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Funding Opportunity: Broadband Technology Opportunities Program	Applicant Organization: UNIVERSITY CORPORATION FOR ADVANCED INTERNET DEVELOPMENT	
Task: Submit Application - BTOP	Applicant Name: Nili Tannenbaum	

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Broadband Infrastructure Application
Submission to NTIA – Broadband Technology Opportunities Program

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A. General Application Information

Applicant Information	
Name and Federal ID for Applicant	
DUNS Number	969524214
CCR # (CAGE)	1QU14
Legal Business Name	UNIVERSITY CORPORATION FOR ADVANCED INTERNET DEVELOPMENT
Point of Contact (POC)	KATHLEEN JOHNSON 7349134264 Ext. kaj@internet2.edu
Alternate POC	NILI TANNENBAUM 7343527083 Ext. ntannen@internet2.edu
Electronic Business POC	KATHY JOHNSON 7349134264 Ext. kaj@internet2.edu
Alternate Electronic Business POC	JAMES PFLASTERER 7343527019 Ext. japflasterer@internet2.edu

Name and Contact Information of Person to be Contacted on Matters Involving this Application:	
Prefix	
First Name	Nili
Middle Name	
Last Name	Tannenbaum
Suffix	

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Telephone Number	734-347-7483
Fax Number	
Email	ntannen@internet2.edu
Title	Senior Manager of Sponsored Projects

Additional Contact Information of Person to be Contacted on Matters Involving this Application:

Project Role	Name	Phone	Email
Secondary Point of Contact	Kathleen , Johnson	7349134264	kaj@internet2.edu

Environmental Point of Contact

Prefix:
Name: Pflasterer, James
Suffix:
Telephone Number: 7349134250
Title: Chief Financial Officer

Organization Classification

Type of Organization	Non-profit Corporation
Is the organization a small business?	No
Does the organization meet the definition of a socially and economically disadvantaged small business concern?	No

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Authorized Organizational Representative

AOR Name	TANNENBAUM, NILI
Result	Applicant Authorized

Project Title and Project Description

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

Project Description: Internet2 and NLR, both non-profit organizations, propose the creation of the United States Unified Community Anchor Network (U.S. UCAN). This national-scale network will construct the middle mile essential to connect all community anchor projects funded by BTOP with each other, and with more than 66,000 other anchors, to ensure a seamless national fabric of high-performance, open networks.

CCI Priority Checklist

The following items were selected from the CCI Priority Checklist:

1. This project will deploy Middle Mile broadband infrastructure to community anchor institutions.

2. The project will deploy Middle Mile broadband infrastructure and has incorporated a public-private partnership among government, non-profit and for-profits entities, and other key community stakeholders.

3. This project will deploy Middle Mile broadband infrastructure in economically distressed areas.

4. This project will deploy Middle Mile broadband infrastructure to community colleges.

5. This project will deploy Middle Mile broadband infrastructure to public safety entities.

6. This project will deploy Middle Mile broadband infrastructure and either includes a Last Mile infrastructure component in unserved or underserved areas or has received commitments from one or more Last Mile broadband service providers to utilize the Middle Mile components. Any Last Mile components in rural areas do not exceed 20% of the total eligible costs of the project.

7. This project will deploy Middle Mile broadband infrastructure and the applicant has proposed to contribute 30 percent or more in non-federal cost match.

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Comprehensive Community Infrastructure Components

The following items were selected from the Comprehensive Community Infrastructure Components:

Middle Mile

BIP Applicants

Have you also applied to BIP for funding in the sample proposed funded service area?
  ➢ No

If Yes, please provide the project title and Easygrants ID number:
Title of Joint BIP Application:
Easygrants ID:

Other Applications

Is this application being submitted in coordination with any other application being submitted during this round of funding?

  ➢ Yes

Easygrants ID	Project Title
4658	Rural, Education, Anchor, community, Health Care: Michigan Middle Mile Collaboration II(REACH-3MCII)
4218	North Carolina Rural Broadband Initiative (NCRBI)
5493	Kentucky Regional Optical Network Community Anchor Institution Expansion
5710	Building Community Capacity Through Broadband (BCCB)
6873	Increasing Public Safety Broadband Demand by Enabling Multi-State Next Generation 9-1-1 Capabilities

If YES, please explain any synergies and/or dependencies between this project and any other applications.

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The U.S. UCAN project has synergies with numerous other CCI applications being submitted in Round 2. A few examples include the following complementary efforts: (i) the proposal by Merit Network, Inc (Easygrants #4658) to extend broadband infrastructure throughout Michigan, providing faster speeds at lower costs as well as diverse paths to remote regions; (ii) the proposal from the University of Wisconsin-Extension (Easygrants # 5710) to build community-driven middle mile broadband infrastructures to expand access to advanced networking services throughout Wisconsin; (iii) the proposal from the North Carolina Rural Broadband Initiative (Easygrants # 4218) which will build 1,150 miles of connectivity through 61 counties in North Carolina; and (iv) the proposal from the Kentucky Regional Optical Network (Easygrants #5493), which focuses on expanding middle mile capacity and deploying broadband connectivity to over 300 community anchor institutions in Kentucky. With each of these CCI applications, and many others as well, if those applications are funded and the U.S. UCAN is also funded, the anchor institutions connected will have the national connectivity they need for advanced broadband applications.

In addition, synergies also exist between U.S. UCAN and the Sustainable Broadband proposal submitted by the National Emergency Number Association (Easygrants #6873). NENA's proposal will move forward the concept of a Next Generation 911 system, also supported in the National Broadband Plan. NENA has recommended using the U.S. UCAN backbone to connect Public Safety Answering Points nation-wide.

Although strong synergistic connections exist with all of these projects as well as many others, there are no dependencies on any of them in order to complete the U.S. UCAN scope of work. If funded, the U.S. UCAN project will implement its planned activities even if the other complementary Round 2 projects do not receive funding.

Individual Background Screening

Is the Applicant exempt from the Department of Commerce requirements regarding individual background screening in connection with any award resulting from this Application?

 ➢ No, Applicant is subject to these requirements

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If the answer to the above question is "No," please identify each key individual associated with the Applicant who would be required to complete Form CD-346, "Applicant for Funding Assistance," in connection with any award resulting from this Application:

Name	Title	Employer
Douglas E. Van Houweling	President and CEO	Internet2
Robert P. Vietzke	Executive Director, Network Services	Internet2
James A. Pflasterer	Chief Financial Officer	Internet2
Glenn Ricart	President and CEO	National LambdaRail
Gwendolyn Huntoon	Chief Technology Officer	National LambdaRail
Grover Browning	Director of Engineering and Operations	National LambdaRail

B. Executive Summary, Project Purpose and Benefits

Essay Question

Executive Summary of the proposed project:

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.

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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

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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.

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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

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(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.

Project purpose:

U.S. UCAN addresses a critical problem. Community anchors must be able to use advanced broadband applications with other anchors nationwide, not just with nearby anchors. Commercial backbones are not the answer. U.S. UCAN will ensure that initially more than 100,000 anchors (including those connected to Round 1 winners, which otherwise would have only local connectivity for advanced applications) will have necessary national connectivity. Eventually, virtually all anchors will have such national connectivity using U.S. UCAN. This project has broad significance in every state, and for every type of community anchor, and will have a more far reaching – and national -- impact on health care delivery, education and children than any other single CCI project.

U.S. UCAN addresses all five BTOP statutory purposes. It will provide nationwide high-performance connectivity to universities, community colleges, K–12 schools, libraries, hospitals and health clinics, museums, science centers, public media, public safety, local government and other community organizations across every part of the nation, including federally designated economic development areas, Native American reservations, and areas unserved and underserved by broadband.

SUPPORTING COMMUNITY ANCHORS BROADBAND NEEDS: This project addresses this purpose to a greater extent than other CCI projects because of its national reach -- benefitting more than 100,000 anchors initially. U.S. UCAN will connect medical and healthcare providers through regional partners and projects funded by the FCC's Rural Health Care Pilot Program. Providers will be able to share critical resources and connect to over 100 university medical centers that deliver cutting-edge care, clinical research and continuing medical education. Through U.S. UCAN, they will also have access to the National Institutes of Health, the National Library of Medicine, the Mayo Clinic, and the VA. Connection to an advanced network can transform healthcare. For example, to receive the best neonatal care, fragile, premature babies born at Adena Regional Medical Center in rural Ohio used to have to endure a costly, dangerous helicopter ride to Nationwide Children's Hospital in Columbus, as well as separation from their

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mothers. But now, due to high-definition videoconferencing, Columbus-based specialists examine babies, review x-rays and lab results, and consult with Adena doctors without moving the babies. Funding this proposal will allow Children's Hospital to offer its expert neonatal care to any rural hospital in the U.S.

Using videoconferencing and other advanced collaboration tools, community colleges with specialty training programs can offer classes to a nationwide audience, improving job skills and employment prospects for thousands. An advanced nationwide network also connecting schools can transform learning experiences for millions of children. Recently, oceanographer Dr. Bob Ballard took 5th grade students on a virtual trip aboard a research vessel via high-definition videoconferencing. Undersea images of the Lost City, a series of mid-Atlantic hydrothermal vents, were beamed to the students' classroom from undersea robotic explorers, transporting students into an immersive underwater learning environment. Funding this proposal will allow Dr. Ballard to bring the ocean depths to every classroom in the country.

IMPROVE BROADBAND TO PUBLIC SAFETY: U.S. UCAN will enable linkage of emergency 911 centers (PSAPs) as part of an effort to create a national Next Generation 911 system (proposed by the FCC's National Broadband Plan and a BTOP proposal by NENA (Easygrant ID 68730). Funding this BTOP proposal as well as NENA's will provide 911 centers with access to a nationwide network with the reliability and capabilities necessary to enable nationwide Next Generation 911 systems, which will significantly enhance public safety.

STIMULATING DEMAND, ECONOMIC GROWTH, JOB CREATION, AND ACCESS TO BROADBAND FOR CONSUMERS IN UNSERVED AND UNDERSERVED AREAS: Advanced networking capabilities will not only enable data-intensive e-science research in our universities, but also serve as a testbed for new network technologies such as dynamic circuit provisioning, expanding the frontiers of Internet technology and enabling scientific discovery that for decades has been a significant driver of innovation, economic growth and job creation. As U.S. UCAN reaches over 50 million Americans through community anchor organizations, users will be exposed to advanced applications like telepresence and demand for broadband at home will increase. Every year, as one million college students graduate from campuses equipped with the most advanced broadband, they will take their broadband expectations to new jobs and homes, further stimulating adoption.

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Internet2 and NLR have over 12 years' experience providing a high-performance national network backbone to the R&E community. During that time, the availability of these networks stimulated over $1 billion in local investments to acquire nearly 25,000 miles of local fiber in over 30 states. The resulting Regional Optical Networks (RONs) are operated by many BTOP first-round winners. Just as investment in RONs followed the "pull" of the national backbones, we can expect another round of investment to be triggered by U.S. UCAN. The resulting fiber builds can be configured to share fiber strands between R&E networks and private ISPs offering expanded broadband service to unserved and underserved consumers.

U.S. UCAN will join the nation's public libraries to each other and to other community facilities and resources, and many unserved or underserved citizens use public libraries and public computer centers to search for jobs and to fill out application forms. U.S. UCAN-connected libraries with videoconferencing equipment will be able to offer face-to-face remote job interviews as well as other employment-related services.

