Broadband USA Applications Database

Applicant Name: UNIVERSITY CORPORATION FOR ADVANCED INTERNET DEVELOPMENT

Project Title: United States Unified Community Anchor Network (U.S. UCAN)

Project Type: Comprehensive Community Infrastructure

_____**Executive Summary**_____

Comprehensive communities must be connected not just locally, but nationally. The U.S. Unified Community Anchor Network (U.S. UCAN) proposal presents a great opportunity and addresses a critical problem. Without U.S. UCAN, community anchors connected by other BTOP projects (as well as other anchors) will only be able to use advanced broadband applications locally and not nationwide. Anchors will be unable to use advanced broadband applications with the vast majority of other anchors in the U.S, and will be limited to communications with just nearby anchors. Internet2 and NLR, working with partners in 50 states, propose this national infrastructure project to tie together all anchor networks funded by BTOP, link them to 66,000 anchors already using Internet2's and NLR's networks, and provide a unique and cutting-edge national middle mile 100 gigabit interconnect optimized for community anchor use of advanced broadband applications. U.S. UCAN will benefit more than 100,000 community anchors in all 50 states initially (and eventually all or virtually all anchors), including schools, community colleges, universities, libraries, health institutions, public safety entities, local government, public media and other community centers. It will provide much needed upgrades and extensions to the non-profit networks operated by Internet2 and NLR, which constitute the 'interstate highway' for advanced broadband applications for anchors, and which would be the foundation for U.S. UCAN. U.S. UCAN will ensure that community anchors can connect with each other nationwide, rather than just locally, with respect to advanced broadband applications, including telepresence, distance education, telemedicine and job training. For example, if this project is funded, (i) countless rural hospitals with at-risk newborns or persons needing an immediate diagnosis will not be limited to engaging in advanced applications with just nearby hospitals, but can do so with the nation's top hospitals; (ii) emergency 911 centers will be able to exchange data nationwide; (iii) underprivileged youth can take a course, or learn a life skill, from the best instructors in the nation; and (iv) unemployed citizens can, via video conferencing, interview for jobs, or receive job training, from anywhere in the U.S., rather than just in their local area. While commercial backbones are sufficient for certain Internet uses, as to advanced broadband applications for community anchors, there is a market failure. Commercial networks are far too congested to support, and are not optimized for, advanced broadband applications for community anchors like telepresence and telemedicine. Commercial networks also do not provide the necessary transparency required to immediately trouble-shoot application-crippling problems across networks. They also do not generally offer next generation Internet technologies like IPv6 and IP multicast, which are critical to certain applications. Internet2 and NLR's networks currently permit more than 66,000 U.S. community anchors to connect to each other for advanced broadband applications. This BTOP project is critical because these networks urgently need significant upgrades and extensions (i) to support the ever-

growing number of users and the increase in the bandwidth needed for continually-evolving advanced applications, and (ii) in light of the BTOP program itself, which will drive even further network traffic to these national networks, as the BTOP winners, who will collectively add tens of thousands of anchors to their networks, either already connect to these national networks (e.g., Merit, MCNC, and I-Light) or almost certainly will want to do so. This proposal will add 11,811 new, diverse 100 Gbps-capable route miles, and upgrades over 10,000 existing network route miles to 100 Gbps. This proposal expands the model used today by Internet2 and NLR for 66,000 anchor institutions, of ensuring national connectivity for them for advanced broadband applications, to 45,000 to 65,000 more anchors initially, and eventually all or virtually all anchors (while also ensuring there are sufficient upgrades to continue to adequately serve the original 66,000 anchors). It is precisely this model of Internet2, NLR and the R&E community that the FCC stated in its National Broadband Plan 'should be expanded to other community institutions' and that doing so 'would offer tremendous benefits.' See Supplementary Materials. If funded, these networks will jump start the goal of connecting all 200,000+ U.S. community anchors to a high-performance network. Thus, this project glues the winning BTOP projects together as a whole. Simply put, this project does not compete with other BTOP projects; it completes them. It will also be a building block that attracts more local investment even for non-funded BTOP projects, as such projects will be more valuable if they are connected to non-profit networks that can support national connections for the advanced broadband applications anchors need (Internet2's and NLR's prior, more limited, upgrades motivated tremendous investment by others in local networks). This project makes BTOP a winner for Americans everywhere, while catalyzing the adoption of transformational broadband applications that can fundamentally improve education, health care, public safety, and job-creating economic innovation. This project compliments other sustainable broadband adoption proposals, as more people will want to use broadband if its benefits are greater. When used by research universities, this project will support the growing demands of data-intensive e-science, thereby helping to uncover new energy sources, reduce cardiovascular disease, and help with cancer research. It can also serve as a test bed for advanced network technologies like dynamic circuit provisioning, which will spur economic growth and the creation of new applications, businesses and jobs. Internet2, NLR, and their over 30 regional and state networking collaborators (RONs) have a strong history of providing advanced networking to anchors. Individuals associated with these organizations played key roles in developing NSFNet in the 1980's, and transforming NSFNet into the commercial Internet in the 1990's. For nearly 15 years, Internet2 and NLR networks have been the solution for RONs connecting to community anchors seeking advanced broadband capabilities. Today, they provide cutting-edge networking for the research community, and have expanded their reach to K12 schools, community colleges, libraries, museums, science centers, performing arts centers, hospitals, and other health clinics. They know the needs of anchors, the technology and applications, and how to ensure sustainable business models. This proposal commits to the open Internet recommendations of BTOP and the FCC and also commits to making these networks completely transparent. U.S. UCAN will have measurement and trouble shooting tools that allow all operational aspects of the network to be published on the web in near real-time. The proposed services include a point-to-point, nationwide optical and routed IP network to last mile providers for community anchors. The minimum peak load network bandwidth capacity is 100,000 Mbps. We expect (i) connections to this infrastructure from regional middle-mile providers in the range of 1,000 to 100,000 Mbps, and (ii) pricing in the range of $21 per Mbps/month to $2 per Mbps/month for such

connections. The proposed network is Wireline ' Fiber-optic Cable. To ensure access to next-generation Internet protocols, the infrastructure will be built as both IPv6 and IPv4 native. U.S.UCAN will provide service to the entire U.S. and will reach community anchors through RONs and extensions serving all 50 states. This project acquires 11,811 miles of newly lit fiber. At the outset, it will reach over 100,000 anchors, serving over 35,000,000 Americans (students, doctors, patients, library visitors, public safety officers, etc.). The infrastructure will be capable of serving the remaining U.S. anchors. This project is expected to cost a total of $96,793,607, of which $62,540,162 (64.61%) is funded by BTOP and $34,253,445 (35.39%) is cost matching. This project is expected to create or save 1,052 job years in advanced manufacturing and technical engineering. The named partners include Internet2, NLR (private not for profit), the Northern Tier Networking Consortium (public partners), Indiana University Information Technology Services (IU) (public partner), Ciena, Cisco, Infinera, and Juniper (private for-profit), and other collaborators include over 30 RONs, who will all provide technology, equipment and connections to the anchors. The American Association of Community Colleges, the National Emergency Number Association, and many other groups support this proposal.