In the Matters of

International Comparison and Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137

REPLY COMMENTS OF U.S. R&E NETWORKS AND HIMSS
NBP PUBLIC NOTICE # 30

The U.S. R&E Networks and HIMSS

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REPLY COMMENTS OF U.S. R&E NETWORKS AND HIMSS
NBP PUBLIC NOTICE # 30

Internet2 together with other national partners, National Lambda Rail ("NLR"), the Quilt, Statenets, and regional and state networks including 3ROX, CENIC, Florida Lambda Rail, Great Plains Network, i-Light, Kan-Ed, Kentucky Regional Optical Network, LEARN, LONI, MAGPI, MCNC, Mid Atlantic Crossroads, MOREnet, NEREN, NYSERNet, OARnet, OSHEAN, Pacific Northwest Gigapop, UEN, University of Memphis, University of Utah, University of Wisconsin Milwaukee and Wiscnet (collectively, the "U.S. R&E Networks"),[1]

[1] In addition to Internet2 which is a national R&E membership organization and NLR and Internet2 who both provide national research and education networks ("R&E networks"), the Quilt is a coalition of 30 advanced regional network organizations, and StateNets provides a national forum for collaboration among individual state networks. Internet2 and NLR and their partner organizations provide middle-mile and last-mile services in 36 states: 3ROX (Pennsylvania, West

and the Healthcare Information and Management Systems Society ("HIMSS")[2] hereby submit these reply comments in the above captioned proceeding.

INTRODUCTION AND SUMMARY

In this proceeding, many parties have commented on issues relating to the provision of broadband service to community anchors, and how best to overcome the hurdles in this area. These Reply Comments of the U.S. R&E Networks and HIMSS seek to address those issues in a manner that would greatly benefit both community anchors nationwide as well as all Americans. Ensuring high capacity broadband to community anchors will (i) ensure that these institutions have the capacity they need to fulfill their missions; (ii) help stimulate the demand for broadband; and (iii) promote jobs and boost the economy.

The broadband needs of community anchors differ significantly from that of residential users, and there is a market failure with regard to the provision of high capacity broadband to community anchors. The best means of addressing this market failure and ensuring that community anchors needs are met with respect to broadband service is for there to be a "Unified Community Anchor Network" ("UCAN") from which all community anchors who wish can receive

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Virginia), CENIC (California, Arizona and Nevada), Florida Lambda Rail (Florida), Great Plains Network (Oklahoma, South Dakota, Kansas, Missouri, Nebraska, Arkansas), i-Light (Indiana), Kan- Ed (Kansas), Kentucky Regional Optical Network (Kentucky), LEARN (Texas), LONI (Louisiana), MAGPI (Pennsylvania, Delaware, New Jersey), MCNC (North Carolina), Mid Atlantic Crossroads (DC, Virginia, and Maryland), MOREnet (Missouri), NEREN (Connecticut, Maine, New Hampshire, New York, Rhode Island, Vermont), NYSERNet (New York), OARnet (Ohio), OSHEAN (Rhode Island), Pacific Northwest Gigapop, (Alaska, Hawaii, Washington, Idaho, Montana), UEN (Utah), University of Memphis (Tennessee), University of Utah (Utah), University of Wisconsin Milwaukee (Wisconsin) and Wiscnet (Wisconsin).

[2] HIMSS focuses on providing global leadership for the optimal use of health care information technology and management systems. HIMSS represents more than 23,000 individual members and over 380 corporate members.

high capacity broadband service and collaborate and share information and resources with each other.

The Research and Education Community (the "R&E Community" or "Community"), which is comprised of the national research and education networks operating in collaboration with the regional and state research and education networks, should lead the management and operation of the UCAN, in partnership with sophisticated partners who have expertise in other pertinent fields. The R&E Community already serves a tremendous number of community anchors. Moreover, just as the existing research and education networks R&E networks have built their capabilities using public/private partnerships, the UCAN would as well.

In short, a UCAN does not need to be created – it needs to be completed. For a UCAN to become a reality, many regional operating networks, which are part of the R&E Community, as well as national networks such as Internet2 and NLR, would need to extend their networks and in many instances would also need upgrades to the network.

The R&E Community has the expertise, in terms of innovation, technology and collaboration needed to turn the goal of a UCAN into a reality. Another factor that makes the R&E Community the most appropriate group to operate and manage the UCAN is the Community's ever-increasing scope of involvement with a wide variety of community anchors. The R&E Community has expanded its reach in large part through partnering with entities in other fields that have the necessary expertise, such as HIMSS.

The R&E Community is also the proper group to lead the effort here because community anchors nationwide need more than just infrastructure. They need support for applications, services, and education/training, which the R&E Community currently provides for its community anchors today and can provide for other community anchors tomorrow.

By permitting the R&E Community to take this lead role two additional and extremely important benefits will accrue: (i) the UCAN will also operate as a test bed for new applications and technologies that will be developed and will then be made available to all Americans; and (ii) the UCAN will be utilized to further numerous scientific endeavors in which the United States is involved, both domestically and internationally, that will also fundamentally change our lives for the better.

For a UCAN to be successfully completed and operated, it is critical that the National Broadband Plan support this endeavor and provide recommendations regarding the next steps. The National Broadband Plan should recommend that the UCAN be managed and operated via a state UCAN Coordinator for each state and one National UCAN Coordinator.

For all of the reasons discussed above, the R&E Community should take the lead with respect to the UCAN. For that to occur seamlessly, without undue delay or expense, and without creating additional layers of bureaucracy or forming new unnecessary entities, (i) in each state in which there is a state or regional optical network that is a member of the R&E Community, that entity should be the State UCAN Coordinator; and (ii) in each state in which there is no

such entity, the State UCAN Coordinator should be the non-profit entity or university most closely working with, and aligned with, the R&E Community as determined by the Community. If the federal government has the power to ensure that such entities become the State UCAN Coordinators, it should do so. If not, the Commission should strongly recommend that such entities become the State UCAN Coordinators. Each State UCAN Coordinator would, among other things, represent the interests, and guide the activities, of its State UCAN Consortium. A State UCAN Consortium would be comprised of all community anchors in that state that wish to utilize the UCAN.

The National UCAN Coordinator would be a non-profit entity with substantial hands-on prior experience with respect to the deployment and operation of nationwide R&E middle mile backbone networks. The National UCAN Coordinator would, among other things, be responsible for seeking to manage and secure sufficient national backbone capacity to support interstate and international transmissions through the UCAN between and among community anchors, content providers, Internet providers and other similar networks throughout the world. The National UCAN Coordinator would also be generally responsible for coordinating the activities of the State UCAN Coordinators to ensure that nationwide benefits flow from the UCAN, in a manner consistent with the principals of the National Broadband Plan.

The successful completion and operation of a UCAN is dependent upon proper funding and administration. The National Broadband Plan should recommend that all potential funding mechanisms be explored by Congress and

the States to ensure the development of a UCAN. In addition, the National Broadband Plan should recommend that appropriate governmental agencies assist in the funding of this effort, or find ways to partner with it, as it will support their missions to fund connectivity for their constituencies.

Another potential route for funding, at least in part, would be through the e-rate program. Modification of the e-rate program in many respects could greatly advance the creation of a UCAN both in terms of funding and administration.

The successful completion and operation of a UCAN would also benefit from, among other things, (i) preemption of state laws or prohibitions that preclude networks serving certain types of community anchors from also serving other types of anchors, thereby forcing the creation of more networks than are necessary; (ii) removal by the federal government of its similar stove pipes; (iii) modifications to the Rural Health Care Pilot Program; (iv) predictable pole attachment, conduit and rights-of-way policy; and (v) the provision of incentives to incumbent carriers to support the completion of a UCAN.

