Improving Broadband Access and Quality in Champaign-Urbana, Illinois

A Report by the Broadband Access Committee of the Champaign-Urbana Cable Television and Telecommunications Commission:

Bill DeJarnette, Mel Farrell, Peter Folk (Chair), Jeff Hamilton, Josh King, Dan Meredith, Safiya Noble, and Peter Resnick

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Executive Summary

The Broadband Access Committee (the "BAC") was created as a sub-committee of the Champaign-Urbana Cable Television and Telecommunications Commission, and tasked to conduct an inquiry into the following questions and provide a report back to the Commission so that the Commission may then advise the City Councils on broadband planning and policies.

a. What should our broadband access goals be in the twin cities?
b. What are the challenges to broadband access in Champaign-Urbana?
c. What is the current broadband infrastructure in Champaign-Urbana?
d. How well is the current infrastructure meeting our goals?
e. What are the alternative models to meet our goals?
f. What is the preferred model for the cities to meet our broadband access goals?

This report answers those questions.

The BAC found that the twin cities' goal should be to promote current and future local internet access offerings that are universally accessible, equitably distributed, reliable, secure, public, open, long-term investments, educational, innovative, and collaborative.

We then evaluated the state of broadband access in Champaign-Urbana in light of those 10 "Core Values," developing a Broadband Report Card for the area that details what current broadband infrastructure serves Champaign-Urbana and how well that infrastructure is meeting our goals.

We found that, in a future where UC2B, Comcast, AT&T, and other providers all serve overlapping but not identical regions and markets in Champaign County, several of the Core Values remain unsatisfied. Specifically, the very first Core Value, universal access to services, will not be much improved in that not-too-distant future than it was when the BAC was formed in 2007, and several of the other core values will have seen some progress—but not as much as we feel is needed to fully realize the BAC members' visions of a connected community.

In order to meet the goals coded in the 10 Core Values, the BAC recommends that the two cities:

1) Create a Broadband Adoption Task Force and Fund to improve the equitable distribution of broadband access, as detailed in Section 2 - Improving Equitable Distribution of Access.
2) Establish a Champaign County Innovation Clearinghouse to promote innovative, collaborative, secure, provider-neutral services that attract commerce, nurture cultural development, support educational institutions, and improve learning opportunities, as detailed in Section 3 - Improving Connectedness of Key Services and the Collaborative Environment
3) Establish a Digital Ombudsman role or position (in the city governments or independent) as detailed in Section 4 - Promoting Public Interest network management

These three entities will provide key, currently-missing, resources that will strengthen the fabric of our community overall, and allow us all to reap the benefits of living in a fully connected society.

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Section 1 - Background and Report Card

A useful Advanced Broadband Communications Plan can only exist in the context of the existing infrastructure and upcoming technological developments in the governmental, educational, and commercial sectors. To gauge what is needed, we need a clear picture of what we have already.

We have adopted the concept of a "report card" that we can use to track how well our community is doing, and track its recent progress (static/stagnant, improving, or falling behind). After thorough review of the core values and status of existing services, we find:

With regard to…	*Our community is…*	*with a grade of…*
Service availability and performance	Improving	B+
Affordability and Equitable/Ubiquitous access	Stagnant	C+
Reliability	Static	B
Privacy of communications	Static	A
Connectedness of key services	Stagnant	C
Public Interest network management	Improving	F
Openness of networks	Improving	B-
Long-term nature of public investment	Improving	B
Support for innovation	Improving	C
Support for collaboration	Stagnant	D

This is an informal report card—based on personal knowledge and opinions of the five BAC members that developed the list of criteria. Some research on the topic was also done by Laura Allured where more background was needed. Each category's status and progress is discussed in detail in Appendix A - Report Card Detail.

We chose these categories because they are each relatively independent of each other, and they cover all of the categories identified in our initial Vision. For categories where no current progress is being made, we draw a distinction between "static" categories that have met the current need and thus no change is needed, and "stagnant" categories where the need has not been met and we do not see recent progress toward meeting that need. We track service availability and Performance together because different services at different speeds are available to different areas and populations.

The Report Card tells us that, for the most part, our community is doing "ok". If a "C" grade is average, we are somewhat above average in most areas.

But as a Committee, we believe that our community can do much better than "average". Our community has contributed significantly to the development of the technological revolution, is the home of one of the top research universities in the nation, and is a community that was named one of the most connected communities in the nation as recently as 10 years ago. We do not believe that "average" should be our goal.

