and 8x 12 TB HDD drives in RAID 5 configuration for data storage and curation. The server was purchased in early August 2019 and installed in September 2019.

PI Gensini worked with NIU IT personnel to install the server next to another department server in the Swen Parson Data Center. The server is running the CENTOS 7 flavor of Linux and currently has Unidata’s LDM installed and configured. The server was given the IP hostname of weather.niu.edu, which is currently running Wordpress to serve a https webpage to the internet.

Resource scripts from PI Gensini’s server are being transferred to weather.niu.edu and the webpage is currently under development for the serving of operational weather data to the community. During spring of 2020, PI Gensini installed a Jupyter Lab server on weather.niu.edu in support of teaching GEOG-493 “Programming for the Geographic and Atmospheric Sciences.” This server is accessible via an internet browser on port 8888 so students can run iPython notebooks remotely as if this is the department’s version of a cloud-based solution for running geoscience code (**Figure 2**).

Unidata software currently running on weather.niu.edu include: LDM (version 6.13.11), MetPy (version 1.0 installed via conda-forge), GEMPAK (version 7.5.1), and netCDF (version 4.7.4). PI Gensini also plans to install a THREDDS Data-server in the coming months to serve North American Regional Reanalysis (NARR) data in grib2 format to the community.

In addition to serving the community and aiding in teaching, weather.niu.edu will also help serve the needs of research in the department. In spring 2020, the department agreed to purchase a GeForce RTX 2080 Ti 11 GB graphics card to upgrade the GPU in weather.niu.edu. This GPU upgrade will significantly expand the research capability of weather.niu.edu, especially as it pertains to machine learning. Initial testing using Python and tensorflow/keras for the development of a Convolutional Neural Network for image classification showed a 1000x speedup over using CPUs for processing! Given the growing importance of using such research methods in the geosciences, this additional hardware for weather.niu.edu is viewed as a significant cost-sharing investment from the Department of Geographic and Atmospheric Sciences at NIU.

Overall, the purchase of weather.niu.edu for use in NIU’s Department of Geographic and Atmospheric Sciences is efficiently serving the needs of students, faculty, and staff. Soon, it will also be serving additional novel datasets to the community via a THREDDS Data-server and LDM. Purchase, installation, configuration, and operations have not encountered any obstacles. It is important to ensure that any PI receiving a Unidata grant have at least a cursory background in server administration, as many of the decisions will fall on him/her. IT support has certainly been helpful, but it has largely been up to the PI to get LDM and the Jupyter Lab server up and running. While this creates additional work for the PI, the upside is that he/she can highly customize the configuration of the server to best meet the needs of research, teaching, and community data delivery.



Figure 1. weather.niu.edu server with the protective top case removed. 2x CPUs, RAM, and SSD drives are easily visible.

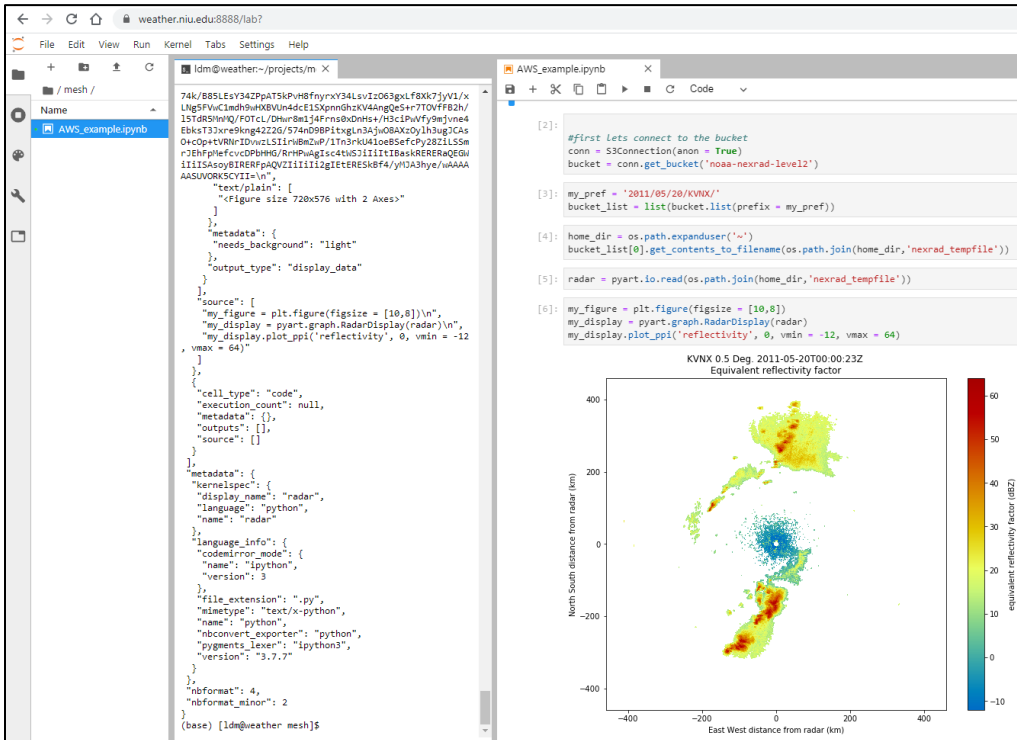


Figure 2. An example of a Jupyter notebook running within weather.niu.edu's Jupyter Lab server environment.