DISCUSSION

I. Community Anchors Require Access to High-Capacity Broadband that Meets their Needs, and the Scope of their Needs are Vastly Different than that of Residential Users

A. Community Anchors Require Access to High Capacity Broadband that Meets their Needs

Community anchors are located in essentially every community in every state in this country. They consist of schools, community colleges and other institutions of higher learning, libraries, health care facilities, public safety entities, public media and other community support organizations. Congress, the National Telecommunications and Information Administration ("NTIA") and the Commission have each recognized that it is vitally important that community anchors have access to the type of broadband connections required to support the applications they need.

In fact, three of the five purposes of the Broadband Technology Opportunities Program ("BTOP"), which is part of the American Recovery & Reinvestment Act (the "ARRA") enacted by Congress,[3] relate directly to the goal of ensuring sufficient broadband access for community anchors. Those three purposes of BTOP are as follows:

- To provide broadband education, awareness, training, access, equipment, and support to … schools, libraries, medical and healthcare providers, community colleges and other institutions of higher learning, and other community support organizations …;

[3] Pub. L. 111-5, 123 Stat. 115 (2009) ("ARRA").

- To improve access to, and use of, broadband service by public safety agencies; and

- To stimulate the demand for broadband, economic growth, and job creation.[4]

While the first two purposes referenced above expressly relate to the provision of broadband to community anchors, the third purpose implicitly does as well. As discussed in more detail below, community anchors stimulate the demand for broadband, which enhances economic growth and job creation.

Like Congress, NTIA clearly recognizes the importance of providing high speed broadband to community anchors to meet their needs. Earlier this month, NTIA announced that for the second round of BTOP funding it will focus its infrastructure grants on projects that emphasize new or substantially upgraded connections to community anchors. NTIA found that by adopting an approach of focusing on broadband to community anchors, it will "maximize the benefits of BTOP funds."[5] In justifying its actions, NTIA discussed the tremendous benefits of seeking to ensure that community anchors have access to the broadband applications they require:

> The 'comprehensive communities' approach, with its focus on the deployment of Middle Mile broadband facilities and the provision of new or substantially upgraded connections to community anchor institutions as its centerpiece, will provide a number of benefits to the public and taxpayers. 'Comprehensive communities' projects can leverage resources and better ensure sustainable community growth and prosperity. These projects also can create consumer demand and lay the foundation for the ultimate provision of reasonably priced end-user broadband services in unserved and underserved communities. Open and nondiscriminatory

[4] 47 U.S.C. § 1305 (b) (3) (A), (4) and (5).
[5] National Telecomms. & Info. Admin., Notice of Funds Availability & Solicitation of Applications, 75 Fed. Reg. 3792, 3794 (Jan. 22, 2010) ("Second NTIA NOFA").

> [comprehensive communities] projects funded by BTOP will enable other service providers to serve the community. Once Middle Mile facilities are built, the costs of providing services to a broad array of end users are reduced. Much like the interstate highways that link together the nation's roads and streets, Middle Mile broadband facilities play a critical role in the healthy functioning of the nation's broadband infrastructure and are a necessary foundation for the ultimate provision of affordable end-user broadband services in unserved and underserved communities.
>
> Expanding Middle Mile broadband service ... also increases the effectiveness of community anchor institutions in fulfilling their missions. Schools, libraries, colleges and universities, medical and healthcare providers, public safety entities, and other community support organizations increasingly rely on high-speed Internet connectivity to serve their constituencies and their communities. Expanding broadband capabilities for community anchor institutions will result in substantial benefits for the entire community, delivering improved education, healthcare, and economic development.
>
> [Comprehensive communities] projects are also job-intensive and pave the way for a ripple effect of economic development throughout the communities they touch. Focusing the awards in this funding round on [comprehensive communities] projects that provide high-speed Middle Mile networks to connect community anchor institutions, including community colleges, or benefit consumers residing in unserved or underserved areas will maximize the benefits of Recovery Act dollars and lay a foundation for economic development for years to come.[6]

The Commission has also recognized the importance of ensuring high capacity broadband to community anchors. Late last year it issued a public notice in this proceeding seeking comments regarding costs estimates for connecting

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[6] *Id.* at 3795. (footnotes omitted) In addition, as NTIA and the Rural Utilities Service correctly recognize, "[e]nsuring that anchor institutions, such as community colleges, schools, libraries, health care facilities, and public safety organizations, have high-speed connectivity to the Internet can contribute to sustainable community growth and prosperity. Such projects also have the potential to stimulate the development of last mile services that would directly reach end users in unserved and underserved areas." National Telecomms. & Info. Admin., Joint Request for Information, 74 Fed. Reg. 58940, 58942 (Nov. 16, 2009).

community anchors to fiber.[7] In addition, the Commission, in implementing its Rural Health Care Pilot Program, also recognized the tremendous benefits involved in ensuring that health care providers have high capacity broadband connections throughout the country, finding as follows:

> Broadband has enabled health care providers to vastly improve access to quality medical services in remote areas of the country. Among other things, telehealth applications allow patients to access critically needed medical specialists in a variety of practices, including cardiology, pediatrics, and radiology, without leaving their homes or their communities. Using video feeds over broadband and real-time patient information, intensive care doctors and nurses can monitor critically ill patients at multiple locations around the clock. Using this technology, a single medical professional is able to administer services to over a hundred patients, while cutting skyrocketing medical costs by shortening average hospital stays and reducing the need for additional tests and treatments. The benefits of these technologies are particularly apparent in underserved areas of the country that may lack access to the breadth of medical expertise and advanced medical technologies available in other areas.[8]

As the above indicates ensuring high capacity broadband to community anchors is a win-win-win scenario. First, it ensures that these institutions have the capacity they need to fulfill their missions. As the Schools Health and Libraries Broadband Coalition ("SHLB Coalition"), which represents a broad cross-section of community anchors and a variety of entities that support high-bandwidth connections to these institutions, previously stated:

> Providing high-capacity broadband to [community anchors] is a way to bring the benefits of broadband to the general public. For example,
>
> - Health care providers can use high-capacity broadband to exchange detailed medical records, provide out-patient medical

[7] FCC Public Notice, Comment Sought on Cost Estimate for Connecting Anchor Institutions to Fiber, NBP Public Notice #12, GN Docket Nos. 09-47, 09-51, 09-137 (2009).
[8] *In re Rural Health Care Support Mechanism*, Order, WC Docket 02-60, FCC 06-144, 21 FCC Rcd. 11111, ¶ 5 (Sept. 29, 2006) (footnotes omitted).

monitoring (telemedicine), and many other health-related services. Broadband capabilities can enhance the doctor-patient relationship, provide immediate access to health information, reduce the costs of health care, and save lives.

- Libraries provide Internet access at no charge to millions of people every day, including those who cannot afford to purchase computers or broadband access at home and others who need assistance, training or education about on-line services. Library patrons use public access computers to do homework, apply for jobs and e-government benefits, conduct research, and engage in all that the Internet has to offer.
- Schools use broadband connections to provide distance learning and offer multimedia teaching programs that address many learning styles and capabilities.[9] In the 21st century, educators and students require more access to information, people, tools and resources. Broadband connections are redefining the education model for administrators, teachers, students and parents alike. "Networked education" makes education personalized, equitable, relevant and cost-efficient, enabling improved 21st century outcomes for students.[10]

Second, by ensuring that community anchors have access to the necessary capacity and applications, numerous Americans who do not use broadband can begin doing so, thereby helping to stimulate the demand for broadband. There are many citizens in the United States today that do not use broadband either because (i) they have no realistic means of accessing broadband; or (ii) even if they can access it, they have no means of utilizing broadband because they either cannot afford it or do not know how to use it. Community anchors can change that once and for all. If all community anchors have the bandwidth and capabilities they need, then virtually every American would at least have access to sufficient broadband very close to his or her home. Moreover, if a person does not know

[9] Schools also use broadband connections to access remote, digitized materials used in classroom instruction, for teacher training, to maintain contact between teachers and parents, and in support of certain digital textbook initiatives, such as that launched in California.