1.1. Ongoing Problems

There are 5 "subjects" where Champaign-Urbana scores C+ or below, and of those, three are "stagnant":

1. Affordability and Equitable/Ubiquitous Access (C+)
   Despite universal availability, many individuals in the community are not "served" by any kind of internet access. This is not a question of whether internet service is available for purchase; it is a question of whether they have it available for them to use, either for free or having decided to purchase it. Access to broadband is the foundation upon which all of the other potential benefits must be built, so making progress on this issue is absolutely critical to our community's ability to use broadband effectively in the long term.
2. Connectedness of key services (C)
   Local educational, governmental, health and other services do not fully utilize the internet to reach as many members of the community as conveniently and powerfully as possible. Without such services, we will not realize the potential benefits broadband can bring to our community.
3. Support for Collaboration (D)
   There is no local facility for developing, learning about, and implementing best practices for the many

common tasks online, and establishing services that may be uncommon online but are common needs among local organizations.

There is only one area where we believe that Champaign-Urbana scores an "F": public-interest network management. We believe that other areas relevant to Broadband Access will improve on their own over time, but the four items above will remain stagnant without proactive effort along the lines we recommend below, with support from the government, local schools, businesses and concerned members of the community.

We discuss them below in three sections:

- Section 2 discusses challenges and proposes solutions for improving the equitable distribution of access
- Section 3 proposes a solution for improving both the connectedness of key services and the collaborative environment
- Section 4 proposes the establishment of a Digital Ombudsman, providing local internet access users with a public representative who can focus user concerns and promote initiatives to change provider behaviors that are not in the public interest

Finally, we discuss the future of the BAC in Section 5.

1.2. UC2B and Broadband Adoption

We do not specifically advocate UC2B being the organization to implement the changes and initiatives outlined below, but practicality may force UC2B to deal with them.

The reasons UC2B should **not** be responsible for solving these challenges are:

- UC2B already has a very challenging road ahead, in constructing its network, deploying services, and finding financial stability over the next two years.
- As a single service provider, it may be challenging for UC2B to avoid conflicts of interest in developing provider-neutral initiatives, given the reality that UC2B needs all the customers it can get in order to not become a burden to the public purse.

Despite the drawbacks to UC2B taking on these challenges, it seems to us that:

- The public expects UC2B to solve these problems
- UC2B is the only local governmental organization tasked with dealing with some aspects of these problems
- All of the interested parties are involved in UC2B, and must remain so for quite some time
- Those parties have limited ability to go to additional meetings, less urgent than UC2B meetings but perhaps as important
- Due to the membership of its Policy and Technical Committees, UC2B already has good, close contact with both cities' staff and City Councils.

Based on the likelihood that UC2B will have significant involvement in these issues, throughout this report we talk about UC2B and what UC2B's role could be in solving the problems we have identified. Such roles are meant to be examples, not a prescription for exactly how UC2B should solve these problems.

Section 2 - Improving Equitable Distribution of Access

2.1. Problem background

The discussion of broadband access often focuses on ensuring that broadband services are universally available for purchase. This is a real concern in many areas of the country and even in some parts of Champaign County, where there are few options for internet access available at any price. The problem in Champaign-Urbana proper, however, is less acute and more complicated. Most areas of Champaign-Urbana have more than two competitive internet access options. As discussed in Appendix A - Report Card Detail, that number, and the capabilities of the individual providers, will blossom over the next two years. By 2012, trends indicate that over 50% of the population will have internet service at speeds that were unavailable in 2009, and 30% of the population will have high-speed access through a cellular smartphone.[1]

However, as shown by the survey conducted in 2009 as background for the UC2B grant application, access is not distributed equally among all demographic groups in Champaign-Urbana. As far as we can tell, those struggling with the digital divide today will continue to struggle in the future, primarily being able to afford only computers that are nearly or already obsolete, and either the slowest or no home-based internet access—access that will become less and less able to support new technologies over time. Meanwhile, affluent members of our community will embrace new capabilities of faster internet service and quickly start treating them as standard features of modern life.

It is critical to the development of a connected society that every member has access to the internet and the ability to use it, in the same way that it is critical to a free society that literacy be universal. Our communities provide free public education to promote literacy, but this educational system only introduces members of our society to the digital world. Just as literacy can't develop without reading outside of school, digital literacy depends on access to computers and networks outside of school: Traditional literacy is reinforced constantly, everywhere, for free with stimuli ranging from street signs to product packaging, but developing digital literacy in a person requires either that the person has for-pay internet service, or the person goes regularly to a public access location. Both of these options have a chilling effect on digital literacy.

