

Broadband USA Applications Database

Applicant Name: Clemson University Research Foundation

Project Title: Palmetto State Integrated Fiber Infrastructure: A Statewide Broadband Strategy for South Carolina

Project Type: Middle Mile

Executive Summary

The federal stimulus funds for broadband creates a unique, once a generation opportunity, for South Carolina to build a comprehensive fiber based backbone for its diverse communities. This middle mile infrastructure application requests \$45,354,165 providing for the saving or creating 493 job years. South Carolina is 75% rural and is one of the hardest hit areas of the country with a poverty level over 15%. This project will have significant, positive impact on the state's 2,548 anchor institutions and public safety entities, 1.75 million households, 105,154 businesses and the state's economic development goals. This application focuses on 25 service areas that when combined, covers all counties and communities in the state. A consortium of institutions, consisting of higher education, medical, research organizations, libraries, and technical colleges, plus private enterprise, is submitting the proposal. This community comprises a comprehensive set of applications and resources needed to assemble fiber optic based infrastructure, network facilities and applications that will use the unique capabilities of large-scale fiber optic facilities based network. The combined anchor sites serve over 200,000 students, many 1000s of patients and doctors, and many 1000s of citizens. Very high capability fiber optic switching and services provisioned using dark fiber, wavelength based facilities and high capacity existing metro-ethernet services will power the infrastructure. The network will attach to the public Internet at two locations and peer with Internet2 and NLR. The rural character of South Carolina provides a model environment that uniquely matches the requirements for federal ARRA based funding, plus current rudimentary network infrastructure makes a quantum improvement possible. The stimulus funds will acquire network facilities for public service, economic development, education, medical and research purposes. The project will be managed by seasoned experts assuring timely and effective use of funds. The key feature of the plan is partnering with fiber facility providers in South Carolina to provision comprehensive fiber or wavelength routes that pass near any point in the state. We will acquire optics, routers and/or switches at and between anchor institutions and central hub sites, allowing easy provisioning nearby anchor institutions. The fiber or wavelength acquisition will be a combination of existing and/or new builds by our facilities partners. The acquisition will be ownership agreements for dark fiber or wavelengths around the state. The ability to assemble services, in an ownership model, will create a modern set of facilities that can provision connections to our anchor institutions, plus enhance workforce and economic development applications by providing anchor sites with adequate network capabilities. The creation of a regional superhighway using education, healthcare and libraries, as anchors sites will enable economic development in rural depressed areas. This comprehensive approach demonstrates that South Carolina is serious about making the transition to coherent modern

networking and economic development facilities. The plan also stands the test of time, using ownership based access as a basic commodity will allow South Carolina to transform the infrastructure as new technologies evolve. The demand created by the project will also increase the available fiber in the state, by encouraging new fiber and wavelength facility creation. The communities in our consortium represent the core of innovation and economic development in the state. We routinely work with each other to create communities of interest. We also work with the private sector to create joint projects, plus we train the private sector's workforce. The health care members of our consortium are key community anchors, and their relationship to education is comprehensive and complex. New techniques in medical record, imaging and patient management have complex requirements for high performance, high capability networking between medical sites as well and research and clinical sites in the higher education community. New techniques in electronic medical records, telemedicine, imaging and health information exchanges have complex requirements for high performance, high capability networking between healthcare sites as well and research and clinical sites in the higher education community. For example, a NIH Clinical Translational Studies Award was recently awarded in South Carolina, and the Medical University of South Carolina has an FCC rural health award which is connecting 88 healthcare providers (hospitals & clinics) across South Carolina using our existing network. These programs and investments will be enhanced and integrated into this ARRA effort. There are numerous other examples where higher education communities work directly with private enterprise, bringing new technologies into widespread adoption. An example in the education community is the ability to teach the same class at multiple institutions. There are unique facility competencies located at institutions around the state. The network will enable students enroll in classes and participate in research with faculty leaders, no matter their home campus. These examples are representative of opportunities that will become a complex mosaic of applications and services enabled by the bandwidth, cost predictability and flexibility of a facilities based network. Today most institutions purchase commodity Internet by the bit and have low capacity last mile facilities. Our goal is to create a flat rate structure, in state network, where institutions on the network can move data as required without regard to low capacity and high cost. The consortia will also provision shared access to multiple commodity providers on a bulk purchase model using multiple providers from diverse points. The network will be managed by a 501(C)(3) organization which includes the state funded research universities. We will create a management structure for the networks provisioned by this proposal. The South Carolina Light Rail (SCLR) is a recently created facility, funded by appropriations to each university and will be the basis for this organization. When the program is funded we will create a dedicated network engineer staff to design, configure, operate and maintain the network statewide. Some services will be outsourced to our private partners, but will fund each university to assign staff to deploy anchor sites in their area. Using the state research universities as leadership for the effort has basis in practical and historical terms. Universities created the Internet and today most states or regions have networking facilities provisioned and supported by similar arrangements. Universities are uniquely positioned to be agents of change while supporting large-scale, complex user communities. The proposal is the first phase in building out statewide infrastructure. We plan to make submissions in the next two phases that could bring others into the infrastructure. We also may bring other entities, like NPR and museums, into the network. We have arrangements in place today procuring wavelengths and dark fiber from the private sector. We have been assured that our existing vendor(s) will provide waves, fiber and metro-ethernet as appropriate. Phase I will procure

middle mile to 100 anchor/hub sites around the state, provisioned using dark fiber or wavelength/metro ethernet bases services. We will acquire rights to the fiber, metro ethernet or wavelengths via long-term ownership agreements with the private sector partners. We will select a wide range of anchor sites including colleges, libraries, technical colleges and medical facilities. The details of the network design and architecture will be presented in section 29 of the proposal. We are asking for the waiver of matching funds due to financial hardship in the state. A key feature of the proposal is the sustainability of the network. The use of federal stimulus resources will be for one-time fiber/wavelength/metro ethernet ownership agreements, hardware, support and facilities. We will purchase networking hardware, create support agreements with vendor partners and fund implementation support staff. This predicates building a network that we can sustain using our current funding streams. The anchor institutions in the state range from colleges with many 1000s of students with 1000s of desktop and servers to libraries with perhaps dozens of desktops and servers. If we look at current bandwidth to all of our consortia members they all would meet an underserved definition if we multiply the number of desktops by 768Kb per desktop as a reasonable baseline. Today we have researchers at a university driving across the state to bring a disk drive to another university they are collaborating with on complex problems This is the ultimate definition of a sneaker net. Leveraging use of one time stimulus funding will create a unique set of resources that would never be possible with state or local funding. We posit that this is exactly the kind of partnership envisioned by Congress and the administration when this part of the stimulus package was enacted. The creation of the comprehensive set of resources, from expansion of network infrastructure using large scale connections to anchor institutions will enable workforce development at libraries and technical colleges and universities. The infrastructure will also attract economic development opportunities that are enabled by close coupling with research institutions, plus taking advantage of the expanded fiber and wavelength footprint. Community outreach will also be enhanced by the existence of comprehensive network infrastructure at the anchor institutions and enabling the local community by programs provided by the anchor sites and future anchor sites from the phase I sites and equipment.