[10] *In re A National Broadband Plan for our Future*, Reply Comments of Schools, Health and Libraries Broadband Coalition, GN Docket No. 09-51, at 2-3 (July 21, 2009) ("SHLB July 2009 Comments").

how to use broadband or the benefits of it, community anchors often will provide the necessary education at no charge. And, as the SHLB Coalition recognizes, "[community] anchor institutions serve some of the most vulnerable, 'at-risk' segments of our society – unemployed, rural, low-income, disabled, immigrants, students, and elderly people." [11]

Third, as NTIA recognized, projects involving improving broadband access for community anchors are often "job-intensive and pave the way for a ripple effect of economic development throughout the communities they touch."[12]

B. The Scope of Community Anchors' Broadband Requirements Differ Significantly from that of the Needs of Residential Users

The broadband needs of community anchors differ significantly from that of residential users. Numerous community anchors require very high bandwidth broadband connections for applications such as distance learning and digital media, remote medical care, job training, etc. as well as for research and development and numerous scientific endeavors (*see* Section III(C)2). Moreover, community anchors often have hundreds or even thousands of simultaneous users whereas an individual residence will generally have at most a few broadband users at one time. For this reason as well, community anchors need capacity and capabilities that far exceed that required by residences.

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[11] *In re Broadband Needs in Education, including Changes to E-Rate Program to Improve Broadband Deployment, NBP Public Notice #15*, Reply Comments of Schools, Health and Libraries Broadband Coalition, GN Docket Nos. 09-47, 09-51, 09-137, CC Docket No. 02-6, WC Docket No. 05-195 at 2 (Dec. 11, 2009) ("SHLB December 2009 Reply Comments").

[12] *See* Second NTIA NOFA, 75 Fed. Reg. at 3795. In the mid-eighties, New York State provided approximately $100,000 of seed money to support the just created NYSERNet, a member of the R&E Community that serves community anchors. In the quarter century since, NYSERNet has made direct contributions back into the economy of approximately $100 million and, if you add the contributions of its two spin off companies, that contribution is about $1B, contributions continuing from the companies that ultimately owned them, Cogent, Level(3), and two web hosting companies.

In addition, as the SHLB Coalition stated, "[b]ecause of the growth of high-definition streaming video and other bandwidth-intensive uses, [community anchors] need upgraded broadband connections simply to maintain their current level of service."[13] Yet, many community anchors today already need and are using from 1Gbps up to 10 Gbps, and sometimes even more, bidirectionally. Moreover, as the SHLB Coalition recognizes, many such institutions will "need even greater levels of bandwidth" in the future.[14] Conversely, many residential users utilize approximately 10 Mbps of one-way bandwidth, with a small percentage utilizing as much as 100 Mbps today. Accordingly, any effort to ensure that community anchors have the capacity they will need both today and tomorrow cannot be based on what individual residential users need. The needs of these two groups are orders of magnitude apart in terms of both bandwidth and capability.

II. A Market Failure Exists with Respect to the Provision of High Capacity Broadband to Community Anchors

There is unquestionably a market failure with regard to the provision of high capacity broadband to community anchors. This market failure is evidenced first and foremost by the countless community anchors throughout the country that need access to far higher capacity and additional services, and yet have been unable to obtain what they require due to either availability or affordability. Indeed, the SHLB Coalition, which is comprised of organizations that themselves collectively represent or serve thousands of community anchors, has as its core mission to improve the broadband capabilities of community anchors, recognizing

[13] SHLB December 2009 Reply Comments at 2.
[14] *Id.*

that these institutions require upgraded broadband connections just to maintain their current level of service, and they need even more bandwidth for the future.[15]

Further evidence of the market failure here comes from Congress' and NTIA's recognition that significant governmental efforts are necessary to assist in ensuring that community anchors have sufficient broadband capacity for their needs. As discussed in Section I above, several of the purposes of BTOP relate to seeking to ensure that community anchors have the necessary capacity, and NTIA has just recently announced that the focus of BTOP Round 2 infrastructure applications should pertain to middle mile service to community anchors. In addition, the incumbent providers' comments in this proceeding generally establish that their primary focus is not on ensuring community anchors receive the necessary capacity. Indeed, it is clear from other proceedings that such providers want to place significant restrictions on users who wish to utilize significant capacity, which appears to run counter to community anchors need for high capacity, and at the very least does not bode well for community anchors receiving such capacity at affordable rates from those providers.[16]

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[15] *Id.*

[16] Ironically, it was a market failure in the first place that led to the creation of the R&E Community's national and regional networks that serve colleges and universities as well as libraries and other community anchors. As commercial vendors and carriers began to support and embrace the Internet in the early to mid-1990s, a view emerged in Washington that the role of the federal government was no longer needed now that the Internet was in a "competitive" phase. Indeed, this view held that government support for programs such as the Internet should be reserved only for technologies that were in their "pre-competitive" (i.e., initial research) stage, and not for those technologies at the critical middle stage as well. Alarmed by this political reality, members of the research and education community met to discuss how to ensure that they would be able to continue to fund and deploy next generation networks to meet their needs. Out of this evolved organizations such as Internet2 (initially called the University Consortium for Advanced Internet Development/UCAID) and NLR.

III. The United States Needs a Unified Community Anchor Network and it Should be Led by the R&E Community

A. The United States Needs a Unified Community Anchor Network

In light of the critical need for high capacity broadband by community anchors, and the market failure described above, the Commission must determine the best mechanism to ensure that all community anchors nationwide have access to the necessary capacity and services they need, while also having the ability to effectively collaborate and share resources and information with each other. As recommended in today's joint filing in this proceeding by the SHLB Coalition, Internet2, NLR and a number of other important organizations, and for the reasons discussed therein as well, the best means of ensuring that community anchors needs are met with respect to broadband service is for there to be a "Unified Community Anchor Network" ("UCAN") from which all community anchors who wish can receive high capacity broadband service and collaborate and share information and resources with each other.

The vision behind UCAN is to provide an electronic superhighway for all community anchors who want to connect to it. With respect to community anchors, the underlying premise of the UCAN is to be inclusive – not exclusive. The most benefits will accrue, and the greatest efficiencies will be realized, through a UCAN that allows any community anchor to have access, regardless of whether it is a university, library, hospital, public safety organization, etc. All of those entities can benefit from communications with one another at various times, and in many cities and towns they are located in close proximity to each other.

Involving the greatest number and types of community anchors in one network will maximize the benefits of advanced broadband services via unprecedented collaboration and resource-sharing among and between education/research/health care/public safety, public media, government and economic development sectors, and will help ensure the existence of a multi-use network that will leverage and harness the creativity and energy of public/private partnerships and alliances with industry.

B. The R&E Community Should Take the Lead with respect to the UCAN

1. The Existing Facilities Managed and Operated by the R&E Community

The R&E Community, which is comprised of the national research and education networks operating in collaboration with the regional and state research and education networks, should lead the management and operation of the UCAN, in partnership with sophisticated partners who have expertise in other pertinent fields.

The R&E Community already serves a tremendous number of elementary, secondary and higher education community anchors as well as many libraries and health care facilities. Internet2 and NLR, collectively, in conjunction with state and regional research and education networks, connect approximately 66,000 community anchors, primarily in the education and library arena at speeds ranging from 10 Mbps up to 10 Gbps and more. That represents approximately 35% of the national total of educational community anchors. Internet2 and NLR already link existing state and multi-state networks active in research, education,

healthcare, education, and public service. Thus, utilizing the R&E Community to take the lead role on operating and managing the UCAN makes perfect sense.

Just as the existing R&E networks have built their capabilities using public/private partnerships, the UCAN would as well. Acting as sophisticated buyers, and perhaps more importantly as sophisticated partners with private firms that have the network elements that can be assembled to extend the UCAN, and acting as sophisticated advocates for the advanced capability needs of the anchor tenants, the R&E Community can help ensure that a UCAN will greatly expand the proven success with broadband that some community anchors in the U.S already experience.

Indeed, there is no need to start from scratch here. A UCAN does not need to be created – it needs to be completed. With respect to infrastructure, the foundation already exists. For a UCAN to become a reality, many regional operating networks, which are part of the R&E Community, as well as national networks such as Internet2 and NLR, would need to extend their networks and in many instances would also need upgrades to the network.[17]

2. The R&E Community's Past Success, and Expertise in Terms of Innovation, Technology and Collaboration

The R&E Community also has the expertise, in terms of innovation, technology and collaboration, among other things, needed to turn the goal of a UCAN into a reality. The R&E Community builds and operates the most advanced R&E networks in the world and is a leader in terms of innovation.

[17] In a number of instances, because of the technical characteristics of some of the older fiber that commercial providers have run to a community anchor, or because equipment is outdated, that anchor cannot receive the advanced networking services it needs without a replacement of the fiber and/or equipment.

In fact, the R&E Community has been down this road before with regard to assisting the United States in taking the next step with respect to technology. It is because of the R&E Community's expertise and ability to collaborate effectively among large groups of unique participants, that the Internet has become such an important part of our society. The Internet evolved into the economic and social powerhouse it is today as the result of large-scale demonstrations of new networking technologies in the R&E Community. It was only because the R&E Community was able to build an operational network (initially the ARPANET and then the NSFNET) that its transformational superiority over the then-closed approaches to networking was demonstrated. The Internet in its current form exists because the world outside of the R&E community recognized the enormous advantages of an open, extensible network environment and wanted, perhaps even needed, to be a part of it.

While technical expertise cannot be underestimated, neither can the need for significant collaboration. In the R&E Community, collaboration among a variety of organizations is more than just beneficial – it is absolutely necessary. And the Community excels at such collaboration, which will be critical as coordination and collaboration with entities from numerous other fields must be expertly managed in order for the UCAN to be properly completed and fully utilized.

Even today, the R&E Community's impact and the operation of advanced R&E networks leads the capability set available on the public Internet. In its Third Quarter, 2009 "State of the Internet Report," Akamai's raw network data

showed that the 9 out of the 10 U.S. cities that ranked globally within the North American region are college towns with a major university anchoring the community. [18]

3. The R&E Community's Expansion of its Reach

Another factor that makes the R&E Community the most appropriate group to operate and manage the UCAN is the Community's ever-increasing scope of involvement with a wide variety of community anchors. While the R&E Community's efforts originally focused on supporting scientific endeavors, engineering, and higher education, over the past several years support has broadened considerably to include economic development initiatives, local and state government, public safety, libraries, local and public television, and health and human services, all for the general benefit of the public good and welfare.

The R&E Community has expanded its reach in large part through partnering with entities in other fields that have the necessary expertise in those industries. For example, prior to commencing service to health care entities, members of the R&E Community, through Internet2, entered into a relationship with a sophisticated partner, the Healthcare Information and Management Systems Society, who had the needed health care expertise.

In fact, even the federal government has recognized that the R&E Community can support far more than just education and library networks, as evidenced by the creation of the Rural Health Care Pilot Program. Under that

[18] Report of Akamai, State of the Internet, Third Quarter 2009, Volume 2, Number 3, at 11, which can accessed at www.akamai.com ("Akamai Report").

program, the Commission agreed to help fund the construction of health care networks that would connect to Internet2's or NLR's network.[19]

Moreover, the types of community anchors that the R&E Community serves has not only greatly expanded over time, but it can expand even further in conjunction with the development and implementation of a UCAN. The R&E Community would then simply engage in further collaborative arrangements with sophisticated partners who have the expertise that the Community may need in any additional areas pertinent to the UCAN's connections (such as public safety).[20]

4. The R&E Community's Support for Needed Applications, Services and Education/Training

The R&E Community is also the proper group to lead the effort here because community anchors nationwide need more than just infrastructure.[21] They need support for applications, services, and education/training, which the R&E Community currently provides for its community anchors today and can provide for other community anchors tomorrow. Raw connectivity is not enough. There has to be significant work done at the applications level, the services level, and with respect to education/training to make the deployment of advanced broadband to community anchors meaningful. The R&E Community is

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[19] *In re Rural Health Care Support Mechanism*, Order, WC Docket 02-60, FCC 06-144, 21 FCC Rcd. 11111 (Sept. 29, 2006); *In re Rural Health Care Support Mechanism*, Order on Reconsideration, WC Docket 02-60, FCC 07-6, 22 FCC Rcd. 2555 (Feb. 6, 2007).

[20] On September 11, 2001, the NYSERNet network stayed up while much of the other networks in New York City, Long Island and Westchester County were down, and the very rapid restoration of those networks happened in part by connecting downed circuits to the NYSERNet network.

[21] References throughout these Reply Comments to the R&E Community leading the effort here should be construed to recognize that it will also partner with sophisticated partners in other fields (health care, public safety, public media, etc.) to ensure that, collectively, the needed expertise is present.

in the best position to provide this as it is already doing so today for so many community anchors.

At the applications level, the transfer of massive image files or video, the use of advanced video conferencing, and the increasing use of "collaboration tools," for example, all require more than raw connectivity. They 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. The R&E Community has worked in the area of advanced internet applications for years, and has helped countless community anchors fully utilize the applications at their disposal to benefit the community anchors and the public.[22]

There are also a variety of "services" that can help community anchors to make better use of advanced broadband connections. For example, the R&E Community is a leader in developing identity management software and inter-institution trust systems, referred to as "middleware," which allow users to use a single password to access protected resources and to collaborate among institutions. The R&E Community's middleware allows for far greater, and more efficient, collaboration and resource/idea sharing among users, while providing protection against any unauthorized access. This middleware, in fact, has become a model for efforts being deployed by the federal government as well as other countries.

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[22] For example, members of the R&E Community are collaborating to bring massive image files from Haiti flyovers to image processing researchers at the Rochester Institute of Technology to help in the rescue and restoration efforts.

The Community has also developed a suite of tools to help network managers "troubleshoot" connections to ensure that advanced applications can work properly end to end. These performance tools render the federation of national, regional and state networks operationally transparent to their users so the users can see exactly what they are getting – and not getting.

And because the networks are run transparently – unlike those of the carriers – it is possible to determine where in the multiple hops from a desktop in Arizona to a desktop in Maine, or even in Europe, problems are occurring. These tools, along with a shared development of architecture and engineering plans, open budgeting processes, public operational ticketing and performance tools and regular communications among organizations, form the foundation of operational transparency in a multi-provider environment – empowering end users with the knowledge to hold their providers accountable for performance and service levels. With these tools, network problems are commonly prevented and no longer unsolvable when they do occur. Instead problem resolution and problem avoidance are a far more easily manageable issue because the root of the problems can be immediately pinpointed by interested parties. Of course, this also makes it far easier for community anchors to ensure their networks are properly managed.

The above represents just a couple of examples of the additional services that can be utilized. The R&E Community is capable of providing all community anchors with a variety of layered network services that meet their needs for today and will accommodate their needs as demand for increased bandwidth and

services grows. Moreover, having the capability to simultaneously serve many communities across a region and state dramatically reduces costs and improves efficiencies.

Underlying all of the above is the need for those parties operating the network and providing the services to ensure that community anchors receive the necessary education/training to take full advantage of all that is offered, as well as any future offerings arising from any modifications to the network, applications or services available. In this area, the R&E Community also excels as its emphasis on training is second to none. In addition, the Community hosts numerous forums and other events throughout each year that coalesce volunteer actions and commitments to improve online services that private sector firms do not.

As the discussion herein demonstrates, the incentives of the Community are in line with the goal of having a vibrant UCAN throughout the country. The Community wants to ensure that there is an open network that will be available to all, as its focus is on benefiting the public. Unlike for-profit companies, it does not need to be focused on shareholder profits.

C. There are Two Additional Important Benefits of Creating a UCAN Managed and Operated by the R&E Community

As the foregoing establishes, the R&E Community is in the best position, and has the most incentive, to operate a UCAN. But to make matters even better, by permitting the R&E Community to take this lead role two additional and extremely important benefits will accrue: (i) the UCAN will also operate as a test bed for new applications and technologies that will be developed and will then be made available to all Americans; and (ii) the UCAN will be utilized to further numerous scientific endeavors in which the United States is involved, both domestically and internationally, that will also fundamentally change our lives for the better.

1. Test Bed

Within "A National Broadband Plan for the Future," as this proceeding is captioned, the Commission should take steps to ensure that in the future the United States is a leader in the global economy with respect to the usage and development of broadband technology, its operation and network applications. But this will only occur if we establish a national program now for continuous innovation in advanced broadband technology deployments, applications development, education and outreach. Development and support of a test bed for continuous innovation, including the next generation of the Internet and future broadband evolution, is a critical long-term strategy to satisfy the goal of meeting and advancing the broadband needs of all community anchors.

Yet, this can all be accomplished within the scope of the development of the UCAN by having the R&E Community take the lead role in operating and managing the network. The R&E Community has had tremendous success operating networks that not only provide a myriad of benefits today,[23] but also provide the necessary testing grounds for the applications of tomorrow. For numerous years, in addition to the practical benefits they bring immediately, networks operated by the R&E Community have served as large-scale test beds for the next generation of technology and applications.

As discussed in Section III(B)2 above, the Internet would likely not exist in anything remotely resembling its current form had it not been for the seminal role of the R&E Community in its development. Indeed, the fact that the initially R&E-only networks became *the* place where most innovative and exciting network developments and services were transpiring became the primary reason why the commercial world was forced to take note and eventually adopt these standards and then extend these networks globally, which has resulted in the current version of the Internet.[24]

More recently, the R&E Community has pioneered new broadband technologies, such as dynamic circuit networks, which allow scientists around the globe to establish on-demand multigigabit "networks" for increasingly global science, including amplifying the power of U.S.-based telescopes by linking them to others around the world in real time.

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[23] *See, e.g.,* Akamai Report at 11.

[24] Research at universities in computer science engineering have repeatedly played an important role in the country's technology leadership and economic well being. In addition to the Internet, computer graphics and search technologies are two other prominent examples. Many of today's leading companies grew out of research at universities (e.g., Google, Cisco).

In general, R&E networks have played a critical role in the implementation of a strategy based on technology transfer and commercialization (i.e., moving technological advances from the R&D environment into the commercial arena). This has proven successful in the past and can be again in the future, and, in fact, on even a larger scale if the Community takes the lead role in managing and operating the UCAN. The Community has tremendous experience forming close partnerships with others with respect to research and development, including facilities owners and equipment manufacturers to ensure that the services blend the most advanced technologies into the test bed and are open to continuous renewal in advance of traditional cycles. In fact, for network equipment manufacturers, R&E networks have provided a place for first, or very early, deployment of the newest, most cutting-edge technology approaches for routing and switching and optical transport. This has provided a direct migration path for new network technologies to make their way into the commercial Internet. Very often, when the newest equipment is deployed into R&E networks, older technologies and equipment are discounted in the manufacturer's inventory, making more standard network deployment cheaper in the broader environment.

While the R&E Community has placed a strong emphasis on research and innovation for several decades, the commercial industry has fragmented its efforts over time, as compared to the early days of Bell Labs which served as a common innovation engine for the telecommunications monopoly. In the present economic climate, it is unlikely that a commercial innovative leader will step in and fill the void left in the more complex environment of the post-monopoly era

that we are in now. The R&E Community, however, continues to place a strong emphasis on seeking to provide a living, breathing, evolving test bed for tomorrow's internet technologies. This type of research is essential to keeping the United States on the cutting edge of innovation, not just during this decade but for generations to come.[25] Moreover, the Community includes corporate members in the for-profit sector including, but not limited to, IBM, Northrup Grumman, Microsoft, Ciena, Cisco, Juniper, Infinera, Level(3), Qwest, AT&T, Verizon, Polycom, Warner Brothers, and C-Span, each of whom have the ability to participate in R&D as well.

2. Scientific Endeavors

The R&E Community currently operates networks that advance critical scientific endeavors in which the U.S. is involved, both domestically and internationally, in fields such as physics, medicine, computer science, distance education, bioinformatics, biodiversity and ecological research, geoscience, astronomy and space exploration. These efforts will be greatly broadened by a UCAN operated and managed by the R&E Community, as the new community anchors connected will bring additional expertise and the benefits from collaboration will be further enhanced. Some of the scientific endeavors that are

[25] While today's Internet is almost 40 years old, new technologies (e.g., mobility, optical, cloud computing) and applications (e.g., immersive technologies, social networking, integrated media types) have dramatically increased its capabilities and global appeal. But research is needed to better understand the dynamics of the Internet, to solve problems related to security and to accommodate and to fully take advantage of these new technologies and applications. In addition, research is needed to enable future breakthroughs. Expansion of the capabilities of the R&E networks to a national UCAN will provide an enhanced opportunity for U.S. computer scientists and engineers, behavioral scientists and others to better understand today's Internet and to invent the Internet of the next decade.

currently ongoing, and which involve use of R&E Networks, include the following:

- LHC (The Large Hadron Collider), which is located in Geneva, Switzerland at CERN, is the world's largest and highest energy particle accelerator. More than 2,500 U.S. physicists will depend upon data from the LHC to conduct their research over the next two decades. The LHC is designed to help resolve many fundamental questions about the origins of the universe and the nature of matter, which research will help uncover new energy sources, develop new materials for numerous industries, and help us better understand the global environment of our planet.

- LIGO (Laser Interferometer Gravitational-Wave Observatory) is a global experiment on finding gravitational waves, which will increase our understanding of the fundamental properties of matter, thereby also helping uncover new energy sources, develop new materials in a variety of industries, and better understand the global environment of our planet.

- ITER (The International Thermonuclear Experimental Reactor) in Southern France is at the cutting edge of trying to harness nuclear fusion, and will provide similar benefits to those of LHC and LIGO. The LHC and LIGO are attempting to verify predicted properties of matter, and ITER is even much closer to bringing fusion into practical production.

- GENIUS (Grid Enabled Neurosurgical Imaging Using Simulation) is a project to use an array of high performance computers connected by advance networks to simulate blood flow into and from the heart to better understand cardiovascular disease, so as to reduce cardiovascular disease and deaths.

- caBIG -- cancer Biomedical Informatics Grid®. caBIG® is an information network enabling all constituencies in the cancer community – researchers, physicians, and patients – to share data and knowledge. The components of caBIG® are widely applicable beyond cancer as well.

- BRIITE (Biomedical Research Institutions Information Technology Exchange) is a project involving very important cancer research that requires significant use of the Research and Education Circuits.

- GLORIAD (Global Ring Network for Advanced Applications Development) is built on a fiber-optic ring of networks around the northern hemisphere connecting numerous countries, including the U.S., Russia and China, to promote increased engagement and cooperation between countries on a wide variety of issues including (i) strengthening current programs in nuclear weapons disposal, nuclear materials

protection, and combating terrorist threats; (ii) supporting technologies to provide virtually limitless supplies of energy; (iii) new telemedicine applications; and (iv) improved weather forecasting and earthquake prediction.

- The e-VLBI (Electronic Very Long Baseline Interferometry) is an array of radio telescopes spread around the globe, which conduct unique high resolution, radio astronomical observations of cosmic radio sources. The e-VLBI provides astronomers with their best view of the most energetic phenomena in the universe, including expanding supernovae, pulsars, flare stars, and the environment surrounding nearby and distant galaxies. These telescopes provide astronomers with the ability to, in effect, use the entire planet as a telescope with remarkable resolution that enables astronomers to observe and predict important trends that affect residents of all nations.

To participate fully in such projects, and to thereby have the opportunity to make paradigm changing discoveries, scientists require very high-speed network connections to their campuses (with extensions to laboratories). Moreover, it is important to recognize that this is about more than international scientific leadership. Discoveries in many of these fields have the ability to spawn new products and even industries, for example, medical devices and therapies from research in genetics, biotechnology and molecular biology/stem cells or new materials and devices for a wide range of applications from research in nanotechnology. To a significant extent, the country's future depends on the ability of our scientists and engineers to invent new paradigms, leading to new industries. A UCAN connecting diverse anchor institutions and communities can help propel the country in this direction by supporting advanced research in science and engineering.

In addition, the type of networks described above provide even further justification for permitting the R&E Community, rather than for-profit entities, to take the lead in operating a UCAN. Much of the commercial Internet views very

high speed individual data flows (e.g., between a research user and a server, now in the gigabit/second range and increasing to tens of gigabits/second over the next several years) as a "problem" to be avoided. Indeed, many commercial Internet providers have in place either "traffic shaping and engineering" systems precisely to detect and limit such use or commercial policies that renders "big science" usage unaffordable in the first place.

In contrast, members of the R&E Community have pursued these advanced applications as an opportunity to build networks that can satisfy the raw demands of the applications, while also building newer, more flexible networking technologies that can be implemented, operated and maintained to support the application. In almost all instances, R&E network leaders have leveraged their sophisticated knowledge of the marketplace and the advanced applications to satisfy the enormous capability requirement, without ever needing to restrain demand.

IV. Actions that the Commission Should Recommend in the National Broadband Plan in Support of the Creation of a UCAN that will be Led by the R&E Community

For a UCAN to be successfully completed and operated, it is critical that the National Broadband Plan both support this endeavor, and provide recommendations regarding the next steps: i.e., how a UCAN would be managed, operated, coordinated, funded, and administered. In addition, the National Broadband Plan should recommend modifications to laws and regulations that would also help support the successful completion and operation of a UCAN. It is equally important that the Commission establish criteria that assures that the UCAN established at the state and national level is innovative in advancing the

interests of the community anchors, and that the UCAN is extended from the existing R&E Community. The FCC should look explicitly to discourage states from building a new bureaucracy that might supplant existing and successful R&E networks.

The discussion below is not meant to provide an exhaustive list of the matters to consider in this regard, and the National Broadband Plan should recommend the commencement of a rulemaking to analyze each of the matters set forth herein and any other pertinent considerations so that the ultimate goal is reached – the completion and successful operation of a national UCAN. That is, the Commission should take all steps necessary to help ensure that the goal of a UCAN managed and operated by the R&E Community -- which directly benefits community anchors and Americans across the country -- becomes a reality.

A. The UCAN Should Be Managed and Coordinated on Both a State and National Level

The deployment and expansion of a nationwide UCAN, involving hundreds of thousands of community anchors and hundreds of thousands of miles of network facilities, will, of course, require substantial coordination and leadership both at the national and state level. Accordingly, the National Broadband Plan should recommend that the UCAN be managed and operated via:

- 50 State-level UCAN consortiums ("State UCAN Consortiums")[26] each led by a "State UCAN Coordinator",[27] and

- 1 National UCAN Coordinator.[28]

[26] A State UCAN Consortium would be comprised of all community anchors in that state that wish to utilize the UCAN.

[27] If two or more states wish to act together, and form a regional UCAN Consortium with only one coordinator for that group of states, that should be permitted as well.

[28] The National UCAN Coordinator and the State UCAN Coordinators will be referred to collectively as the "UCAN Coordinators."

1. The General Roles and Responsibilities of the State UCAN Consortiums and the State UCAN Coordinators

a. The State UCAN Consortiums

The State UCAN Consortiums would provide a formalized and centralized vehicle for the participation, in each state, of the greatest number and types of community anchors in the UCAN, as well as a mechanism for ensuring that state-specific priorities are considered as part of the implementation of the UCAN.

b. The State UCAN Coordinators

(i) Selecting the State UCAN Coordinators

For all of the reasons set forth in Section III of these Reply Comments, the R&E Community should take the lead with respect to the UCAN. For that to occur seamlessly, without undue delay or expense, and without creating additional layers of bureaucracy or forming new unnecessary entities, (i) in each state in which there is a state or regional optical network that is a member of the R&E Community (such networks are referred to as Regional Operating Networks or "RONs"),[29] the RON should be the State UCAN Coordinator; and (ii) in each state in which there is no RON, the State UCAN Coordinator should be the non-profit entity or university most closely working with, and aligned with, the R&E Community as determined by the Community (collectively, these entities in (i) and (ii) above shall be referred to as "RONs/R&E Community Recommended State UCAN Coordinators"). If the federal government has the power to ensure that such entities become the State UCAN Coordinators, it should do so.

[29] The RONs are in an excellent position to continue to serve their primary missions while making available to other community anchors the networking resources at hand.

If not, the Commission should strongly recommend that RONs/R&E Community Recommended State UCAN Coordinators become the State UCAN Coordinators.[30] If a state has the right to select its UCAN Coordinator and wishes to consider entities other than the RONs/ R&E Community Recommended State UCAN Coordinators, the Commission should recommend that in determining its UCAN Coordinator, each state should select a non-profit entity or an entity under a University Board of Regents, and it should also place an emphasis on the following criteria in selecting the UCAN Coordinator: (i) demonstrated experience with operating R&E networks, including participation in national forums of existing R&E networks and a recognition of the business needs and issues associated with such networks and serving community anchors in general; (ii) expertise in optical networking, wide area networking and next generation technologies; and (iii) expertise with regard to research and development in connection with broadband technologies.

If the federal government lacks the power to make the selections, then the Commission should further enhance its recommendations to states by also encouraging selection of non-government not-for-profit entities that include independent boards that have the best leaders among the community anchors or entities such as organizations under the auspices of the State Board of Regents as long as such entities satisfy all of the other criteria set forth herein. States should look for organizations with the independence to act as sophisticated partners to the state, its community anchors and potential providers. States should be

[30] There is no reason to reinvent the wheel here. The R&E Community has the expertise needed, and operates and manages much of the facilities that should be utilized for a UCAN.

encouraged to think of the best organization that would be innovative, take calculated risks, and that would be best able to manage its financial, strategic and organizational stability, regardless of the state's political or financial changes.

(ii) Responsibilities of the State UCAN Coordinators

Each State UCAN Coordinator would represent the interests, and guide the activities, of its State UCAN Consortium. The State UCAN Coordinators would facilitate communication between the various State UCAN Consortiums and the National UCAN Coordinator, as well as the Commission and other relevant agencies. The State UCAN Coordinators would also be responsible for development of state-specific multi (up to 5)-year network and operational plans for the UCAN. Such multi-year UCAN plans, prepared locally, but with an eye towards coordinated national priorities of the community anchors, are key components of the UCAN concept. They would include strategic objectives for each state, coordinated service objectives for the community anchors and also objectives to support the advanced scientific activities and the test bed activities. Specifically, permitting plans up to 5 years in length allows for the identification and implementation of long-term network development and technological innovation. Such approach would allow community anchors utilizing the UCAN the opportunity to plan their activities in a manner which will allow broadband deployment to achieve greater scalability and sustainability.[31]

[31] To the extent that filings are required by the State UCAN Consortiums, the State UCAN Coordinators would be responsible for the preparation, submission and prosecution of such filings.

2. The General Roles and Responsibilities of the National UCAN Coordinator

The National UCAN Coordinator would be a non-profit entity with substantial hands-on prior experience with respect to the deployment and operation of nationwide R&E middle mile backbone networks.[32] The National UCAN Coordinator would be responsible for seeking to manage and secure sufficient national backbone capacity to support interstate transmissions through the UCAN between and among community anchors, content providers, Internet providers and other similar networks throughout the world. The National UCAN Coordinator would also be generally responsible for coordinating the activities of the State UCAN Coordinators to ensure that nationwide benefits flow from the UCAN, in a manner consistent with the principals of the National Broadband Plan. It would also be generally responsible for acting as a liaison between and among the State UCAN Coordinators, as well as acting as the primary liaison between the Commission and any other relevant agencies (e.g., NTIA, RUS, USAC) with respect to all UCAN activities.

The National UCAN Coordinator would also be responsible for the development of a nationwide UCAN-specific technology and implementation plan. Such nationwide plan would address the technology needs and UCAN national network requirements necessary to meet the policy objectives of the Commission with respect to broadband deployment, as specified in the National Broadband Plan. In addition, such nationwide plan would address policy objectives related to advanced broadband services, and realistic priorities for

[32] The National UCAN Coordinator could be, for example, an existing entity, or a joint venture comprised of multiple existing entities, with the proper expertise.

R&D, innovation and test bed activities. By providing necessary leadership and promoting community priorities in the national broadband landscape, the National UCAN Coordinator would play a critical role in the deployment of the UCAN.

3. The Shared Responsibilities of the UCAN Coordinators

Under this plan, the UCAN Coordinators, working together, would manage and operate the UCAN, along with the assistance of other members of the R&E Community. The shared responsibilities of the UCAN Coordinators would include:

- Developing system architecture and other technical requirements associated with the creation, deployment and expansion of the UCAN.

- Identifying and partnering with vendors and service providers with capabilities relevant to the UCAN.

- Identifying specific network goals on a local, regional and nationwide basis, and facilitate knowledge and resource-sharing for member community anchors to help achieve those goals.

- Ensuring that deployment and expansion of the UCAN is fully transparent, with regard to pricing and cost of facilities, network operation and identification of capacity planning, as well as ensuring that neutrality principals are embraced.

- Acting as "information clearinghouses," by articulating state-specific needs and goals with respect to broadband deployment via the UCAN, reporting on the status of state efforts to achieve such goals, and developing specific means of communication among state consortia and their members, to foster the free flow of information, consistency and "best practices."

- Identifying appropriate and realistic priorities for R&D, innovation and test bed activities.

The management of the UCAN can also serve as an achievable and effective model for future large-scale telecommunications network management efforts unrelated to community anchors.

B. The UCAN Must Be Appropriately Funded and Administered

The successful completion and operation of a UCAN is dependent upon proper funding and administration.

1. Potential Funding Sources

Given the importance of implementing a UCAN that supports the greatest number and types of community anchors, and the recognition that considerable funding will be necessary to support its completion, the National Broadband Plan should recommend that all potential funding mechanisms be explored by Congress and the States to ensure the development of a UCAN. This could include, for example, congressional funding either in a second stimulus bill or a direct appropriation for the National Broadband Plan.

In addition, the National Broadband Plan should recommend that the following agencies strongly consider assisting in the funding of this effort, or find ways to partner with it, as it will support their missions to fund connectivity for their constituencies: the Department of Energy, National Science Foundation,[33] Department of Education,[34] NTIA, Rural Utilities Service, Department of Health and Human Services,[35] the Indian Health Service,[36] NASA,

[33] The National Science Foundation should provide assistance funding high performance connectivity for the nation's research universities (including campuses, regional R&E networks, and national R&E backbones) that can be part of a comprehensive cyberinfrastructure investment program.

[34] The Department of Education should invest a percentage of any "education technology" funding to fill educational connectivity gaps – to make sure that all educational institutions in the nation can afford to connect to R&E networks and thereby to the UCAN. Such funds would "fill in the gaps" between NSF and e-rate investments.

[35] The Department of Health and Human Services should devote a percentage of the "Health IT" funding from ARRA toward ensuring that electronic medical record exchange, telemedicine, networked health research (NIH), and distance medical education are integrated through the nation's R&E networks and thereby to the UCAN, coordinating these investments with the FCC's rural health care efforts and other federal agencies health IT investments.

Institute of Museum and Library Services, National Endowment for the Humanities,[37] National Endowment for the Arts,[38] Department of Veteran Affairs,[39] the Department of Defense[40], NASA, National Institute of Standards and Technology, and National Oceanic and Atmospheric Administration.[41]

2. Potential Funding and Administration of the UCAN Via the E-Rate Program

In addition to all of the potential funding sources set forth above, another potential route for funding, at least in part, would be through the e-rate program. As described below, modification of the e-rate program in several respects could greatly advance the creation of a UCAN both in terms of funding and administration.

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[36] The Indian Health Service should be funded by Congress to connect reservations to R&E networks and thus to the UCAN in their states to better deliver high performance telemedicine and medical record exchange.

[37] The Institute of Museum and Library Services should be funded by Congress to assist as well by helping to provide a new "high performance connections" program for museums and libraries, so that they may connect to the nation's R&E networks and thereby to the UCAN.

[38] The National Endowment for the Arts and the National Endowment for the Humanities should be funded by Congress to provide high performance connectivity for performing arts organizations and humanities organizations.

[39] The Department of Veterans Affairs should explore ways to use R&E networks and thus the UCAN for the delivery of high performance telemedicine and medical record exchange -- among VA hospitals, between VA hospitals and University research hospitals, and extending to rural health clinics to better serve the veteran population.

[40] The Department of Defense operates unclassified research and education networks that could be coordinated with the UCAN. Homeland Security might use the UCAN for some of its connectivity to community anchors.

[41] Numerous federal agencies, including NASA, National Institute of Standards and Technology, and National Oceanic and Atmospheric Administration, should be encouraged to not only provide funding where applicable, but also to build their solutions on the foundation of the UCAN (i.e. to partner with the effort here).

a. Extension of E-Rate Eligibility and Funding to Other Critical Community Anchors

The e-rate program currently supports only a small fraction of the community anchors that are critical to the National Broadband Plan and should be connected to the UCAN. The e-rate program should be expanded to include all community anchors, including all entities defined as community anchors with respect to the BTOP program. Accordingly, and by way of example only, two-year higher education institutions, universities and colleges (including community colleges), job, science and cultural centers, public media, health care facilities in non-rural areas,[42] museums, government-affiliated facilities and programs providing after-school care and similar services are not currently supported by e-rate as "eligible" entities, yet these entities all have enormous potential to provide tremendous benefits to the American population via broadband. Thus, the exclusion of these entities from the e-rate program is a substantial obstacle that prevents achievement of Congress' and the Commission's goals, and discourages the development of collaborative and efficient networks. Excluding such community anchors from e-rate or a similar funding programming does not help support the goal of building comprehensive broadband communities – it undermines it.

Accordingly, e-rate eligibility should be extended to such additional community anchors. The National Broadband Plan should recommend the appropriate statutory and regulatory changes necessary to ensure that these

[42] The rural health care program under universal service and the e-rate program should be merged so that all health care providers fall under one program.

additional community anchors are able to receive discounts as e-rate eligible entities for their participation in a UCAN.

In light of the extension of e-rate eligibility as proposed above, the National Broadband Plan should recommend an increase of the annual e-rate funding cap sufficient to cover the additional participation of these critical community anchors.

b. Extension of Participation to Non-Profit Private Networks

The e-rate program should be modified to enable participation by non-profit private networks, including those entities that are a part of the R&E Community, and which serve eligible entities. Given the importance of these non-profit private networks to the overall National Broadband Plan, including but not limited to the proposed UCAN, it makes no sense to exclude them from participation in the e-rate program.

c. Additional Modifications to the E-Rate Program to Help Facilitate Completion of the UCAN

As listed below, certain additional modifications to the e-rate program would greatly assist the completion and successful operation of the UCAN. These modifications would provide some of the resources necessary for the completion and operation of the UCAN, and would also support the collaboration and planning required for the UCAN to be successful. To the extent that the e-rate program cannot be modified in some of the manners discussed below, some other mechanism must be created to ensure that the completion of the UCAN is not derailed by an inability to have the necessary support in place. The proposed modifications are as follows:

(1) Eligibility of the State UCAN Consortiums for weighted e-rate discounts for services related to the UCAN, based on the large number and types of community anchors involved, and the national priorities being served consistent with the National Broadband Plan.

(2) Eligibility of the State UCAN Coordinators for e-rate funding, and delegation to the State UCAN Coordinators the responsibility for handling logistical and application-submission matters similar to those currently handled by consortium lead members under existing e-rate practice.[43]

(3) E-rate support for the substantial leadership, coordination and research and development responsibilities and activities of the National UCAN Coordinator. The e-rate program, at least with regard to the UCAN national organization, must support network-related applications support, regional and national backbone segments for the UCAN, and those portions of the national backbone needed to support the research and development activities.

(4) Submission to USAC by the State UCAN Coordinators of state-specific multi (up to 5)-year network and operational plans for the UCAN and its State UCAN Consortium. Permitting e-rate funding for plans up to 5 years in length, by both the State UCAN Coordinator and the State UCAN Consortium Members, allows for the identification and implementation of long-term network development and technological innovation that current e-rate

[43] *See e.g.*, "Consortia – Lead Member Responsibilities", accessed at http://www.usac.org/sl/tools/reference/consortia.aspx. These State UCAN Coordinators will provide tremendous insight on local needs, disparities and opportunities that can also help shape future funding.

technology plans are unable to address, and allows community anchors to have far greater certainty as to the level of consistent e-rate support they can expect to receive. While preparation, review and approval of such multi-year UCAN plans will require additional up-front effort by the eligible entities and USAC, subsequent progress reports and annual progress funding should benefit from substantial efficiencies once the program is up and running.

(5) The development and submission to USAC by the National UCAN Coordinator of a nationwide UCAN-specific umbrella application and technology plan, which would be e-rate eligible and funded.

(6) Greater flexibility with respect to the selection of providers, including encouraging "best value" and long-term strategic investment. Such approach would be consistent with the implementation of the above-described multi-year UCAN plans and long-term compliance with the objectives of the National Broadband Plan.

(7) Priority 1 treatment, on an unrestricted basis, for UCAN-specific capital assets/expenses (including fiber builds and IRUs or leases of dark fiber, which should be on the eligible services list), as long as such treatment would not result in an eligible entity receiving more e-rate benefits than it would otherwise be eligible to receive (that is, an entity can supplement capital assets/expenses in whole or in part for operating expenses for which it would have otherwise been eligible to receive e-rate benefits). To the extent necessary, therefore, e-rate requirements currently relegating certain capital assets/expenses to Priority 2 status should be waived in the context of UCAN deployment where a

State UCAN Coordinator concludes that such treatment will further UCAN deployment objectives and that, in the absence of such treatment, incumbent pricing alone would not afford UCAN deployment the "best value" advantage.[44]

All of the recommendations set forth above with respect to modifications to the e-rate program are in addition to, and not meant to diminish the importance of, other funding sources as well, as discussed in Section IV(B)1 above.

C. Other Recommendations in the National Broadband Plan that Would Support the Successful Completion of a UCAN

1. Pre-Emption of Certain State Laws and Prohibitions

As discussed earlier, the vision behind a UCAN is to complete an electronic superhighway for all community anchors who wish to be a part of it. With regard to community anchors, inclusion, rather than exclusion, should be the rule of the day. The most benefits will accrue, and the greatest efficiencies will be realized, when a UCAN is completed that allows any community anchor to hop aboard.

While states have focused to varying degrees on building out networks for on one or more types of community anchors, some state laws or prohibitions preclude R&E networks from being used for other types of anchors, thereby forcing the creation of more networks than are necessary. These laws undermine the benefits from, and the efficiencies of, having one network, used by all community anchors who wish to be a part of it. Accordingly, the National Broadband Plan should recommend the preemption of state laws and prohibitions

[44] The Commission should also recommend consideration of the additional e-rate related proposals set forth in the *National Internet2 K20 Initiative* submission filed on November 20, 2009 by Louis Fox in GN Docket No. 09-47.

that require exclusivity for one type of anchor use (such as education or health care) in a network, thereby preventing a network from connecting all community anchors it passes. Mandating inefficiencies (i.e., requiring the building of multiple networks to serve facilities that are in close proximity of each other), and unnecessarily restricting benefits to the public by limiting community anchor collaboration, should be at odds with the goals of the National Broadband Plan.

2. Remove the Stove Pipes from the Federal Laws

In addition to ensuring the preemption of state laws that create stove pipes (one network for education, another network for health care, etc.), the National Broadband Plan should further recommend that the federal government remove its stove pipes. A network under the Rural Health Care Pilot Program should be permitted to provide educational traffic (and other community anchor traffic in addition to health care traffic), and a network which carries e-rate traffic should be permitted to carry health care traffic also without any undue administrative burdens on reimbursement (such as by rendering the accounting too difficult). The National Broadband Plan should recommend the removal of any other similar types of stove pipes, so as to further the goal of the completion of a successful UCAN.

3. Modify the Rural Health Care Pilot Program

In a recent filing in this proceeding, the Health Network Group Organized by Internet2 proposed several modifications to the Rural Health Care Pilot Program, which modifications would make the pilot program even more viable by reducing costs incurred by those participating in the program while increasing

efficiencies.[45] The National Broadband Plan should recommend adoption of those proposals.

4. Predictable Pole Attachment, Conduit and Rights-of-Way Policy

The National Broadband Plan should recommend all action necessary to render access to poles, conduits and public rights-of-way, timely, predictable and affordable to all potential attachers, and certainly to any entity providing services to community anchors in connection with the UCAN. The pole attachment rules today are under-inclusive with respect to who benefits from, and who must comply with, the rules, and, even where applicable, they have anti-broadband deployment characteristics. For example, many utilities cause great delays in the issuance of pole attachment permits because there is no deadline by which they must issue such permits. Predictability as to what criteria will allow an attachment to go forward, when make ready or conduit availability can be assured, and other clarifications are needed as well.

We believe one method to further a predictable rights-of-way policy would be to require all pole-attachers and conduit occupants, including incumbents and pole/conduit custodians to publish every attachment request, past and current status reports, make ready requirements and progress and license issuance in a database that is searchable on the Internet by the public.

In addition, the interpretation of 47 U.S.C. Section 253, which involves access to public rights-of-way, has been subject to far too much controversy on

[45] In *re Comment Sought on Health Care Delivery Elements of National Broadband Plan, NBP Public Notice #7*, Comments of the Health Network Group Organized by Internet2, GN Docket Nos. 09-47, 09-51, 09-137 and WC Docket No. 02-60 at 17 (Dec. 2, 2009).

critical issues, such as what are the limitations on the amounts that can be charged for access to rights-of-way.

5. Providing Incentives to Incumbent Carriers to Support the Completion of a UCAN

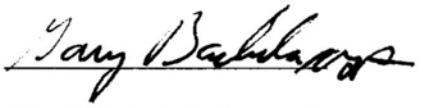
Incumbent carriers own much of the infrastructure used today in connection with the provision of broadband services to community anchors, and the R&E Community often leases or has an IRU for use of those facilities. Accordingly, in many instances, the most efficient and least expensive means of extending the reach of a UCAN will be through leases or IRUs of dark fiber from incumbent carriers to those who will operate and manage the UCAN. However, incumbent carriers are often unwilling to provide such leases or IRUs at affordable prices. The National Broadband Plan should recommend tax incentives for incumbents to encourage such leases and IRUs. These and any other incentives should encourage incumbents to become viable partners with the UCAN strategies developed in each state.

Given the high capacity services that will be provided over the UCAN, it may also be helpful to modify the universal service high-cost fund rules to support funding of high speed services to community anchors as well.

CONCLUSION

For all of the reasons set forth herein, the U.S. R&E Networks strongly encourage the Commission to draft the National Broadband Plan in a manner consistent with the recommendations set forth herein.

Respectfully submitted,



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[46] Gary Bachula has been given authorization by all of the U.S. R&E Networks listed in this filing and HIMSS to submit this filing on their behalf.