Recovery Act and Other Governmental Collaboration:

The U.S. UCAN project has significant synergies with a number of other Recovery Act programs relating to advanced networking at the National Science Foundation, NOAA, the Department of Energy, and the Department of Health and Human Services. The NSF ARI-R2 program will fund university and regional networking projects as part of its "cyberinfrastructure" efforts to support science. The 100 gigabit U.S. UCAN backbone will serve those projects and improve their effectiveness through enhanced capacity. The NSF MRI-R2 program is likely to include projects investing in scientific disciplines relying on large data flows capabilities, including a pilot set of research university campuses collaborating with data from the Large Hadron Collider and other high energy physics projects. The U.S. UCAN backbone will transfer that data from university to university at far greater capacity than can be done today. NOAA is using Recovery Act funds to build increased networking capacity among its data centers and research sites, and plans to use Internet2 to provide the underlying network connections (with a contract expected to be in place before the award of BTOP funds). The U.S. UCAN backbone will make those NOAA investments more valuable by enhancing the backbone connections. The Department of Energy's "Energy Sciences Network" (ESnet) will use $70 million of ARRA funds to upgrade its network to 100 gigabit capacity. ESnet currently rides on Internet2 infrastructure, and ESnet connects (peers) with the Internet2 network to connect researchers in Energy Labs with researchers in universities. If both the ESnet and Internet2 backbone networks are upgraded to

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100 gigabits at the same time, there can be cost savings, synergies, and improved efficiencies for both networks by "learning together." (There are no currently deployed 100 gigabit production networks in the research community; these two networks would be the first.)

In all of these cases, these investments, combined with access to the U.S. UCAN backbone, is likely to expand the involvement of smaller universities in national research efforts, thereby enhancing economic opportunities in their communities. In addition, this is likely to enhance early, primary, secondary, and post-secondary education and increase the competitive achievements of the U.S. educational system in all of these areas regardless of geography or demographics. Finally, the Department of Health and Human Services is investing major ARRA funds to develop and promote the use of electronic medical records. Internet2's network currently connects over 100 academic medical centers, the NIH, and the Department of Veterans Affairs. The U.S. UCAN network, as it connects more hospital and other health-related community anchor institutions, would be fully capable of transmitting medical records, including those requiring high bandwidth transmission because of file size (X-rays, MRIs, and other images).

Fit with BTOP CCI Priorities:

PRIORITY 1: U.S. UCAN proposes to ensure national connectivity for advanced broadband applications for more than 100,000 anchors across the U.S. initially. U.S. UCAN will immediately serve and benefit the 66,000 anchors connected by our regional partners today, the 14,500 new anchors which will be served by BTOP Round 1 grants announced as of 3/11, and an estimated 30-50,000 additional anchors that will be connected by additional round one and two BTOP projects. Furthermore, the U.S. UCAN service will be prepared to handle all 200,000+ anchor institutions.

PRIORITY 2: This project is a public-private partnership. Internet2, NLR, and Northern Tier are non-profit entities, as will be the U.S. UCAN entity. Indiana University (IU) is a public entity. Ciena, Juniper, Infinera and Cisco are for-profit entities. Many government entities are served by the network (anchor institutions, public safety entities) and state-run schools (and systems) operate the regional networks that will connect to U.S. UCAN in many of the states.

PRIORITY 3: U.S. UCAN will deploy infrastructure throughout the United States, including infrastructure in economically distressed areas. Access to uncongested high-speed networking

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and combined tools set will make anchor institutions in economically distressed areas served by U.S. UCAN and its partners more effective.

PRIORITY 4: 1,152 of the proposed anchor institutions are community colleges. As the American Association of Community Colleges noted in their letter of support, "The U.S. UCAN proposal will provide the national infrastructure that will serve as the foundation for connecting all of the nation's community anchor institutions, including community colleges, to each other through a linked, high-performance network that enables advanced applications… U.S. UCAN would jump start an effort to get all community colleges connected to each other, nation-wide at gigabit speeds or higher..."

PRIORITY 5: 6,183 of the proposed anchor institutions are public safety entities.

PRIORITY 6: U.S. UCAN has commitments (including existing contractual relationships that can and will be migrated to this network) from many member universities, as well as the following state and regional networks: 3ROX, CENIC, CIC OmniPoP, Drexel University, GPN, Indiana GigaPoP, KyRON, LEARN, LONI, MAGPI, MAX, MCNC, Merit Network, MREN, NOX, NYSERNet, Inc., Oregon Gigapop, Pacific Northwest GigaPoP, SoX, Univ. of Memphis, Univ. of South Florida/Florida LambdaRail, LLC, Univ. of Utah/Utah Education Network (UEN), MATP (Mid-Atlantic Terascale Partnership), Western Regional Network (WRN), North Carolina Partnership, and the Front Range GigaPoP to utilize the Middle Mile components. Since no funds in this proposal go to Last Mile components, we satisfy the requirement that less than 20% of costs of the project go to rural areas.

PRIORITY 7: This proposal contributes 35.39% in non-federal cost match, $34,253,445 out of the total budget of $96,793,607.

Is the applicant seeking a waiver of the Buy American provision pursuant to section x.Q of the NOFA?

➢ No

Is the applicant deliquent on any federal debt?

➢ No

If Yes, justification for deliquency:

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Are you seeking a waiver of any requirement set forth in the NOFA that is not mandated by statute or applicable law?

➢ Yes

Is the applicant a current recipient of a grant or loan from RUS?

➢ No

C. Partners

Are you partnering with any other key institutions, organizations, or other entities for this project?
➢ Yes

If YES, key partners are listed below:

Project Role: Sub-recipient
Name: Ricart, Glenn
Phone: 8012323403
Email: gr@nlr.net
Address 1: P.O. Box 1610
Address 2:
Address 3:
City: Cypress
State: California
Zip Code: 90630
Organization: National LambdaRail
Organization Type: Non-profit Corporation
Small business: No
Socially and economically disadvantaged small business concern: No

Project Role: Sub-recipient
Name: Kraemer, Ronald
Phone: 6082625381
Email: ron.kraemer@cio.wisc.edu
Address 1: 100 Bascom Hall
Address 2: 500 Lincoln Drive
Address 3:
City: Madison
State: Wisconsin
Zip Code: 53706

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Organization: University of Wisconsin
Organization Type: Non-profit Association
Small business: No
Socially and economically disadvantaged small business concern: No

Project Role: Sub-recipient
Name: Jent, David
Phone: 3178560763
Email: djent@iupui.edu
Address 1: 535 W. Michigan Street
Address 2:
Address 3:
City: Indianapolis
State: Indiana
Zip Code: 46202
Organization: Indiana University
Organization Type: Other
Small business: No
Socially and economically disadvantaged small business concern: No

Project Role: Contractor
Name: Perkins, Drew
Phone: 4085725200
Email: dperkins@infinera.com
Address 1: 169 Java Drive
Address 2:
Address 3:
City: Sunnyvale
State: California
Zip Code: 94089
Organization: Infinera
Organization Type: For-profit Entity
Small business: No
Socially and economically disadvantaged small business concern: No

Project Role: Contractor
Name: Boroumand, Javad
Phone: 7934942726
Email: jboroum@cisco.com
Address 1: 170 W. Tasman Drive
Address 2:

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Address 3:
City: San Jose
State: California
Zip Code: 95134
Organization: Cisco
Organization Type: For-profit Entity
Small business: No
Socially and economically disadvantaged small business concern: No

Project Role: Contractor
Name: Archuleta, James
Phone: 8009211144
Email: jarchule@ciena.com
Address 1: 1201 Winterson Road
Address 2:
Address 3:
City: Linthium
State: Maryland
Zip Code: 21090
Organization: Ciena
Organization Type: For-profit Entity
Small business: No
Socially and economically disadvantaged small business concern: No

Project Role: Contractor
Name: McClear, Robin
Phone: 2486871005
Email: rmcclear@juniper.com
Address 1: 101 W. Big Beaver Road
Address 2:
Address 3:
City: Troy
State: Michigan
Zip Code: 48084
Organization: Juniper Networks
Organization Type: For-profit Entity
Small business: No
Socially and economically disadvantaged small business concern: No

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Description of the involvement of the partners listed above in the project.

The U.S. UCAN proposal is a partnership between Internet2, National Lambda Rail (NLR), the Northern Tier Networking Consortium (NTNC), Indiana University Information Technology Services (IU), Ciena, Cisco, Infinera, and Juniper. Internet2, NLR, and NTNC will own and operate a set of broadband middle mile infrastructure, including fiber IRUs, optical equipment, routers, and measurement equipment. Some parts of the infrastructure will include developing new network segments and some will be an expansion of existing network segments to accommodate growth. Subsets of that new segment infrastructure will be owned and operated by: Internet2 only (Seattle to Los Angeles, Salt Lake City to Chicago, Kansas City to Dallas, New York City to Atlanta, New York City to Chicago, and Harrisburg to Washington, DC), NLR only (NLR legacy system), Internet2 and NLR (New York City to Cleveland via Boston, Chicago to Atlanta, Nashville to Dallas, and Salt Lake City to Los Angeles), and Internet2, NLR, and NTNC (Seattle to Chicago). IU will provide coordinating NOC services for the entire network, and each partner will also provide its own NOC. Ciena ████████ Cisco ████████, Infinera ████████ and Juniper ████████ are all providing cash matches.

The proposed project will be a national "middle mile" backbone, linking regional "middle mile" networks, which in turn connect anchor institutions. As such, local community participation will be indirect, both through improved connectivity, and through membership in organizations such as Internet2. It is expected that the growth in connectivity to additional anchor institutions will be accomplished through affiliation with U.S. UCAN, which will acquire the needed networking capabilities from Internet2 and NLR. U.S. UCAN will be incorporated as a not-for-profit organization governed by organizations representative of anchor institutions.

The Internet2 President and CEO will be the overall project director. For purposes of this project, the President and CEO of NLR, the Chair of NTNC, the Assoc. VP. of Networks of IU, and the 4 vendor representatives, all co-directors, report to Internet2's CEO. Day-to-day management of the project will fall to a coordinating technical team led by the Internet2 Executive Director of Network Services and will include the NLR Director of Engineering and Operations, the Chair of the NTNC Technical Committee, and the IU Director of Global Research NOC Engineering. Each member of the coordinating technical team will be responsible for managing and coordinating the build-out and operation of their corresponding network components. Internet2 will be responsible for coordination between the partnering organizations required to achieve the unified project goals.

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U.S. UCAN will be a new organization that will create a convening and coordinating function for anchor institution constituencies that do not have a direct governance role in Internet2 or NLR. U.S. UCAN will set policy standards, market U.S. UCAN services and add capabilities and capacity to Internet2 and NLR's current services. The U.S. UCAN organization will not own or operate the national network to be created by the BTOP proposal; that will be done through NLR, Internet2, and NTNC. However, future additions to the network may be accomplished by asking Internet2 and NLR to make them or having U.S. UCAN engage other parties to do so.

The partners envision an 11-member Board for U.S. UCAN with 2 members named by Internet2, 2 members named by NLR, 2 members elected by the state and regional optical networks, and 5 members named by organizations associated with community anchors (e.g. the American Library Association or the National Governor's Association). The staff of U.S. UCAN would market the network to community anchors, arrange for community meetings, maintain liaisons with associations related to community anchors, keep metrics on the performance and utilization of the network, and handle inquiries on how specific-purpose point-to-point connections can be made. U.S. UCAN will not own or operate the network and it will refer those interested in connections to their state or regional optical network.

Fees will primarily be directly assessed through the state and regional optical networks because they will connect community anchor institutions. The partners envision that a small per institution per year surcharge will be needed to cover the operations of U.S. UCAN and the additional costs being shouldered by the national networks. U.S. UCAN may also seek other sources of funding; the FCC, the NTIA, or even a direct congressional appropriation would be potential sources of additional funding.

As a result of the U.S. UCAN proposal, Internet2, NLR, and NTNC will also be able to more effectively serve their middle mile/last mile network partners with enhanced connectivity between anchor institutions across the country. The respective memberships of Internet2, NLR, and NTNC will grow to include new anchor institutions from the R&E community. Through its operational coordinating role, IU will be able to better understand networking needs and operational challenges across the country, thus improving the value proposition of the IU Global NOC.