As with traditional literacy, both adults and youth need to be digitally literate. Educational, governmental and employment services that are only available (or much easier to access) over the internet are quickly becoming critical to life in this community. One example of this is the difficulty of finding employment (especially non-entry-level employment) without using electronic means such as e-mail and online applications. It is particularly important for the unemployed and underemployed to have access to online employment services, but without significant improvements in the affordability of internet access those below the poverty line will never cross the digital divide. Access to educational and governmental internet services should be available to all, regardless of ability to pay, like public education and broadcast TV.

Guaranteeing access to the *entire* community enables government, businesses, and schools to put services and information online that would not otherwise make sense as digital services. For example, businesses could market online with the assurance that all of their customers have access, schools could put resources for parents and students on their websites, and teachers could better prepare students for the realities of 21st century life by requiring students to extensively use the internet for assignments.

UC2B is a step in the right direction in this regard, especially with their adoption of support for a community benefit initiative and associated fund, but it will not significantly improve the universal access to broadband service (as opposed to the universal availability of services for purchase) because:

- UC2B service will only be available, at least for several years, to the approx. 10% of Champaign-Urbana residents in specific grant-defined "underserved" neighborhood blocks.[2] While local "unserved" popula-

[1] http://blog.kelseygroup.com/index.php/2007/09/10/us-mobile-advertising-forecast/

[2] For the purposes of this document, and the BTOP grant funding UC2B, we define "Underserved" per http://www.ntia.doc.gov/frnotices/2009/FR_BBNOFA_090709.pdf section III as "one or more contiguous census

tion is most prevalent in those areas, there are many members of the "unserved" population that do not reside in those areas.

- Even in the UC2B coverage area, UC2B will not significantly lower the minimum cost of internet access: UC2B has proposed providing 5mbps service for $19.99/mo, while AT&T Direct Elite DSL currently provides 6mbps for the same price and Comcast is expected to target low-income areas with a $10/mo service (per their agreements with the FCC and FTC surrounding the Comcast/NBC Universal merger).
- The bill for internet service will continue to compete with other household bills, and it will often lose out to more immediate concerns like food, shelter, heat and electricity.
- The current focus of the UC2B Community Benefit funding is to support public computer labs, which may be helpful but do not fully close the digital divide: people use the internet differently at home as part of their daily routine than they do if they have to go to a public location to use it.

Champaign and Urbana should promote universal internet availability regardless of ability to pay, as follows.

2.2. Recommendation: Create a Broadband Adoption Task Force and Fund

We recommend that Champaign and Urbana create a joint initiative to promote and subsidize internet connections and/or computers for those who can't otherwise afford them.

2.2.1. Managing the fund

As that Task Force and Fund is developed, many details of its mission and operation will need to be decided, but a few details are clear at this point:

1. That fund could be managed by UC2B only if the fund's management was clearly separated from the "service provider" operations and concerns of UC2B. Otherwise the interest of promoting UC2B services will conflict with the Task Force's mission of promoting broadband adoption in general, independent of which service provider users choose.
2. The task force and fund should not rely solely on UC2B for funding, nor should it only benefit users of UC2B—subsidies should be available to all low-income residents regardless of which internet access provider they choose.
3. Subsidies should be available to households throughout Champaign-Urbana based on objective criteria that deal with each household's individual situation, not as a blanket specifically for residents of the UC2B coverage areas.
4. Eligibility for subsidy should use existing verifiable metrics, like eligibility for USF Lifeline subsidy or school lunch assistance.
5. Service subsidy should be applicable to any available service plan from any provider whose services available to low income households have at least as low price/performance ratio as those available to higher-income households.[3]
6. The Task Force should produce an annual report (possibly based on this report) for both City Councils that evaluates our community's progress towards universal local broadband adoption and the development of networks that promote the 10 Core Values identified by the BAC.

We recommend that subsidies be available on both a coarse and fine grain. The services should be subsidized from the Fund for all residents in some areas based on area demographics, but also on a per-person or per-household granularity based on income, student affiliation, other subsidies they may receive (disability, etc). This will result in a few users getting access even if they could afford to pay for themselves, but with appropriate technical solutions (location-based access control, single-instance user sign-on, etc.) we believe that abuse will not be significant.

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blocks where … [t]he rate of broadband subscribership … is 40 percent of households or less." We define "unserved" as those households, in any area, that do not currently subscribe to broadband internet access.

[3] See http://gigaom.com/broadband/offering-a-lifeline-reform-for-a-broadband-age/ for background on this item.

2.2.2. What to subsidize

With 49,168 occupied housing units[4] and a 25.3%[5] poverty rate, it would require $2.99M per year to fully fund broadband access at a $20/mo level for all households below the poverty line in Champaign and Urbana—about $6.77/mo per unsubsidized household, $11.29/mo per internet-subscribing household, or $0.13 per $100 of Equalized Assessed Value of properties in Champaign and Urbana.[6] That amount of subsidization is currently not feasible. That said, we believe subsidy at a lower level would provide significant benefit if managed well, for example providing subsidy on a sliding scale based on a range of factors including income level and number of household members in school (not just K-12), using bulk purchasing to lower prices, and providing shared resources at a lower cost per household in addition to subsidizing individual access. Note that, while we see benefit in group computer labs, only individual always-on access at home will truly level the playing field between internet "have"s and "have not"s.

In addition to currently available services, we recommend the Task Force investigate funding, and coordinate internally, contract for, or encourage service providers to offer:

- Low-cost, local-only access
  Working with existing providers, including UC2B, may make it possible to field a specialized, lower-cost, service for local-only access. This service should include access to public libraries, local schools, all websites with .edu domains, government websites including .gov and .il.us, health facilities, local media streams and websites, and any local organization that wants to set up a local-limited presence. The service should carry few (if any) performance guarantees but it should be adequate for basic access to these facilities.

  Students might use this connectivity to reach their school, with the understanding that the school may then provide some access to class materials and the public internet, sufficient to level the playing field between low- and high-income students, via a Virtual Private Network (VPN) or similar connection from the student to the school. This mediated internet access could be provided for a fee to some students and on a sliding scale to others, based on the same data the schools already have to support school lunch assistance programs and other financial aid. As recommended above, local K-12 schools could fund this from the savings they expect to have with the advent of UC2B.

- Pay-as-you-go service
  The contract-free pay-as-you-go model has proven to be very successful among low-income users of mobile phones. This model would also make it easier for many users (for example those for whom $20/mo is not a good value, or a monthly subscription is hard to reliably support) to afford Internet access. That service may be hard for UC2B to offer to new fiber customers, due to the large up-front cost of service installation, but for providers and services where that does not apply, or where the up-front investment can come in the form of retrievable/returnable equipment (which the Task Force could facilitate collection and exchange of), we would like to see more pay-as-you-go broadband services.

- A wireless access network
  At over $10M, a wireless access overlay for Champaign-Urbana would require a significant one-time investment. With sufficient buy-in from existing providers, that cost could be recouped over time from a combination of paid access and recognized benefit that city services may find using the network for other purposes including public safety access.

  Note that we do not believe a wireless overlay network is sufficient for general-purpose internet access equivalent to commercial wired access or even 4G cellular access. The technical limitations of this tech-

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[4] 2010 Census Redistricting Data (Public Law 94-171) Summary File, Tables P1, P2, P3, P4, H1.

[5] http://www.heartlandalliance.org/povertyreport/2009-acs-fact-sheets/champaign-city-09-acs-final.pdf

[6] Assuming 70% internet penetration among non-poverty households, $1,561,800,000 Equalized Assessed Value of all properties (total EAV) in Champaign (http://archive.ci.champaign.il.us/archive/dsweb/Get/Document-8719/SS2010-064.pdf) and $715,592,870 total EAV in Urbana (http://www.usd116.org/files/budget/1011budgetsummary.pdf). Note that all households could be provided $20/mo service for $0.52 per $100 of EAV.

nology mean that it will never be quite as reliable or fast as land line or licensed-frequency services, but despite that such an overlay can provide significant public benefits.

Ideally, we would like to see free local access for all residents over the wireless network, possibly using advertising, sponsorship, or a service provider model to recoup costs associated with offering that service.

The above services could all be rolled into the mandate of UC2B, but in the interest of ensuring that the public gets the best value for its funding, they should be subject to public bid through a Request for Proposals (RFP) process, with UC2B's service provider component treated as any other provider. To the extent economically feasible, these services should be provided piecemeal—not via one monolithic provider—to encourage competition.

2.2.3. Funding the fund

The challenge we foresee, in today's economic and political climate, is where to find **any** money to fill that fund. There are three sources of funding that seem, to this subcommittee, to philosophically be appropriate supporters of this type of fund:

- It makes philosophical sense for some of this funding to come from education taxes, because the fund's primary mission is to make digital literacy possible community-wide. That said, we recognize that there is currently no provision in the education budgets for this funding and we believe that political considerations will make raising the tax rate an untenable option. **We recommend that, instead of raising additional taxes, each city request that their school district earmark savings they expect to have with the advent of UC2B for this fund, or for related purposes.**
- There are other initiatives underway that may serve as sources of funding for this fund. **We recommend that the Task Force pursue grants and participation in programs promoting universal broadband access.**
- The other source that we feel should be supporting universal access to broadband is broadband access providers. There is no current provision that would allow the cities to tax broadband providers, but there is also no current provision for providers that are not telecommunications providers to have low-cost access to public rights of way. **We recommend that both cities establish a right-of-way access protocol for providers that are not telecommunications providers that mirrors the "franchise fee" structure currently in place for telecommunications providers**, with such fees going primarily into the Fund. This model has several benefits:
  1. It levels the playing field between Information Service providers (ISPs like UC2B and Volo Broadband) and Telecommunications Service providers (pay-TV and telephone providers like Comcast and AT&T) by giving both access to public rights of way at costs based on their revenues.
  2. Unlike most progressive taxes, where those paying the majority of the taxes get minimal benefit from the tax, this fee provides value back to the end user due to the "network effect" (the concept that a network becomes more valuable in proportion to the square of the number of people on it).
  3. It provides a model for funding Public, Educational, and Government (PEG) access video and similar services in the eventuality that local phone and pay-TV providers largely disappear (instead being delivered over the internet), which we feel is likely to occur over the next 10 years.
  4. It provides a legal and financial framework that encourages existing telecommunications providers to be honest about their broadband vs telecommunications service delivery, and reduces the incentive for them to bundle services, as more telecommunications services migrate to "the cloud" (Netflix, Hulu, MagicJack, and Vonage are the vanguard of this trend).

A combination of the above sources could provide substantial funding for the Broadband Adoption Fund, but there are several other sources that also deserve investigation. These include charitable contributions, grants, corporate sponsorship, ad-based revenues, and voluntary participation by service providers outside of right-of-way access fees.

Section 3 - Improving Connectedness of Key Services and the Collaborative Environment

3.1. Problem Background

Many of the services that empower a connected community are not at the "access" layer. They depend on people having access to the network, but they do not depend on the details of that access like how an individual gets access, who their provider is, or even (for most services, with some lower bound) how fast their connection is. Much of the confusion over the mission of UC2B and its ability to effect change stems from not clearly separating these provider-neutral services—which UC2B is neither funded nor organized to deal with—from the access challenges discussed above.

Most community organizations are working to bring their services online:

- Both the Champaign and Urbana public libraries provide remote access to many databases.
- Both city governments provide lots of information via their websites.
- Schools offer some services and information via their websites.
- cucabletv.com and other PEG-channel-related websites offer some services and have more services planned.
- Broadcast stations all have some digital presence.
- The Independent Media Center, Parkland College, and the UIUC Informatics Clubs all have some form of help desk or computer assistance and training program

There are a few areas where we do not see progress:

- There is no blueprint for how a community organization can communicate privately/securely with local constituents who "opt in".
- There is little in the way of telemedicine available from local health providers.
- Local providers do not leverage their time with new customers to give them access to and training to use other local services.

Even in the areas where there is significant progress, we find little coordination to enable the best practices and expertise developed by one organization to benefit others, and even less integration of multiple organizations' efforts to create a cohesive "community web presence" in any of these areas. The result is higher cost to the organizations, slow and haphazard progress in developing our community's online presence, and no easy way for new internet users to find community resources.

3.2. Recommendation: Establish a C-U Innovation Clearinghouse

We recommend that the cities form or task an independent entity to develop, offer, and promote innovative, collaborative, secure, provider-neutral services that promote more and better employment, attract commerce, nurture cultural development, support educational institutions, and improve learning opportunities.

Many imagine that providing these services is the role of UC2B. We disagree: the provider-neutral stance this organization would need to take in order to provide these services conflicts with the potential role of UC2B as a competitor to other providers. It *might* be feasible for this organization to be an independent arm of UC2B, but efforts would need to be made to ensure that conflicts of interest do not compromise the provider-neutral mission of this Clearinghouse.

In addition to offering a shared knowledge base and single point of contact for organizations developing—or who have developed—an online presence, we recommend that this organization create and promote the following:

1. A certification program for local internet service installers, with a trademarked "Local Provider" mark for providers that use certified installers. (Certified installers should, at least, provide new users with local library credentials and a verified digital ID, provide students with access to local student-only resources for their school, and walk new users through other new credentialed services and local-only services.)

2. Secure systems that make it easy for users to manage, grant, and revoke fine-grained permissions, and for organizations (including schools, libraries, and media outlets) to provide local-only services on a provider-neutral basis. (These systems will enable the distribution of media that might otherwise be restricted, enable research by supporting anonymous participation in studies, and empower users and organizations to generally control who has access to what information. These systems could include an implementation of the Open Authentication standard, a local-only proxy, the use of private or local-provider network address space, and the geolocation of public IP addresses.)
3. Documenting and publishing offline events in the digital world. We envision working with UPTV (Urbana Public Television) and other public-access organizations to provide equipment and training that helps people bring offline events online, with real-time streaming via a local streaming gateway, with online real-time public participation by voice, video or chat, and archived online for permanent access to create a digital cultural history of our community.

This organization should be funded through public funds to the extent that it enables the mission of public entities, through reasonable fees for services provided to organizations, and through right-of-way access and/or franchise fees as discussed in our first Recommendation.

Section 4 - Promoting Public Interest network management

Currently, the Cable Commission serves as a community ombudsman for the cable television and telecommunications service industry, hearing complaints from video subscribers that escalate beyond the cable provider's support infrastructure.[7] This is valuable as a balance to providers' power because it provides the public with a way to make their concerns and complaints known to other consumers, and it provides the community (through the Cable Commission's reports to City Council and its recommendations regarding franchise agreements) with a means to judge whether service providers are meeting the needs of the community.

Internet users have no similar way to escalate problems beyond their provider. That leads to user frustration and dissatisfaction with services, and it fails to provide an environment where the end-user experience becomes the subject of competitive improvement among providers.

4.1. Recommendation: Establish a Digital Ombudsman role in both cities

We recommend that the cities either:

- empower the person responsible for replying to cable customer complaints to also serve as an ombudsman for Broadband Service Provider issues, with similar reporting requirements to those for cable complaints, or
- establish a new, independent Ombudsman position that is responsible for following up on consumer issues with internet access service providers in both cities

If the latter approach is taken, then it might be efficient to have that Ombudsman also respond to cable and telecommunications complaints, if desired by each city. **The BAC does not feel that this role can be effectively accomplished, without a perception of conflict of interest, by someone reporting to UC2B or the UC2B Policy Committee.**

A functional Digital Ombudsman is the fundamental base upon which public interest network management can be built. Without such a "voice for the users", providers are the only entities that have enough information to weigh in convincingly about service quality and user issues. It is fundamental to customer satisfaction as well as gauging whether the available internet service options are meeting the needs of the community. In the case of ISPs, service that meets the core values laid out by the BAC should be the standard.

The ombudsman role is a "soft power" role: because ISPs are unregulated, this person would not be able to compel ISPs to take particular actions to resolve customer problems. Instead, it would help promote competition by providing a knowledgeable advocate for consumer needs, providing a focal point for the public that can compile and catalog complaints, and bringing pressure to bear on bad actors (or laude good ones) in public fora.

[7] See http://ci.champaign.il.us/city-council/boards-and-commissions/cu-cable-television-and-telecommunications-commission/ for background on the Cable Commission's mission and role in this regard.

Section 5 - Conclusion – The future of the Broadband Access Subcommittee

We believe following the above three Recommendations will put Champaign-Urbana on a path towards becoming a fully connected society.

With this report, the primary task of the Broadband Access Committee of the Champaign-Urbana Cable Television and Telecommunications Commission is concluded. There is some need for continuing operation of this Committee in order to disseminate the information in this report, and update it periodically. Along those lines, we would recommend that this report be forwarded to both City Councils and the UC2B Policy Committee, with an offer to present the primary recommendations in summary form and answer any questions they may have at a time that is convenient to them. After those presentations, and based on the direction given by the City Councils, it may make sense for this Committee to continue to operate while some of the recommendations are put into effect, or to reconvene annually to update this report. Alternatively, this Committee could be dissolved. If the Committee is dissolved, it might be efficient for some of the members of this Committee be included in future Broadband Access and Adoption efforts along the lines of the Recommendations above.

Regardless of the disposition of the BAC, we believe that it is appropriate at this time, given communication trends, to add adoption and development of broadband and internet connectivity to the responsibilities of the Champaign-Urbana Cable Television and Telecommunications Commission, and to rename that Commission "the Champaign-Urbana Communications Commission."

Appendix A - Report Card Detail

A.1 Service availability and performance (B+ - Improving)

Champaign-Urbana has two major broadband internet service providers (Comcast and AT&T), four cellular broadband providers, and a variety of independent providers, which will all be upgrading their networks over the next three years. In addition, local governmental and educational institutions will see significant network upgrades, and over the next three years, two new providers are expected begin offering service:

A.1.1 Comcast

Comcast rolled out its Xfinity branding for phone, TV, and internet service in late 2009. In December 2010 they completed a major technology upgrade, freeing up many of the formerly-analog TV channels and upgrading cable modems and headend equipment to the "DOCSIS 3" standard. This upgrade allows Comcast to deliver 50- to 150-mbps service over their existing hybrid fiber/coaxial cable infrastructure (consisting of fiber-connected "nodes" that serve neighborhoods of houses connected with coaxial cable).

Comcast cable TV and home Internet is available to nearly all residents of Champaign-Urbana as required by franchise rules. Comcast also covers most businesses. It is not available in most outlying areas.

With the Comcast/NBC-Universal merger, Comcast is required to provide $10/mo internet access and $150 computers to 2.5 million low-income households. These services are expected to be available in Champaign-Urbana by Q1 2012.

A.1.2 AT&T

AT&T rolled out its U-verse service (high-speed DSL and cable television) in June 2009, deploying over one hundred small huts connected to a fiber backbone that it has expanded to run throughout the community. In new-development areas of Champaign-Urbana, AT&T is deploying U-verse as a Fiber-To-The-Premise (FTTP) service. In the future, U-verse is expected to increase from 30mbps to 100+mbps as more huts are deployed, and eventually higher speeds as the copper infrastructure is replaced with fiber over the next 5-10 years.

U-verse is not universally available (AT&T's statewide franchise does not require full build out like the C-U franchise does), and it has the disadvantage that internet speeds are reduced when TV is being watched or recorded. As of December 31, 2009 U-verse, which offers up to 24mbps of downstream internet speed and 2 simultaneous HD television streams, was available to 27% of C-U households (31% of "low-income" households). Non-U-verse DSL internet access with speeds ranging from .768 to 6mbps is available to most residents of Champaign-Urbana, most businesses, and some outlying areas.

A.1.3 3G and 4G Broadband

In addition to the major wireline providers, Verizon Wireless, T-Mobile, Sprint and AT&T Wireless are in the process of upgrading their networks to provide tens of megabits per user (compared with fractions of a megabit in 2009). By 2012, all four cellular providers are expected to offer some form of 4G service, capable of providing speeds in the 10-30mbps range. By 2015, these may reach speeds as high as 400mbps.

This means that ISPs, big and small, will be competing with cellular providers' high-speed service plus the appeal of increasingly versatile all-in-one cell phone devices. In the past, desktop computers, laptop computers and even video game consoles were all dependent on the traditional ISP connection, but in a world where cellular companies can offer a high-speed connection to the internet, some will inevitably decide to drop their wireline ISP.

A.1.4 Independent providers

Independent providers, including Paetec, Volo Broadband, and Pavlov Media, are also important to this discussion. Paetec offers phone and internet services over its own fiber infrastructure and AT&T's copper infrastructure. Its upgrade plans are currently unknown to the BAC. Volo Broadband offers wireless service in most areas of Champaign-Urbana and fiber services in some areas. Both services are currently being expanded and upgraded. Pavlov Media serves mostly multiple-dwelling units (MDUs) with wireless service. In 2010, Pavlov deployed a substantial upgrade to its wireless network, using equipment capable of delivering up to 100mbps to most MDUs.

A.1.5 Governmental networks

In 2010, the City of Urbana completed its independent Governmental and Educational fiber network, connecting most City facilities and schools to a fiber backbone. