West Virginia, located in the heart of Appalachia, is the only state located entirely in the Appalachian Region as defined by the Appalachian Regional Commission. This location has historically been a challenge for telecommunication service deployment, and has left a major part of the state's households, business and education communities with limited or no access to broadband. Despite this, recognizing that broadband access is a vital service to citizens and to increase economic development, WV Governor Joe Manchin, III, created the Broadband Deployment Council (BDC) as an entity to facilitate innovative, quality, affordable broadband to all of WV. To facilitate broadband deployment, WV must have a complete, robust middle mile. It is essential to last mile broadband deployment and provides a full range of interconnect possibilities to meet provider, carrier, and end user requirements. In early 2010, WV was successful in securing a round one BTOP award to deploy broadband throughout the state. With this award, expedient and systematic build-out of a network middle mile solution providing fiber to most critical community anchors including K12 schools, libraries, healthcare facilities, public safety, and emergency response entities has begun. A majority of WV's higher education institutions have access to broadband fiber service. However a minority of institutions are unserved by fiber, and were not addressed in the round one award. This proposal will resolve this issue. However an equally important yet unidentified issue remains: inadequate levels of broadband service. This plan will deliver fiber and connectivity to those institutions without service, and will substantially upgrade service for those that do. This extension and upgrade of the state's middle mile infrastructure would begin immediately upon receipt of funds. This project creates opportunities for redundancy and increased investment by broadband service providers. It will also push fiber into parts of the state where there is none, completing the infrastructure necessary for the build-out of broadband to homes, businesses, and other public institutions currently without access. There are important economic and workforce goals as well. The number of jobs created by this request is easily quantified. CWA estimates an employment multiplier effect of 19.5 jobs in telecommunications and information technology (IT) for every $1 million invested. The U.S. Department of Commerce determined that communities with broadband not only increased the employment rate by 1%, but added 0.5% to the growth of business establishments and 0.5% to the share of IT establishments. The economic development impact on this rural state will be profound and immediate. Four anchor institution groups are addressed in this proposal: * Institutions represented by the WV Council for Community and Technical College Education (CCTCE) * There are 10 community colleges housed in a total of 18 facilities'host and satellite campuses'across the state that support the mission of the CCTCE in WV. Currently one-third of these facilities lack access to fiber
broadband. Facilities are predominantly located in remote southern counties and are community anchors for more than half the underrepresented populations of the state. CTC campus population, faculty, staff, and students is comprised of approximately 25,500 individuals statewide. Median broadband connectivity to these institutions is 14Mb/s. * Institutions represented by the Higher Education Policy Commission (HEPC) * There are 11 colleges and universities housed in a total of 16 facilities'host and satellite campuses' across the state represented by the HEPC in WV. They are the backbone for competitive scientific, engineering, mathematical, and technology research generated in the state. None lack access to fiber broadband services. HEPC institutions are predominantly located in more densely populated areas and are typically economic anchors for those communities. Total campus population is approximately 82,000 individuals. Median broadband connectivity is 22.5Mb/s. * Institutions represented by the Independent College Enterprise (ICE) and other Private Baccalaureate Institutions * There are 8 non-profit independent colleges and universities in the state; the majority represented by the ICE. One lacks fiber broadband service. They tend to be located in less densely populated areas but are typically economic community anchors. Campus population is 7,500 individuals statewide. Median broadband connectivity is 45Mb/s. * Publicly Funded Non-Profit Research Institutions and Government Partners * Several non-profit research institutions exist across the state that contribute to its research portfolio. They are often major contributors to the local economic engine of the communities that host them. For example, the WV High Tech Consortium Foundation in Fairmont, WV, is a major economic driver for the surrounding area. Others include the Blanchette Rockefeller Neurosciences Institute at WVU, the Canaan Valley Institute in Davis, WV, and MATRIC, in South Charleston, WV. Broadband connectivity to these institutions varies considerably. Some (i.e. CVI) lack access to fiber broadband services. A total of 9 entities are represented in this group. Government partners will assist in the interconnection between the services proposed here and the existing state networks. The broadband needs of higher education and the research community are vastly different from typical broadband users. The campuses of our colleges and universities function as small 'cities.' Even the smallest colleges depend heavily on the availability of broadband to support the education and research needs of their students, faculty, and staff. At first glance it appears that the broadband needs of these communities are met most have fiber service, or some level of broadband access. However, the NTIA definition of broadband applied to these institutions exposes an endemic problem: Because of the lack of affordable broadband service, even the largest broadband enabled campus in our state (WVU) has not been able to scale-up broadband services to adequately meet the needs of their faculty and student populations. The definition of broadband, at its lowest level defined by NTIA is 768Kb/s per household. The US Census Bureau indicates the average household consists of 2.73 individuals. Assuming all members are broadband consumers, a download bitrate of 281Kb/s per person results. If we apply this formula to the smallest community college in the state'Eastern WV CTC' with a campus population of 644, we would expect broadband service to be near 176Mb/s. Eastern currently supports their campus with copper-based 4Mb/s commodity internet. Fractional DS3 service is deployed at Eastern, but due to cost, they are only able to deliver a portion of the full service. Applied to WVU we find their 560Mb/s connection is drastically below the 10Gb/s suggested service level for their 36,500 campus population. All faculty, staff, and student in the higher education system are active broadband users. These 'cities' tax the broadband services delivered to them without bandwidth shaping, network utilization would constantly be at peak, services would grind to a halt. Shaping delays network requests
or reduces bandwidth for some applications, and is an inappropriate solution for those universities with science research programs that rely heavily on broadband access to support their work. The reality for most institutions would suggest that service levels should be somewhere between what service is currently provisioned and what the NTIA formula suggests as a maximum. No institution in the state's higher education system approaches half the suggested value, and this is a significant problem we seek to address with this proposal. This middle mile solution will be built quickly and will provide advanced broadband access to these anchor tenants and the communities that host them. It will complete the middle mile solution and allow for last mile solutions from most, if not all, broadband service providers by providing numerous interconnect options to meet provider, carrier, and end user needs. Costs for service will be greatly reduced due to natural competition generated by this solution. The Chancellors of the CCTCE and HEPC, James L. Skidmore and Dr. Brian Noland, in cooperation with the Secretary of Commerce, Kelley Goes, will oversee broadband deployment to the critical anchor institutions in this proposal. This leadership will provide stability and structure to broadband build-out and utilization. WVNET, the primary broadband, telecommunications, and computing services provider for the higher education system, in cooperation with the Governor’s Office of Technology, is poised to take the lead role in the implementation, daily operation, and sustainment of the results of this proposal.