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Internet2 and NLR will share revenues that result from providing these capabilities to U.S. UCAN in proportion to their contributions to establishing this network facility. Details of this partnership have been worked out in the form of a memorandum of understanding between Internet2 and NLR. The formula will be based on fraction of cash contribution and fraction of in-kind contribution associated with both partners. The NTNC benefits from expanding the network to include 100Gbps waves and to close it into a ring. IU will benefit in the form of fees paid for coordinating NOC services. Ciena Cisco, Infinera, and Juniper have been selected to provide equipment for specific sections of the U.S. UCAN infrastructure.

D. Congressional Districts

Applicant Headquarters

➢ Michigan

Project Service States

Arizona

Arkansas

California

Colorado

Connecticut

Delaware

District of Columbia

Florida

Georgia

Alabama

Idaho

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Illinois

Indiana

Iowa

Kansas

Kentucky

Louisiana

Maine

Maryland

Massachusetts

Michigan

Minnesota

Mississippi

Missouri

Montana

Nebraska

Nevada

New Hampshire

New Jersey

New Mexico

New York

North Carolina

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North Dakota

Ohio

Oklahoma

Oregon

Pennsylvania

Rhode Island

South Carolina

South Dakota

Tennessee

Texas

Utah

Vermont

Virginia

Washington

West Virginia

Wisconsin

Wyoming

Alaska

Hawaii

Not Applicable

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Project Service Areas

Arizona - 1

Arizona - 2

Arizona - 3

Arizona - 4

Arizona - 5

Arizona - 6

Arizona - 7

Arizona - 8

Arkansas - 1

Arkansas - 2

Arkansas - 3

Arkansas - 4

California - 1

California - 2

California - 3

California - 4

California - 5

California - 6

California - 7

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California - 8

California - 9

California - 10

California - 11

California - 12

California - 13

California - 14

California - 15

California - 16

California - 17

California - 18

California - 19

California - 20

California - 21

California - 22

California - 23

California - 24

California - 25

California - 26

California - 27

California - 28

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California - 29

California - 30

California - 31

California - 32

California - 33

California - 34

California - 35

California - 36

California - 37

California - 38

California - 39

California - 40

California - 41

California - 42

California - 43

California - 44

California - 45

California - 46

California - 47

California - 48

California - 49

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California - 50

California - 51

California - 52

California - 53

Colorado - 1

Colorado - 2

Colorado - 3

Colorado - 4

Colorado - 5

Colorado - 6

Colorado - 7

Connecticut - 1

Connecticut - 2

Connecticut - 3

Connecticut - 4

Connecticut - 5

Delaware - At-Large

District of Columbia - At-Large

Florida - 1

Florida - 2

Florida - 3

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Florida - 4

Florida - 5

Florida - 6

Florida - 7

Florida - 8

Florida - 9

Florida - 10

Florida - 11

Florida - 12

Florida - 13

Florida - 14

Florida - 15

Florida - 16

Florida - 17

Florida - 18

Florida - 19

Florida - 20

Florida - 21

Florida - 22

Florida - 23

Florida - 24

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Florida - 25

Georgia - 1

Georgia - 2

Georgia - 3

Georgia - 4

Georgia - 5

Georgia - 6

Georgia - 7

Georgia - 8

Georgia - 9

Georgia - 10

Georgia - 11

Georgia - 12

Georgia - 13

Alabama - 1

Alabama - 2

Alabama - 3

Alabama - 4

Alabama - 5

Alabama - 6

Alabama - 7

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Idaho - 1

Idaho - 2

Illinois - 1

Illinois - 2

Illinois - 3

Illinois - 4

Illinois - 5

Illinois - 6

Illinois - 7

Illinois - 8

Illinois - 9

Illinois - 10

Illinois - 11

Illinois - 12

Illinois - 13

Illinois - 14

Illinois - 15

Illinois - 16

Illinois - 17

Illinois - 18

Illinois - 19

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Indiana - 1

Indiana - 2

Indiana - 3

Indiana - 4

Indiana - 5

Indiana - 6

Indiana - 7

Indiana - 8

Indiana - 9

Iowa - 1

Iowa - 2

Iowa - 3

Iowa - 4

Iowa - 5

Kansas - 1

Kansas - 2

Kansas - 3

Kansas - 4

Kentucky - 1

Kentucky - 2

Kentucky - 3

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Kentucky - 4

Kentucky - 5

Kentucky - 6

Louisiana - 1

Louisiana - 2

Louisiana - 3

Louisiana - 4

Louisiana - 5

Louisiana - 6

Louisiana - 7

Maine - 1

Maine - 2

Maryland - 1

Maryland - 2

Maryland - 3

Maryland - 4

Maryland - 5

Maryland - 6

Maryland - 7

Maryland - 8

Massachusetts - 1

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Massachusetts - 2

Massachusetts - 3

Massachusetts - 4

Massachusetts - 5

Massachusetts - 6

Massachusetts - 7

Massachusetts - 8

Massachusetts - 9

Massachusetts - 10

Michigan - 1

Michigan - 2

Michigan - 3

Michigan - 4

Michigan - 5

Michigan - 6

Michigan - 7

Michigan - 8

Michigan - 9

Michigan - 10

Michigan - 11

Michigan - 12

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Michigan - 13

Michigan - 14

Michigan - 15

Minnesota - 1

Minnesota - 2

Minnesota - 3

Minnesota - 4

Minnesota - 5

Minnesota - 6

Minnesota - 7

Minnesota - 8

Mississippi - 1

Mississippi - 2

Mississippi - 3

Mississippi - 4

Missouri - 1

Missouri - 2

Missouri - 3

Missouri - 4

Missouri - 5

Missouri - 6

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Missouri - 7

Missouri - 8

Missouri - 9

Montana - At-Large

Nebraska - 1

Nebraska - 2

Nebraska - 3

Nevada - 1

Nevada - 2

Nevada - 3

New Hampshire - 1

New Hampshire - 2

New Jersey - 1

New Jersey - 2

New Jersey - 3

New Jersey - 4

New Jersey - 5

New Jersey - 6

New Jersey - 7

New Jersey - 8

New Jersey - 9

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New Jersey - 10

New Jersey - 11

New Jersey - 12

New Jersey - 13

New Mexico - 1

New Mexico - 2

New Mexico - 3

New York - 1

New York - 2

New York - 3

New York - 4

New York - 5

New York - 6

New York - 7

New York - 8

New York - 9

New York - 10

New York - 11

New York - 12

New York - 13

New York - 14

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New York - 15

New York - 16

New York - 17

New York - 18

New York - 19

New York - 20

New York - 21

New York - 22

New York - 23

New York - 24

New York - 25

New York - 26

New York - 27

New York - 28

New York - 29

North Carolina - 1

North Carolina - 2

North Carolina - 3

North Carolina - 4

North Carolina - 5

North Carolina - 6

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North Carolina - 7

North Carolina - 8

North Carolina - 9

North Carolina - 10

North Carolina - 11

North Carolina - 12

North Carolina - 13

North Dakota - At-Large

Ohio - 1

Ohio - 2

Ohio - 3

Ohio - 4

Ohio - 5

Ohio - 6

Ohio - 7

Ohio - 8

Ohio - 9

Ohio - 10

Ohio - 11

Ohio - 12

Ohio - 13

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Ohio - 14

Ohio - 15

Ohio - 16

Ohio - 17

Ohio - 18

Oklahoma - 1

Oklahoma - 2

Oklahoma - 3

Oklahoma - 4

Oklahoma - 5

Oregon - 1

Oregon - 2

Oregon - 3

Oregon - 4

Oregon - 5

Pennsylvania - 1

Pennsylvania - 2

Pennsylvania - 3

Pennsylvania - 4

Pennsylvania - 5

Pennsylvania - 6

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Pennsylvania - 7

Pennsylvania - 8

Pennsylvania - 9

Pennsylvania - 10

Pennsylvania - 11

Pennsylvania - 12

Pennsylvania - 13

Pennsylvania - 14

Pennsylvania - 15

Pennsylvania - 16

Pennsylvania - 17

Pennsylvania - 18

Pennsylvania - 19

Rhode Island - 1

Rhode Island - 2

South Carolina - 1

South Carolina - 2

South Carolina - 3

South Carolina - 4

South Carolina - 5

South Carolina - 6

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South Dakota - At Large

Tennessee - 1

Tennessee - 2

Tennessee - 3

Tennessee - 4

Tennessee - 5

Tennessee - 6

Tennessee - 7

Tennessee - 8

Tennessee - 9

Texas - 1

Texas - 2

Texas - 3

Texas - 4

Texas - 5

Texas - 6

Texas - 7

Texas - 8

Texas - 9

Texas - 10

Texas - 11

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Texas - 12

Texas - 13

Texas - 14

Texas - 15

Texas - 16

Texas - 17

Texas - 18

Texas - 19

Texas - 20

Texas - 21

Texas - 22

Texas - 23

Texas - 24

Texas - 25

Texas - 26

Texas - 27

Texas - 28

Texas - 29

Texas - 30

Texas - 31

Texas - 32

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Utah - 1

Utah - 2

Utah - 3

Vermont - At-Large

Virginia - 1

Virginia - 2

Virginia - 3

Virginia - 4

Virginia - 5

Virginia - 6

Virginia - 7

Virginia - 8

Virginia - 9

Virginia - 10

Virginia - 11

Washington - 1

Washington - 2

Washington - 3

Washington - 4

Washington - 5

Washington - 6

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Washington - 7

Washington - 8

Washington - 9

West Virginia - 1

West Virginia - 2

West Virginia - 3

Wisconsin - 1

Wisconsin - 2

Wisconsin - 3

Wisconsin - 4

Wisconsin - 5

Wisconsin - 6

Wisconsin - 7

Wisconsin - 8

Wyoming - At Large

Alaska - At-Large

Hawaii - 1

Hawaii - 2

Will any portion of your proposed project serve federally recognized tribal entities?

> Yes

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Indicate each federally recognized tribal entity your proposed project will serve.

Ak Chin Indian Community Council

Cocopah Tribal Council

Colorado River Tribal Council

Fort McDowell Yavapai Tribal Council

Gila River Indian Community Council

Havasupai Tribal Council

Hopi Tribal Council

Hualapai Tribal Council

Kaibab Paiute Tribal Council

Navajo Nation

Pascua Yaqui Tribal Council

Quechan Tribal Council

Salt River Pima-Maricopa Indians

San Carlos Tribal Council

San Juan Southern Paiute Council

Tohono O'odham Nation

Tonto Apache Tribal Council

White Mountain Apache Tribe

Yavapai-Apache Nation

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Yavapai-Prescott Board of Directors

Agua Caliente Band of Cahuilla Indians

Alturas Rancheria

Augustine Band of Mission Indians

Barona Band of Mission Indians

Bear River Band of Rohnerville Rancheria

Benton Paiute Tribe

Berry Creek Rancheria

Big Lagoon Rancheria

Big Pine Paiute Tribe of the Owens Valley

Big Sandy Rancheria Band of Western Mono Indians

Big Valley Rancheria

Bishop Paiute Tribe

Blue Lake Rancheria

Bridgeport Indian Colony

Buena Vista Rancheria

Cabazon Tribal Business Committee

Cahto Tribal Executive Committee

Cahuilla Band of Mission Indians

California Valley Miwok Tribe

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Campo Band of Mission Indians

Cedarville Rancheria

Chemehuevi Tribe

Chicken Ranch Rancheria

Cloverdale Rancheria

Cold Springs Rancheria

Colusa Rancheria

Cortina Rancheria

Coyote Valley Reservation

Dry Creek Rancheria

Elem Indian Colony

Elk Valley Rancheria

Enterprise Rancheria

Ewiiaapaayp Band of Kumeyaay Indians

Federated Indians of Graton Rancheria

Fort Bidwell Reservation

Fort Independence Reservation

Fort Mojave Tribal Council

Greenville Rancheria

Grindstone Rancheria

Guidiville Rancheria

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Habematolel Pomo of Upper Lake

Hoopa Valley Tribal Council

Hopland Reservation

Inaja-Cosmit Reservation

Ione Band of Miwok Indians

Jackson Rancheria Band of Miwuk Indians

Jamul Indian Village

Karuk Tribe of California

Kashia Band of Pomo Indians of Stewarts Point Rancheria

La Jolla Band of Luiseno Indians

La Posta Band of Mission Indians

Laytonville Rancheria

Lone Pine Paiute-Shoshone Reservation

Los Coyotes Reservation

Lower Lake Rancheria KOI Nation

Lytton Rancheria

Manchester - Point Arena Band of Pomo Indians

Manzanita Band of Mission Indians

Mechoopda Indian Tribe of the Chico Rancheria

Mesa Grande Band of Mission Indians

Middletown Rancheria

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Mooretown Rancheria

Morongo Band of Mission Indians

North Fork Rancheria

Pala Band of Mission Indians

Paskenta Band of Nomlaki Indians

Pauma/Yuima Band of Mission Indians

Pechanga Band of Mission Indians

Picayune Rancheria of Chukchansi Indians

Pinoleville Reservation

Pit River Tribal Council

Potter Valley Rancheria

Quartz Valley Reservation

Ramona Band of Cahuilla

Redding Rancheria

Redwood Valley Reservation

Resighini Rancheria

Rincon Band of Mission Indians

Robinson Rancheria

Round Valley Reservation

San Manuel Band of Mission Indians

San Pasqual Band of Diegueno Indians

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Santa Rosa Band of Mission Indians

Santa Rosa Rancheria

Santa Ynez Band of Mission Indians

Santa Ysabel Band of Mission Indians

Scotts Valley Rancheria

Sherwood Valley Rancheria

Shingle Springs Rancheria

Smith River Rancheria

Soboba Band of Luiseno Indians

Susanville Indian Rancheria

Sycuan Band of Mission Indians

Table Bluff Reservation - Wiyot Tribe

Table Mountain Rancheria

Timbisha Shoshone Tribe

Torres-Martinez Desert Cahuilla Indians

Trinidad Rancheria

Tule River Reservation

Tuolumne Rancheria

Twenty-Nine Palms Band of Mission Indians

United Auburn Indian Community

Upper Lake Rancheria

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Viejas Band of Mission Indians

Wilton Miwok Rancheria

Woodfords Community Council

Yocha Dehe Wintun Nation

Yurok Tribe

Southern Ute Tribe

Ute Mountain Ute Tribe

Mashantucket Pequot Tribe

Mohegan Indian Tribe

Miccosukee Indian Tribe

Seminole Indian Tribe

Poarch Creek Indians

Coeur d'Alene Tribal Council

Fort Hall Business Council

Kootenai Tribal Council

Nez Perce Tribe

Sac & Fox Tribe of the Mississippi in Iowa

Iowa Tribe of Kansas & Nebraska

Kickapoo Tribe in Kansas

Prairie Band of Potawatomi Nation

Sac and Fox Nation of Missouri

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Chitimacha Tribe of Louisiana

Coushatta Indian Tribe

Jena Band of Choctaw Indians

Tunica-Biloxi Tribe

Aroostook Band of Micmacs

Houlton Band of Maliseet Indians

Passamaquoddy Tribe - Indian Township

Passamaquoddy Tribe - Pleasant Point

Penobscot Indian Nation

Mashpee Wampanoag Tribal Council

Wampanoag Tribe of Gay Head/Aquinnah

Bay Mills Indian Community

Grand Traverse Band of Ottawa and Chippewa Indians

Hannahville Indian Community

Huron Potawatomi, Inc.

Keweenaw Bay Indian Community

Lac Vieux Desert Band of Lake Superior Chippewa Indians

Little River Band of Ottawa Indians

Little Traverse Bay Bands of Odawa Indians

Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan

Pokagon Band of Potawatomi Indians

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Task: Submit Application - BTOP	Applicant Name: Nili Tannenbaum	

Saginaw Chippewa Indian Tribe of Michigan

Sault Ste. Marie Tribe of Chippewa Indians of Michigan

Bois Forte Reservation

Fond du Lac Reservation Business Committee

Grand Portage Chippewa Tribe

Leech Lake Tribe

Lower Sioux Indian Community of Minnesota

Mille Lacs Band Assembly

Minnesota Chippewa Tribe

Prairie Island Indian Community

Red Lake Band of Chippewa Indians

Shakopee Mdewakanton Sioux Community of Minnesota

Upper Sioux Community of Minnesota

White Earth Tribe

Mississippi Band of Choctaw Indians

Eastern Shawnee Tribe of Oklahoma

Blackfeet Tribal Business Council

Chippewa Cree Business Committee

Confederated Salish & Kootenai Tribes

Crow Tribal Council

Fort Belknap Community Council

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Fort Peck Tribes

Northern Cheyenne Tribe

Omaha Tribe of Nebraska

Ponca Tribe of Nebraska

Santee Sioux Nation

Winnebago Tribal Council

Battle Mountain Band Council

Carson Community Council

Dresslerville Community Council

Duckwater Tribal Council

Elko Band Council

Ely Shoshone Tribe

Fallon Paiute Shoshone Tribe

Fort McDermitt Tribal Council

Las Vegas Tribal Council

Lovelock Tribal Council

Moapa Business Council

Pyramid Lake Paiute Tribal Council

Reno-Sparks Tribal Council

Shoshone-Paiute Business Council

South Fork Band Council

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Stewart Community Council

Summit Lake Paiute Tribe

Te-Moak Tribe of Western Shoshone

Walker River Paiute Tribal Council

Washoe Tribal Council

Wells Band Council

Winnemucca Tribal Council

Yerington Paiute Tribe

Yomba Tribal Council

Jicarilla Apache Nation

Mescalero Apache Tribe

Ohkay Owingeh Pueblo

Pueblo of Acoma

Pueblo of Cochiti

Pueblo of Isleta

Pueblo of Jemez

Pueblo of Laguna

Pueblo of Nambe

Pueblo of Picuris

Pueblo of Pojoaque

Pueblo of San Felipe

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Pueblo of San Ildefonso

Pueblo of Sandia

Pueblo of Santa Ana

Pueblo of Santa Clara

Pueblo of Santo Domingo

Pueblo of Taos

Pueblo of Tesuque

Pueblo of Zia

Pueblo of Zuni

Ramah Navajo Chapter

Zuni Pueblo

Cayuga Nation

Oneida Indian Nation

Onondaga Indian Nation

Seneca Nation of Indians

St. Regis Band of Mohawk Indians

Tonawanda Band of Seneca

Tuscarora Nation

Eastern Band of Cherokee Indians

Spirit Lake Tribal Council

Standing Rock Sioux Tribal Council

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Three Affiliated Tribes Business Council

Trenton Indian Service Area

Turtle Mountain Band of Chippewa

Absentee-Shawnee Tribe of Indians of OK

Alabama-Quassarte Tribal Town

Apache Tribe of Oklahoma

Caddo Nation of Oklahoma

Cherokee Nation

Cheyenne-Arapaho Tribes of Oklahoma

Chickasaw Nation

Choctaw Nation of Oklahoma

Citizen Potawatomi Nation

Comanche Nation

Delaware Nation

Delaware Tribe of Indians of Oklahoma

Fort Sill Apache Tribe of Oklahoma

Iowa Tribe of Oklahoma

Kaw Nation

Kialegee Tribal Town

Kickapoo Tribe of Oklahoma

Kiowa Indian Tribe of Oklahoma

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Miami Tribe of Oklahoma

Modoc Tribe of Oklahoma

Muscogee (Creek) Nation

Northw

Osage Nation

Otoe-Missouria Tribe of Indians

Ottawa Tribe of Oklahoma

Pawnee Nation of Oklahoma

Peoria Tribe of Indians of Oklahoma

Ponca Tribe of Indians of Oklahoma

Quapaw Tribal Business Committee

Sac and Fox Nation of Oklahoma

Seminole Nation of Oklahoma

Seneca-Cayuga Tribe of Oklahoma

Shawnee Tribe

Thlopthlocco Tribal Town

Tonkawa Tribe of Indians of Oklahoma

United Keetoowah Band of Cherokee Indians

Wichita and Affiliated Tribes

Wyandotte Nation

Burns Paiute Tribe, General Council

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Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians

Confederated Tribes of the Grand Ronde

Confederated Tribes of the Umatilla Indian Reservation

Confederated Tribes of the Warm Springs Reservation, Tribal Council

Coquille Indian Tribe

Cow Creek Government Offices

Klamath General Council

Siletz Tribal Council

Narragansett Indian Tribe

Catawba Indian Nation

Cheyenne River Sioux Tribe

Crow Creek Sioux Tribal Council

Flandreau Santee Sioux Tribe

Lower Brule Sioux Tribal Council

Oglala Sioux Tribal Council

Rosebud Sioux Tribal Council

Sicangu Lakota - Rosebud Sioux Tribe

Sisseton-Wahpeton Oyate

Yankton Sioux Tribe

Alabama-Coushatta Tribes of Texas

Kickapoo Traditional Tribe of Texas

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Ysleta del Sur Pueblo

Goshute Business Council

Northwestern Band of Shoshone Nation

Paiute Indian Tribe of Utah Tribal Council

Skull Valley Band of Goshute Indians

Ute Indian Tribe

Colville Business Council

Confederated Tribes of the Chehalis Reservation

Cowlitz Indian Tribe

Hoh Tribe

Jamestown S'Klallam Tribal Council

Kalispel Business Committee

Lower Elwha Tribal Council

Lummi Indian Business Council

Makah Indian Tribal Council

Muckleshoot Tribal Council

Nisqually Indian Community Council

Nooksack Indian Tribal Council

Port Gamble S'Klallam Tribe

Puyallup Tribal Council

Quileute Tribe

Broadband Infrastructure Application
Submission to NTIA – Broadband Technology Opportunities Program

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Quinault Indian Nation - Business Committee

Samish Indian Nation

Sauk-Suiattle Tribal Council

Shoalwater Bay Tribe

Skokomish Tribal Council

Snoqualmie Tribe

Spokane Business Council

Squaxin Island Tribal Council

Stillaguamish Board of Directors

Suquamish Tribal Council

Swinomish Indian Tribal Community

Tulalip Board of Directors

Upper Skagit Tribal Council

Yakama Nation

Bad River Band of Lake Superior Chippewa

Forest County Potawatomi Tribe

Ho-Chunk Nation

Lac Courte Oreilles Band of Chippewa Indians

Lac du Flambeau Band of Lake Superior Chippewa

Menominee Indian Tribe of Wisconsin

Oneida Tribe of Indians of Wisconsin

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Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin

Sokaogon Chippewa Community

St. Croix Chippewa Indians of Wisconsin

Stockbridge Munsee Community of Wisconsin

Arapaho Business Committee

Shoshone Business Council

Agdaagux Tribe of King Cove

Akiachak Native Community (IRA)

Akiak Native Community (IRA)

Alatna Village

Aleut Community of St. Paul Island

Algaaciq Native Village

Allakaket Village

Angoon Community Association (IRA)

Anvik Village

Arctic Village Council

Asa'Carsarmiut Tribe

Atqasuk Village

Beaver Village

Birch Creek Tribal Council

Central Council Tlingit & Haida Indian Tribes of Alaska

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Chalkyitsik Village

Cheesh-Na Tribal Council

Chevak Native Village

Chickaloon Native Village

Chignik Lake Village

Chilkat Indian Village

Chilkoot Indian Association (IRA)

Chinik Eskimo Community (aka Golovin)

Chuloonawick Native Village

Circle Native Community (IRA)

Craig Community Association

Curyung Tribal Council

Douglas Indian Association (IRA)

Egegik Village

Eklutna Native Village

Ekwok Village

Elim IRA Council

Emmonak Village

Evansville Village

Gambell IRA Council

Gulkana Village

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Healy Lake Village

Holy Cross Village

Hoonah Indian Association (IRA)

Hughes Village

Huslia Village Council

Hydaburg Cooperative Assn. (IRA)

Igiugig Village

Inupiat Community of Arctic Slope

Iqurmiut Traditonal Council

Ivanof Bay Tribal Council

Kaguyak Village

Kaktovik Village

Kenaitze Indian Tribe (IRA)

Ketchikan Indian Corporation

Ketchikan Indian Corporation (IRA)

King Island Native Community (IRA)

King Salmon Tribe

Klawock Cooperative Association

Knik Tribe

Kobuk Traditional Council

Kokhanok Village

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Kongiganak Traditional Council

Koyukuk Native Village

Larsen Bay Tribal Council

Lesnoi Village

Levelock Village

Lime Village Traditional Council

Louden Tribal Council

Manley Hot Springs Village

Manokotak Village

Mary's Igloo Traditional Council

McGrath Native Village Council

Mentasta Traditional Council

Metlakatla Indian Community

Naknek Native Village

Native Tribe of Kanatak

Native Village of Afognak

Native Village of Akhiok

Native Village of Akutan

Native Village of Aleknagik

Native Village of Ambler

Native Village of Atka

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Native Village of Barrow

Native Village of Belkofski

Native Village of Brevig Mission

Native Village of Buckland (IRA)

Native Village of Cantwell

Native Village of Chenega

Native Village of Chignik

Native Village of Chignik Lagoon

Native Village of Chitina

Native Village of Chuathbaluk

Native Village of Council

Native Village of Crooked Creek

Native Village of Deering (IRA)

Native Village of Diomede (IRA) (Inalik)

Native Village of Eagle (IRA)

Native Village of Eek

Native Village of Ekuk

Native Village of Eyak

Native Village of False Pass

Native Village of Fort Yukon

Native Village of Gakona

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Native Village of Georgetown

Native Village of Goodnews Bay

Native Village of Hamilton

Native Village of Hooper Bay

Native Village of Karluk (IRA)

Native Village of Kasigluk

Native Village of Kiana

Native Village of Kipnuk

Native Village of Kivalina (IRA)

Native Village of Kluti-Kaah (Copper Center)

Native Village of Kotzebue (IRA)

Native Village of Koyuk (IRA)

Native Village of Kwigillingok

Native Village of Kwinhagak (IRA)

Native Village of Marshall

Native Village of Mekoryuk (IRA)

Native Village of Minto (IRA)

Native Village of Nanwalek (English Bay)

Native Village of Napaimute

Native Village of Napakiak (IRA)

Native Village of Napaskiak

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Native Village of Nikolski (IRA)

Native Village of Noatak (IRA)

Native Village of Nuiqsut

Native Village of Nunam Iqua

Native Village of Nunapitchuk (IRA)

Native Village of Ouzinkie

Native Village of Paimiut

Native Village of Perryville

Native Village of Pitka's Point

Native Village of Point Hope (IRA)

Native Village of Point Lay (IRA)

Native Village of Port Heiden

Native Village of Port Lions

Native Village of Savoonga (IRA)

Native Village of Shaktoolik (IRA)

Native Village of Sheldon Point

Native Village of Shishmaref (IRA)

Native Village of Shungnak (IRA)

Native Village of South Naknek

Native Village of St. Michael (IRA)

Native Village of Stevens (IRA)

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Native Village of Tanana (IRA)

Native Village of Tatitlek (IRA)

Native Village of Tazlina

Native Village of Tetlin (IRA)

Native Village of Tyonek (IRA)

Native Village of Unalakleet (IRA)

Native Village of Venetie Tribe (IRA)

Native Village of Wales (IRA)

Native Village of White Mountain (IRA)

Nelson Lagoon Tribal Council

Nenana Native Association

New Koliganek Village Council

New Stuyahok Village

Newhalen Village

Newtok Traditional Council

Nightmute Traditional Council

Nikolai Village

Ninilchik Traditional Council

Nome Eskimo Community

Nondalton Village

Noorvik Native Community (IRA)

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Northway Village

Nulato Tribal Council

Nunakauyarmiut Tribe

Ohogamiut Traditional Council

Organized Village of Grayling (IRA)

Organized Village of Kake (IRA)

Organized Village of Kasaan (IRA)

Organized Village of Kwethluk (IRA)

Organized Village of Saxman (IRA)

Orutsararmuit Native Council

Oscarville Tribal Council

Pauloff Harbor Village

Pedro Bay Village Council

Petersburg Indian Association (IRA)

Pilot Point Traditional Council

Pilot Station Traditional Village

Platinum Traditional Village Council

Port Graham Village Council

Portage Creek Village Council

Qagan Tayagungin Tribe of Sand Point Village

Qawalangin Tribe of Unalaska

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Rampart Village

Ruby Tribal Council

Scammon Bay Traditional Council

Selawik IRA Council

Seldovia Village Tribe (IRA)

Shageluk Native Village (IRA)

Shoonaq' Tribe of Kodiak

Sitka Tribe of Alaska (IRA)

Skagway Village

Sleetmute Traditional Council

Solomon Traditional Council

St. George Island

Stebbins Community Association (IRA)

Steelmute Traditional Council

Sun'aq Tribe of Kodiak

Takotna Village

Tanacross Village Council

Telida Village

Teller Traditional Council

Traditional Village of Togiak

Tuluksak Native Community (IRA)

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Tuntutuliak Traditional Council

Tununak IRA Council

Twin Hills Village Council

Ugashik Traditional Village Council

Umkumiut Native Village

Unga Tribal Council

Venetie Village Council

Village of Alakanuk

Village of Anaktuvuk Pass

Village of Aniak

Village of Atmautluak

Village of Bill Moore's Slough

Village of Chefornak

Village of Clarks Point

Village of Dot Lake

Village of Iliamna

Village of Kalskag

Village of Kaltag

Village of Kotlik

Village of Lower Kalskag

Village of Old Harbor

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Village of Red Devil

Village of Salamatoff

Village of Stony River

Village of Wainwright

Wrangell Cooperative Assn. (IRA)

Yakutat Tlingit Tribe

Yupiit of Andreafski

Have you consulted with each of the federally recognized tribal entities identified above?

➢ No

E. Service Area Details

Is the applicant seeking a waiver for providing less than 100% coverage of a service area?

➢ No

Project Details

Service Area Type: Middle Mile
Service Area Name: U.S. UCAN
Rural Classification of the Last Mile Service Area: Non-Rural
Service Status of the Last Mile Service Area: Served

If Service Status is "Underserved" please select at least one applicable option from this list.

Total Square Miles in Service Area: 3,794,101
Total Population in Proposed Service Area: 99,999,999
Total Number of Households in Service Area: 99,999,999

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Total Number of Businesses in Service Area: 25,409,525
Total Number of Community Anchor Institutions and Public Safety Entities in Proposed Funded Service Area: 200,000
 Unemployment Rate in the Service Area: 10
 Median Income in the Service Area: 52,000
Estimated Percentage of Households with Access to Broadband: 99
Estimated Percentage of Households Subscribing to Broadband: 64

F. Community Anchor Summary

Community Anchor Summary	
Schools (k-12)	132436
Libraries	17914
Medical and Healthcare Providers	58454
Public Safety Entities	6183
Community Colleges	1152
Public Housing	0
Other Institutions of Higher Education	2176
Other Community Support Organization	0
Other Government Facilities	0
TOTAL COMMUNITY ANCHOR INSTITUTIONS	218315
Historically Black colleges and Universities	105

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Tribal Colleges and Universities	36
Alaska Native Serving Institutions	0
Hispanic Serving Institutions	191
Native Hawaiian Serving Institutions	10
TOTAL MINORITY SERVING INSTITUTIONS	342

G. Project Benefits

Demographics

Jobs	
How many direct jobs-years will be created from this project?	337
How many indirect jobs will be created from this project?	337
How many jobs will be induced from this project?	378

Methodology used to estimate jobs:
The proposal uses the "Simple Rule for Estimating Job-Years Created by Government Spending" as specified in the "Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009" published by the Executive Office of the President Council of Economic Advisers.
Project Impact:
If funded, U.S. UCAN will have the most far-reaching impact of all CCI projects. It will, among other things, (i) allow comprehensive communities to be connected nationally and globally, rather than just locally; (ii) benefit orders of magnitude more community anchors than other CCI projects (benefitting more than 100,000 community anchors initially in comparison to other projects that benefit 100's of anchors); (iii) act as the glue for the BTOP program, and tie all other funded CCI projects together and thereby make each of those projects far more valuable to users; (iv) jump start the implementation of Recommendation 8.22 of the FCC's National

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Broadband Plan; (v) complement the activities of sustainable adoption programs; and (vi) incentivize build-outs in areas that do not receive BTOP funding.

Other funded CCI projects will provide local networks that will permit community anchors to use advanced broadband applications with nearby anchors but not with anchors throughout the nation. It is not sufficient that anchors have great connectivity to just anchors in the next county, as they need reliable connections to other anchors, resources and people in the next state, across the nation, and internationally. For the reasons discussed in the Level of Need section, commercial backbones are not a viable solution to this problem. If funded, U.S. UCAN is such a solution.

Internet2's and NLR's non-profit networks already permit more than 66,000 community anchors in the U.S. to connect to each other for advanced broadband applications. These networks, however, are in urgent need of significant upgrades and extensions requiring BTOP funding due to the ever-growing number of broadband users, the tremendous increase in the bandwidth needed for advanced applications, and because of BTOP itself, which will drive even further traffic to these national non-profit networks. This proposal would add 11,811 new, diverse 100 Gbps-capable route miles, and upgrades over 10,000 existing network route miles to 100 Gbps.

With such upgrades and extensions, U.S. UCAN will enable more than 100,000 community anchors initially, and eventually all or virtually all 200,000+ anchors, to use advanced broadband applications with other anchors throughout the country, rather than just locally.

When connected to U.S. UCAN, anchors will have access to seamless, coordinated high performance networking from end-to-end, from coast to coast, from continent to continent. They will be able to use, across the nation, advanced applications such as telepresence, telemedicine, distance learning and very large file transfer (in acceptable time frames). As a result, these communities will benefit from better education, globally-connected libraries, improved health care, and more effective public safety operations.

Indeed, rural hospitals need to use such advanced applications with the top hospitals in the country, not just nearby hospitals; public safety organizations during a national disaster must use such applications in communication with other such organizations across the nation; community colleges, universities and schools do not want to be limited to using such applications with only

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nearby educational facilities, and libraries' offerings will be far more valuable and diverse if they can communicate using such applications with other libraries across the nation.

By providing the interstate highway that links all of these BTOP projects together, this project makes each local BTOP project far more complete and valuable to its users.
Specifically, this project would tie together all anchor networks funded by BTOP, link them to 66,000 community anchors already connected to the non-profit networks operated by Internet2 and NLR, and provide a unique and cutting-edge national middle mile 100 Gbps interconnect optimized for advanced broadband applications. Such an advanced network would spur innovation, create jobs and economic growth, and deliver improved education, health care, and public safety services to the nation.

The U.S. UCAN national backbone will reach anchor institutions through our regional partner research and education networks, as well as other BTOP-funded anchor networks. For example, current partners for Internet2 and NLR include Merit in Michigan, MCNC in North Carolina, and I-Light in Indiana – all first round BTOP winners. The U.S. UCAN will allow high performance traffic to flow between these winners, nationwide, who are already connected to the network, but who also need this network to be upgraded.

We will also permit, at very reasonable costs, all other BTOP-funded anchor networks to connect to U.S. UCAN, as well as anchor networks (schools, libraries) operated by local governments and other non-profits. Anchor institutions will want to be connected to those networks, as they will receive immediate benefits from U.S. UCAN – high performance connectivity both nationally and internationally.

Thus, U.S. UCAN will immediately serve and benefit the 66,000 anchor institutions connected by our regional partners today, the 14,500 new anchor institutions which will be served by BTOP Round One grants announced as of March 11, 2010, and an estimated 30-50,000 additional anchors that will be connected by additional Round One and Two BTOP projects. Accordingly, by the time the BTOP projects come on-line, well over 100,000 anchor institutions will be connected through regional networks to U.S. UCAN and will have access over high performance networks to the world.

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

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approximately 45,000 to 65,000 more institutions 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). And, it is precisely this model of Internet2, NLR and the R&E community that the FCC stated in its National Broadband Plan (NBP) "should be expanded to other community institutions" and that doing so "would offer tremendous benefits." See Supplementary Materials.

In terms of people benefited by this project, based on the percentages of currently connected higher education and K12 schools alone, we estimate that the 66,000 currently-connected community anchors serve as many as 25 million people (50% of the 18 million students in higher education, 33% of the 48 million K12 students). When both rounds of BTOP projects are added to U.S. UCAN, the reach will extend to well over 50 million people, particularly when users of libraries, and employees and patients in hospitals are included.

Given that more than 100,000 community anchors will benefit immediately from U.S. UCAN (which are almost half of the community anchors in the U.S.), countless underserved and unserved consumers will also benefit from U.S. UCAN.

Moreover, by enabling advanced applications with nationwide connectivity in community colleges, schools, and libraries, U.S. UCAN will expose millions of Americans to new and productive uses of broadband, stimulating demand and broadband adoption. This project complements sustainable broadband adoption proposals of other applicants, as far more people will want to use broadband if its benefits are greater (and that will certainly be true if this project is funded, given the national connectivity that will then exist).

In addition, this project benefits both winning BTOP projects as well as areas that did not receive funding. It will create a solid foundation upon which more investment, more anchor connections, and more benefits to more people can be built. By gluing together the separate BTOP projects into a whole, this project will be a building block for more local investment even for BTOP applications that were not funded, as such projects will be more valuable if they are connected to non-profit networks that can support national (not just local) connections for the types of advanced broadband applications community anchors need.

The U.S. UCAN would benefit businesses and third party providers in comprehensive communities across the nation, as it would accept traffic from other BTOP anchor projects that

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provide connections or access to transport for business Internet traffic or even for consumer residential service in their communities. U.S.UCAN will abide by the interconnection requirements of BTOP.

U.S. UCAN will have broad impact everywhere in the United States. It does not compete with other BTOP projects. It completes them.

Vulnerable Populations:
Through this proposal, U.S. UCAN, in cooperation with its partner regional networks, seeks to offer services to all fifty states. From this perspective vulnerable populations should be fairly represented, however given UCAN's focus on bringing advanced opportunities to public sector institutions such as libraries and public schools, as apposed to focusing on residential and commercial broadband, funding this proposal will increase the quality of broadband access for those populations of lower income, as well as populations likely to receive Internet training and access in the context of a community facility such as a library.

Level of Need:
As discussed elsewhere in this application, community anchors need to use advanced broadband applications with other anchors throughout the nation, and not just with nearby institutions. The other BTOP projects receiving funds only ensure that community anchors can use advanced applications with nearby collaborators. To connect those BTOP "winners," and 66,000 other anchors to each other for reliable national connectivity for advanced broadband applications, this national-scope BTOP project needs to be funded. As discussed below, commercial backbones are not a viable alternative. In Recommendation 8.22 of the National Broadband Plan, the FCC stated that the model used by Internet2, NLR and the state and regional research and education networks to provide the kinds of advanced broadband applications that community anchors need -- should be expanded to include all anchors. For the past 15 years, state and regional networks (RONs), including several first round BTOP award winners such as Merit, MCNC, and I-Light, who directly connect to community anchors, use the Internet2 and NLR non-profit networks to ensure that the anchors these RONs reach can use advanced applications with each other throughout the nation. As to advanced broadband applications, with respect to each of the critical needs of community anchors discussed below, commercial networks cannot meet those needs; only the national non-profit networks can. U.S. UCAN involves an efficient means of providing such national connectivity, through upgrades of existing facilities and new dark fiber IRUs.

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1) NETWORKS OPTIMIZED TO SERVE COMMUNITY ANCHOR NEEDS, AND AVOIDANCE OF CONGESTION: Commercial backbones are not optimized for the use of advanced broadband applications by community anchors. Because of commercial providers' business models, their networks deliberately run near capacity, which ensures that they maximize profits. This, however, produces congestion, which in turn causes packet loss and increases jitter. Such problems often go unnoticed with respect to the type of applications that are at the core of commercial providers' business, namely e-mail and other applications that do not need to run over uncongested networks.

However, congestion, packet loss and jitter cause completely unreliable and unacceptable performance for community anchors that want to use advanced broadband applications. For example, a high definition two-way video conference (telepresence) will not work on a congested network. The screen "pixelates" when packets are dropped. The sound is not synchronized. This congestion matters: it is not enough to buy end-user video equipment; you need networks that actually support high definition video and massively large file transfers. Commercial networks also do not accommodate "bursty" applications, such as the transfer of very large medical files with images. By contrast, Internet2, NLR, and their regional partners have operated networks for years that ensure that bursty applications are as reliable as any other application. The U.S. UCAN built on these networks would continue this operational model. The number of broadband users is growing rapidly, while the amount of broadband consumption per user is also increasing at tremendous rates. The CTO of AT&T stated in 2009 that its backbone will need to be extensively upgraded (far quicker than ever before) just to meet the needs of AT&T's existing users, and he further added that there are limits to the amount of upgrades that are even possible. His comments demonstrate that commercial networks will have difficulty just keeping up with the needs of their core residential users in the years to come. AT&T's core users, of course, are not anchor institutions using advanced broadband applications. The gap between the requirements of community anchors that need to use advanced broadband applications, and the capabilities of commercial networks, is widening.

The national non-profit networks, conversely, focus on ensuring that community anchors can use advanced broadband applications with other anchors across the nation. Thus, given their core mission, Internet2 and NLR will use the BTOP funding to make certain that congestion, jitter, and packet loss will be non-issues with respect to these networks. The proposal will ensure a 100 Gbps IP backbone, with significant expansion capabilities for future growth, which will be sufficient to meet the national connectivity needs of community anchors with respect to advanced broadband applications.

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While some commercial carriers may offer advanced applications through one-off, proprietary solutions, such as a virtual private network for a medical link, these create so-called "walled gardens" that do not scale or provide cost efficiencies that non-profit community anchors require. These "dedicated network" solutions are extremely expensive to build and, at best, can only be used by a finite number of institutions thus impeding possible collaborations between many institutions, which directly undermines the needs of those institutions and the public in general.

2) TRANSPARENCY: Given the critical nature and time-sensitivity of many advanced broadband applications used by community anchors, network transparency is a necessity. A typical physical network path connecting one doctor to a remote colleague requires crossing several so called "administrative network domains," meaning the connection could include any number of commercial network providers. Each of these commercial providers do not share network performance data as they consider it competitive and proprietary information. Since a problem can occur on any one of these "network links" without transparency on the entire "end to end" path, it is very difficult to troubleshoot and fix any application problems. Without the ability to seamlessly troubleshoot and resolve these issues across networks, the advanced broadband application can be significantly hindered. The result is an unpredictable, frustrating experience for the doctors involved who would likely decide against adopting and using the technology in the future.

The national, regional and local non-profit networks, on the other hand, have a tradition of operating open networks in a collaborative fashion. These networks have also developed and deployed a suite of open-source network performance tools that optimize applications and trouble-shoot problems, especially across networks hops. The U.S. UCAN commits to operating under these same principles and will publish network statistics in near real time on publicly available websites. Problem resolution and problem avoidance are far more easily managed because the root of the problems can be immediately pinpointed by interested parties. Network problems are commonly prevented and quickly resolved when they do occur.

3) IPv6 AND MULTICAST: Anchor institutions need Internet Protocol version 6 (IPv6) and multicast capabilities that commercial Internet backbones today do not routinely deploy. These technologies make more efficient use of networks, enable more efficient video broadcasting and file transfer, and are essential to the growth and expansion of the Internet. U.S. UCAN will deploy IPv6 and multicast. Internet2 and NLR networks have operated with IPv6 since their

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inception. Very few commercial networks deploy IPv6 and multicast, and while both are extremely important the discussion here will focus on IPv6. The emerging Nationwide Health Information Network (NHIN) will need to support the huge proliferation of medical records among healthcare providers and enabling technology organizations. The model for transferring electronic medical records is peer-to-peer. As the IPv4-based Internet exhausts its supply of IPv4 addresses, more and more devices will lose their native IP addresses, and will be aggregated into shared IP addresses via the use of devices such as network address translation (NAT) gateways. This forced aggregation into shared addresses will dramatically increase the technical and operational challenges to ensuring that the NHIN can operate as planned. To ensure a sufficient number of unique IP address, thereby ensuring the flexibility of true peer-to-peer transfers in this area, requires the transition to IPv6 as IPv4 addresses are exhausted. The national non-profit networks that will underpin U.S. UCAN are IPv6 ready and, as a community, its members can provide the technical support and knowledge required for the widespread adoption and deployment of IPv6 during this major transition in Internet technology.

4) ADDITIONAL SUPPORT: Community anchors need more than just infrastructure to support their advanced broadband applications. Significant work must be done at the applications and services levels to make the deployment of advanced broadband to anchors meaningful. By way of examples only, (i) at the applications level, anchors often require expertise, demonstrations, help centers and engineers who can "tune" applications, sometimes with the intent of increasing the bandwidth available to an application to better serve the user, while not constraining it; and (ii) at the services level, the identity management software and inter-institution trust systems referred to as "middleware," and which allow users to use a single password to access protected resources and to collaborate among institutions, allow for far greater, and more efficient, collaboration and resource/idea sharing among users, while providing protection against unauthorized access. Unlike commercial networks, the national non-profit networks regularly engage in these types of application-related activities and are pioneers in developing and providing such middleware infrastructure.

One example of the needs this BTOP proposal aims to address comes from the current network path between a hospital in Indiana and a specialized health care facility in Texas. Both institutions have (last-mile) high-speed connectivity to their commercial Internet providers, but until and unless the U.S. UCAN becomes a reality, they cannot reliably use advanced broadband applications with each other. Several fundamental problems prevent the two health care facilities today from using their high-speed Internet connections to improve patient care. Their current

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commercial service providers do not cooperate to ensure reliable end-to-end service, nor do they do optimize their networks and operations to support advanced applications. The round trip time via the Internet for a packet traveling from the one location to the other is approximately 40 ms. If there was a packet loss of 1% along the path, transfers of files would be limited to less than .4 Mb/s, regardless of the network bandwidth. This means that it would take 3 hours to transfer a 500MB MRI study compared to less than a minute with no packet loss and only a 100Mb/s network connection. A consulting physician is unlikely to want to wait 3 hours to be able to view such a file especially in a life or death ER situation. A 1% packet loss rate is not rare for commercial networks. When it does occur in the commercial world, engaging a local ISP to troubleshoot such a problem would be a challenge. A user needing to coordinate and engage four or five networks along the path to coordinate a remedy is almost unthinkable. U.S. UCAN is far less likely to have any packet loss, and in those rare instances when it does, it will have a common network operations center that understands how such impairments can dramatically impact the performance of critical applications, and has existing relationships with last mile providers of U.S. UCAN to coordinate troubleshooting and problem resolution.

There is no comparable commercial Internet backbone service available today that offers what U.S. UCAN will offer to anchors nationwide. If BTOP is to realize its full vision, this project is essential.

H. Technology

Technology Type

Indicate the technology that will be used to deliver last mile services. The following items were selected:

Wireline - Fiber-optic Cable

Other:

Technology Questions

Methodology for Area Status:

➢ None of the service areas in this proposal are classified as unserved or underserved.

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Description of Network Openness:

Within the limitations of the underlying facilities acceptable use policies (see supplemental information), the middle mile infrastructure funded through this proposal will provide public Internet access on equal terms to all potential users, within reasonable business and technical limits. The proposal also offers a peering service designed to directly interconnect UCAN users with peers on the public Internet. A managed network service interconnecting Unified Community Anchor Network members will also be available.

Users of the network will be able to select and contract with any ISP of their choosing for transport across the middle mile infrastructure. Through open cross-connects to providers, users will be able to leverage the access points on the middle mile infrastructure at key Internet exchange points and other carrier facilities to access the provider of their choice.

Access capacity to the public Internet, and the peering service, will operate in a transparent fashion. All management practices, including those that have the potential to impact network performance, will be published on the UCAN web site. In addition, customer visibility into the real-time operations of network elements will be made available via a secure web interface (this is a practice that Internet2 has pioneered and will extend to all of the network funded by this proposal).

Access to the peering service, for the purpose of interconnecting with UCAN, will be offered on a non-discriminatory basis (typically using a settlement-free model). Networks seeking access to UCAN via the peering service will be required to meet reasonable peering requirements (i.e., multiple common locations, reasonable speeds, etc.).

Access to the UCAN managed service will be limited to community anchor institutions.

Real-time access to operations data will include the ability to run non-disruptive commands on the network devices that comprise UCAN, the peering service, and access to the public Internet. This access will be publicly available. This level of transparency is a key to enabling the successful cross-domain deployment of advanced network applications. If a network impairment is suspected, the operators of a regional network are empowered to see under the covers of UCAN to determine its health and performance.

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Beyond being transparent in operations, UCAN will be instrumented with Internet2 Performance Nodes. These performance nodes actively test the network to determine end-to-end performance, as well as serving as a test point to aid network operators in identifying the source of network impairments. Data collected by the performance nodes will be availably to all users of UCAN as well as network researchers and industry worldwide. UCAN's performance nodes will join an existing global deployment of approximately 200 additional nodes, providing network operators and researchers access to performance data beyond UCAN.

System Design:

As a step toward meeting the longer-term needs of the community anchor tenant institutions, and the regional networks that those institutions may connect to, U.S. UCAN proposes the following 3 components for funding under the BTOP program:

·   A community-owned 20-year IRU on a pair of fiber on a national footprint.
·   A fully resilient optical system to provide the community with 100Gbps DWDM capabilities
·   A resilient routed IP service that sits atop the optical system

The proposed network is fiber-based to support the high volume of aggregated network traffic flowing between the regional networks and the community anchor institutions.

Fiber Acquisition

Securing long-term fiber IRUs helps provide a long-term asset that can be efficiently leveraged toward future capacity upgrades in support of community anchor traffic growth. U.S. UCAN has surveyed the regional connectors who provide service to community anchor institutions and identified nation-wide fiber routes that will augment their connectivity and enhance their capability to provide advanced services. U.S. UCAN will have access to 20-year IRUs for fiber from both Allied Fiber and Level(3) Communications along the routes detailed in the provided network maps. In addition, U.S. UCAN will leverage the existing IRU on the current NLR fiber footprint to provide long term resilient fiber paths on a significant portion of the national footprint.

Optical Network

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The U.S. UCAN optical system will provide a highly reliable and redundant Dense Wavelength Division Multiplexing (DWDM) optical platform that will allow for rapid and flexible service provisioning to the U.S. UCAN community. The system will support multiple 10Gbps, 40Gbps and 100Gbps wavelengths along most of the nationwide footprint. In addition to diversity at the fiber level, the U.S. UCAN network will provide DWDM services atop the fiber on diverse and resilient optical systems along most of the project footprint. The U.S. UCAN partners also propose to upgrade the Northern Tier Network between Chicago and Seattle to provide increased wavelength capacity and 100Gbps capability. New fiber acquisitions will be equipped with optical equipment that will provide both regional and nation-wide redundancy.

U.S. UCAN has surveyed a number of optical vendors, and has elected to partner with Infinera, Ciena, and Cisco Systems to provide a concrete design for newly acquired fiber paths. This design has informed the project budget, but it is understood that U.S. UCAN will go through a formal procurement process in order to leverage changes in cost or capabilities.

IP Network

U.S. UCAN will provide access to two fully redundant nation-wide IP networks. U.S. UCAN partners Internet2 and National Lambda Rail will contribute their backbone IP routers to the project build and fund platform upgrades that will enable 100Gbps routed service. In addition, both networks will be augmented by additional Layer3 nodes at strategic locations across the national footprint. Regional networks will aggregate Community Anchor Institutions and have the option of peering with one or both IP networks to obtain redundancy. Having diverse service providers on diverse routing platforms provides an incredible amount of resiliency to the Community Anchor Institution community.

U.S. UCAN will provide Commodity Internet service to its participants via L2VPN transport to one or more Commercial ISP(s). In addition, the U.S. UCAN network will provide a commercial peering service functionality. This will allow the U.S. UCAN community to realize the cost-benefits of settlement free peering arrangements on a national-scale. To accomplish this, U.S. UCAN will place six new routers at Commercial Internet exchange points across the country with the express purpose of obtaining settlement free interconnect with commercial peers. U.S. UCAN will provide L2VPN transport between the Community Anchor regional networks and the peering service routers.

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With the expected rapid rate of broadband adoption, U.S. UCAN's middle-mile infrastructure is well-positioned to add capacity and capability. As broadband bandwidth usage grows, pushing the limits of the initial build, the deployed infrastructure will be ready to support additional wavelengths to meet the increased demand.

Is the applicant seeking a waiver pursuant to section IX.C of the NOFA so as to sell or lease portions of the award-funded broadband facilities during their life?

No

I. Project Budget

Project Budget		
	Federal Grant Request	Match
Last Mile	0	0
Middle Mile	62,540,162	34,253,445
Total	62,540,162	34,253,445

Project Budget Total: $96,793,607

Match Percent: 35.4%

Projects Outside Recommended Funding Range:

➢ The project's budget is well within the funding range so there is no variance involved.

Outside Leverage	
Applicant is providing matching funds of at least 20% towards the total eligible project costs?	Yes
Matching cost detail	Internet2 is providing ███████████████████████████ as a grant match for use as infrastructure. Key financing terms and conditions: Of the ████████████████ will be funded from net cash from operations. The rest has no terms or conditions. Internet2 is providing ███████████████████████ as a grant match

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for use as working capital (pre-award expenses), with no terms or conditions. Internet2 is providing ███████ as an in-kind contribution ████████████████ for equipment for infrastructure. This qualifies as an eligible cost under BTOP eligible cost rules because it is capital equipment. Internet2 will share in revenues that result from providing these capabilities to U.S. UCAN in proportion to its contribution to establishing this network facility.

NLR is providing ████████ in cash █████████████ as a grant match for use as infrastructure. Key financing terms and conditions: Of the ████████████████ will be funded from net cash from operations. The rest has no terms or conditions. NLR is providing ██████████████████████ as a grant match for use as working capital (pre-award expenses), with no terms or conditions. NLR is providing ██████████ as an in-kind contribution ████████████████ for equipment for infrastructure. This qualifies as an eligible cost under BTOP eligible cost rules because it is capital equipment. NLR will share in revenues that result from providing these capabilities to U.S. UCAN in proportion to its contribution to establishing this network facility.

NTNC is providing █████████ as an in-kind contribution ████████████ for equipment for infrastructure. This qualifies as an eligible cost under BTOP eligible cost rules because it is capital equipment. The NTNC benefits from expanding the network to include 100Gbps waves and to close it into a ring.

Ciena is providing ████████████████████████ as a grant match for use as infrastructure. Ciena has been selected to provide equipment for specific sections of the U.S. UCAN infrastructure.

Cisco is providing ██████████████████████████ as a grant match for use as infrastructure. Cisco has been selected to provide equipment for specific sections of the U.S. UCAN

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	infrastructure. Infinera is providing ███████████████████████████ as a grant match for use as infrastructure. Infinera has been selected to provide equipment for specific sections of the U.S. UCAN infrastructure. Juniper is providing ███████████████████████ as a grant match for use as infrastructure. Juniper has been selected to provide equipment for specific sections of the U.S. UCAN infrastructure.
Unjust enrichment	The U.S. UCAN project is not receiving and has not applied for any Federal support for non-recurring costs in the area for which it is seeking an award.
Disclosure of federal and/or state funding sources	No other federal or state funding sources are involved in the support of the U.S. UCAN project, nor are any such funds involved in any related activities or projects.
Budget reasonableness	Internet2 and NLR are proposing a national network to interconnect the NTIA BTOP funded networks from Rounds 1 and 2, creating an infrastructure to meet the national backbone needs of over 200,000 Community Anchor Institutions (CAIs) that will result in a cohesive facility that increases access to high-speed connectivity and expands network capabilities, thereby enhancing the value of those investments. The network is projected to cost approximately $96,793,607 that will include $34,253,445 in matching funds comprised of cash and In-kind or 35.39% of the total requested grant amount. The network will be cost-effectively deployed on existing fiber paths or on paths scheduled for completion within the next six months, which will eliminate the need for design, acquisition, construction, and permitting expenses and delays. Internet2 and NLR have worked diligently to gain the best pricing on fiber-optic cable IRUs, contacting a range of vendors and arriving at IRU pricing that reflects a minimum discount of ███ as compared to the normal fiber IRU market. Similarly, networking equipment has been negotiated to discount levels of more than ███ off list price, across all vendors. Through this project, U.S. UCAN is positioned to provide a cohesive

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	national facility that supports advanced services (e.g., IPv6 and multicast) and high-bandwidth capabilities that could be delivered to the CAIs at reasonable cost. Both NLR and Internet2 have extensive experience in building advanced national backbone networks, as well as operating them within a sustainable business model. Based on estimates the project should be cash flow positive after the first year. This positive cash flow from the project will continue as the project grows through the out years. As the project participation grows, the cash flow will be sufficient not only to sustain operations for the first eight years; it will allow for the prudent accumulation of cash reserves required at the end of that period to replace the then end-of-life networking equipment. Additionally, the combination of the projected levels of operating revenues and operating expenses will allow the project to build enough cash reserves to take advantage of any significant technological advancement, prior to the end of the initial eight year term.
Demonstration of need	This project will not be implemented without Federal assistance because the Research and Education community lacks sufficient funds to build a network of this size that could accommodate the remaining anchor institutions. Under current operations of Internet2 and NLR, cash available for capital improvements ▇▇▇▇▇▇▇▇▇▇) is only sufficient for replacement and incremental growth within a limited size community of anchor institutions. From a revenue generation standpoint, this is a sustaining model, rather than a growth model. Growth to connect a majority of the CAIs requires a capital investment to extend advanced services to a nationwide footprint to the state and regional areas that have already or will benefit from BTOP capital infusions. By connecting nationwide, the advanced services become available end-to-end with capacity sufficient to support new participants. BTOP funding allows anchor institutions to receive the advance services they require on a national basis and provides a long-term sustainable business model. The particular level of Federal assistance requested is appropriate

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because it represents the minimum amount of capital investment necessary to expand the capacity of the nation-wide backbone and to connect the states and regions at consistently higher speeds. The net present value over the 8-year projections for the project assumes a 9% discount rate and generates a positive result of ▇▇▇▇▇▇▇ The discount rate of 9% provides a reasonable return on investment when compared to alternative investments in today's market. The project accumulates sufficient funds to replenish and update the network. The level of requested investment and the resultant rate of return help to ensure the technical adaptability and financial sustainability of the project.

