

Equipment for Fire and Remote Sensing Data Processing and Distribution Between EastFIRE Lab at GMU and the Unidata Community

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EastFIRE Lab (<http://eastfire.gmu.edu>) focuses on providing timely, accurate, cost effective, and technically appropriate fire-related information, especially real-time fuel moisture, fire danger index, active fire, smoke, and burned area, to the broad and diverse fire communities of the eastern United States. The rapid growth of EastFIRE research and education activities makes it an urgent need to extend the computational and storage capacity of the lab. In 2006, the Unidata Equipment Award successfully helped us to construct a high-performance computing platform to improve the capabilities and performance of remote sensing data processing and distribution at the EastFIRE Lab.

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Our Unidata Equipment Award proposal was funded in June 2006. The proposed equipments were ordered in September 2006, and were received in October 2006. Using these equipment, we constructed a small cluster, which includes a Dell PowerEdge 2900 server with two Intel Xeon duo-core CPUs at 3.2GHZ, 4G memory, and 3 terra-bytes disk space; 6 Dell Precision 490n workstations, each with two duo-core CPUs at 3.0GHZ, 2G memory; and a one Giga-byte network switch. Our old equipments were also integrated into the EastFIRE cluster. The infrastructure of our system is illustrated in the Figure 1.

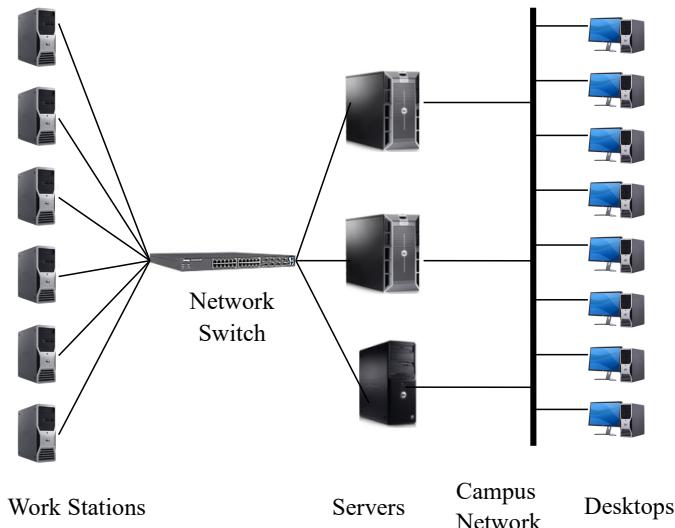


Figure 1: Infrastructure of the EastFIRE Equipments

The EastFIRE cluster is used for supporting research and education activities at the EastFIRE Lab. Since the system was installed, we have been developing software packages and web-based applications on it to transfer our research results for operational data processing and applications. During the fire season of 2007, we processed real-time data products for part of the eastern United States to provide support to the fire community. These products include MODIS true-color and false color images, real-time live fuel moisture, active fire, smoke, vegetation index, fire danger index, drought index, and aerosol optical depth. Images of these data products can be obtained from <http://eastfirelab.gmu.edu/gafire/index.shtml>. The system was also used to support the 2007 EastFIRE Conference, which was held at George Mason University from June 5 to 8. A special session was organized to address the recent fires in Georgia and Florida. The EastFIRE data products generated with the equipment from the Unidata Equipment Award, was introduced to analyze the Georgia and Florida fires.

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Figure 2: Prof. John J. Qu, technical director of EastFIRE Lab, was introducing EastFIRE data products at the EastFIRE 2007 Conference.

Over 12 scientists and Ph.D. students from EastFIRE Lab have used this system regularly for satellite remote sensing data processing and modeling. In addition, the system is used for supporting various courses at GMU, such as 1) EOS756 Physical Principles of Remote Sensing (<http://eastfire.gmu.edu/eos756-07/>), and 2) EOS 900 Wildland Fire – Natural Hazard and Ecosystem Process (<http://eastfire.gmu.edu/eos900-06/>). Students in these classes used the EastFIRE cluster to study remote sensing data processing and to complete their course projects.

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The facilities from the Unidata Equipment Award helped us significantly in processing real-time remote sensing datasets and providing fire-related data and images to various communities for research and operational use. These high resolution real-time datasets are not just valuable for the fire community, but also very useful for research and applications in air quality, environment, and climate related communities. We appreciate the support from Unidata, and we are making efforts to standardize the formats of our real-time datasets and to develop related software toolkits so that other communities can use these data efficiently through Unidata.

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