Internet2 and NLR separately applied to the National Science Foundation ARI-R2 solicitation for $10 million each to upgrade portions of their national networks to 100 Gbps. Although both proposals scored very highly, the NSF was unable to fund either national network project. There is no other national funding source, other than the Internet2 and NLR existing membership structures, to build a national, non-profit high-speed network of this scale. The historical financial data reflects that the applicant, for example, only generates a little more than ▇▇▇▇▇▇▇ in free cash for capital improvement on an annual basis. Though sufficient for providing cash match on a project of this magnitude, it's not sufficient for the project by itself.

A project of this scope and magnitude attracts the interest of private corporate partners allowing sufficient scale for those partners to make the levels of discounts and cash matches available that would not otherwise be available on smaller projects.

Funds to States/Territories

States	Amount of Federal Grant Request
Arizona	1,622,894

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Arkansas	339,814
California	6,290,884
Colorado	1,629,861
Connecticut	402,207
Delaware	82,733
District of Columbia	223,016
Florida	3,649,151
Georgia	2,560,830
Alabama	598,694
Idaho	269,956
Illinois	3,932,438
Indiana	844,183
Iowa	382,767
Kansas	413,194
Kentucky	500,000
Louisiana	1,296,123
Maine	153,107
Maryland	624,787
Massachusetts	1,822,861
Michigan	1,148,301

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Minnesota	612,427
Mississippi	333,634
Missouri	1,799,648
Montana	76,533
Nebraska	229,660
Nevada	279,220
New Hampshire	153,107
New Jersey	1,049,197
New Mexico	463,358
New York	4,154,534
North Carolina	1,194,303
North Dakota	76,553
Ohio	3,294,543
Oklahoma	545,576
Oregon	738,336
Pennsylvania	2,872,483
Rhode Island	160,187
South Carolina	473,480
South Dakota	76,553
Tennessee	1,842,308
Texas	7,054,186

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Utah	1,318,187
Vermont	76,553
Virginia	1,920,717
Washington	1,745,128
West Virginia	229,660
Wisconsin	612,477
Wyoming	140,153
Alaska	76,553
Hawaii	153,107
Not Applicable	

Funds to States/Territories Total: $62,540,162

J. Historical Financials

Matching Funds			
	2007	2008	2009
Revenue	29,442,477	31,724,904	34,425,316
Expenditures	38,121,814	38,781,531	37,882,580
Net Assets	23,533,518	17,157,051	14,247,859
Change in Net Assets from Prior Year	-6,857,940	-6,376,466	-2,909,192
Bond Rating (if applicable)	N/A	N/A	N/A

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K. Project Readiness

BTOP Organizational Readiness

The U.S. UCAN project is a partnership between Internet2 and NLR, with Internet2 as the submitting organization. Both organizations have a Board of Trustees or Steering Committee providing strategic direction, leadership and oversight for the organization. Advisory councils assist in setting organizational priorities, ensuring that they continue to meet the needs of the R&E community. Since 1997, Internet2 has successfully implemented, managed and operated a national network serving the R&E community, encompassing everything from network build out (including several network upgrades) to daily management, invoicing, billing, customer support and member relations, and good management and stewardship of its members' dues to deliver a premier national network. The Internet2 Network has a dedicated management, operations, and accounting team responsible for the business and operational aspects of the network including business tasks (contract management, invoicing, accounts receivable and payable, maintenance agreements, and membership/network participation agreements); operation of the high-speed hybrid network infrastructure (connection policy, pricing decisions, prefix acceptances, and monitoring network hardware and performance); management of subcontractors and vendors (IU NOC, equipment vendors, service providers, corporate partners); and providing infrastructure for a national commodity peering fabric for the delivery of advanced content. The CEO is responsible for all day-to-day operations, including 80+ staff, contractors, and assigned personnel. The 2009 operating budget exceeded $35 million. It has been the recipient of federal grants and received unqualified ("clean") audit opinions for all of the years in which A-133 Government audits have been required including the most recent year ending 12/31/09. Internet2 is experienced in on-time delivery of national projects of similar scale. NLR's nationwide high-performance network infrastructure provides unrestricted usage and bandwidth, advanced network services and applications and customized support for researchers. Its capabilities and assets are complementary to those provided by Internet2, who was an initial investor in NLR helping to establish NLR's capabilities and business practices. A coordinating technical team led by the Internet2 Executive Director of Network Services, including the NLR Director of Engineering and Operations, Chair of the NTNC Technical Committee, and IU Director of Global Research NOC Engineering will be responsible for managing the build-out and operation of their respective network components and coordination. Internet2 will be responsible for the coordination between the partnering organizations required to achieve the unified project goals.

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Initially, Internet2 will handle billing and customer care of the new network. As U.S. UCAN is established, Internet2 will work to transfer billing and customer care into that framework.

Construction and Vendor Contracts

Contractors and vendors will be used to deploy network assets to support the proposed network. Internet2 and NLR have solicited several bids from relevant vendors and contractors for installation of networking equipment and for access to fiber optic cable IRUs. Internet2 and NLR have requested and received statements from the vendors that they will honor the provided pricing if the project is awarded. These commitments are either in the form of written statements on the offers themselves or separate written letters. No new construction projects will need to be initiated to implement the network. There are two primary fiber vendors that are under consideration for providing the fiber infrastructure. There have been discussions with three additional fiber vendors though they are only considered as optional at this point. The router equipment is coming from a Cisco and Juniper. The optical equipment is coming from Cisco, Infinera, Ciena, and possibly other vendors to be determined. Physical deployment of networking equipment would be managed by either one of the fiber vendors or one of the networking equipment vendors. Internet2 and NLR also have the capability to do their own deployment if needed. Pricing has been secured for the deployments from each of the vendors. The total number of vendors is projected to be six.

Customer Base

Internet2 (the applicant) and NLR (key partner) provide advanced broadband services to over 66,000 community anchor institutions through partnerships with over 20 regional networks (i.e., last mile providers). Included among the 66,000 anchor institutions currently being served by Internet2 and NLR are the leading 214 U.S. research universities, over 400 community colleges, and tens of thousands of K-12 schools. In addition to the existing research and education-related anchors, these networks serve many healthcare facilities, including Mayo Clinic, MD Anderson Cancer Center, and the Veterans Administration. Many more healthcare facilities are in the process of building FCC-funded rural healthcare networks that will interconnect using the NLR and Internet2 backbones. Both the Internet2 and NLR backbones offer their last mile providers, typically organizations focused on providing advanced networking to research and education users, with the flexibility to support a wide variety of user types. In some regions these last mile providers extend the service of Internet2 and NLR to local government, libraries, and public

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safety agencies. Internet2 and NLR also serve the research networking requirements of large for-profit companies including Microsoft and Cisco Systems.

Licenses, Regulatory Approvals and Agreements

Internet2 and NLR currently have agreements for long haul and metropolitan fiber leases and networking equipment purchase from vendors, predicated on an award for the proposed network. NLR and Internet2 currently operate national networks that serve a representative subset of the CAIs across the national. No additional regulatory approvals will be required to operate the proposed network. The vast majority of the proposed fiber footprint is already constructed and would not be subject to further permitting or review. New fiber segments (i.e. the northern route from Chicago to Seattle which is scheduled to be completed by mid-2013) will be purchased from an established vendor that does not anticipate any challenges in obtaining the permitting they require for this route.

SPIN Number

Internet2's FCC Universal Service Fund Service Provider Identification Number (SPIN) is 143032410.

L. Environmental Questionnaire

Project Description

Through this project, the deployment of U.S. UCAN will involve the addition of equipment in approximately 450 pre-existing sites across the continental United States. All sites are pre-existing telecommunication facilities. The addition of equipment at these sites is not a material alteration of any of the facilities. No permit or licensees are required for the equipment installation.

Property Changes

There will be no changes to the properties.

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Buildings

No buildings will be constructed or changed through this project.

Wetlands

No sites will be affected by construction through this project.

Critical Habitats

No counties will be affected by construction through this project. The project will have no impact on critical habitats.

Floodplain

No project-related construction is within any floodplain.

Protected Land

We are unaware of any site being located in protected land.

Coastal Area

We are unaware of any site being located in a Coastal Area.

Brownfield

We are unaware of any site being located in a Brownfield.

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Uploads

The following pages contain the following uploads provided by the applicant:

Upload Name	File Name	Uploaded By	Uploaded Date
Service Offerings and Competitor Data	UCAN Service Offerings and Competitor Data Attachment.xls	Tannenbaum, Nili	03/22/2010
Network Diagram	UCAN Network DIAGRAMS FINAL 032410.pdf	Tannenbaum, Nili	03/24/2010
Build Out Timeline	UCAN Build out timeline FINAL 032410.pdf	Tannenbaum, Nili	03/24/2010
List of Community Anchors and Points of Interest	UCAN CCI Anchor-POI data FINAL.xls	Tannenbaum, Nili	03/23/2010
Management Team Resumes and Organization Chart	UCAN Resumes and Org Chart FINAL 032410.pdf	Tannenbaum, Nili	03/24/2010
Government and Key Partnerships	UCAN Letters of Commitment.pdf	Tannenbaum, Nili	03/25/2010
Historical Financial Statements	UCAN Historical Financials Upload.pdf	Tannenbaum, Nili	03/11/2010

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Budget Narrative	UCAN Budget Narrative FINAL 032510 A.pdf	Tannenbaum, Nili	03/25/2010
Detailed Budget	UCAN CCI Detailed Budget FINAL 032510.xls	Tannenbaum, Nili	03/25/2010
Pro-forma Forecast	UCAN Pro Forma Financial Projections FINAL 032510.xls	Tannenbaum, Nili	03/25/2010
Subscriber Estimates	UCAN CCI Subscriber Estimates Attachment.xls	Tannenbaum, Nili	03/19/2010
Dashboard Metrics	UCAN Key Metrics Dashboard FINAL A 032510.doc	Tannenbaum, Nili	03/25/2010
Service Area Data	UCAN CCI Service Areas Attachment FINAL.xls	Tannenbaum, Nili	03/22/2010
Waivers	UCAN Waiver and FCC FINAL 032510.pdf	Tannenbaum, Nili	03/25/2010
Network Maps	UCAN Network MAP FINAL A 032410.pdf	Tannenbaum, Nili	03/24/2010
BTOP Certifications	UCAN certifications.pdf	Tannenbaum, Nili	03/24/2010
SF-424 C and D	UCAN SF424 C&D	Tannenbaum, Nili	03/25/2010

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	FINAL A 032510 .pdf		
Supplemental Information	UCAN SUPPLEMENTAL MATERIALS.doc	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN FCC National BB Plan - Excerpts.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN Internet2 NSF IDC Rate2 July 08.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN Supplement service area.doc	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN stateregnet1 LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN stateregnet2 LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN state and regional 3 LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN stateregnet4 FINAL LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN universities LoS.pdf	Tannenbaum, Nili	03/24/2010

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Supplemental Information	UCAN non-profits LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN commcoll LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN health support letters LoS.pdf	Tannenbaum, Nili	03/24/2010
Supplemental Information	UCAN other network org LoS.pdf	Tannenbaum, Nili	03/24/2010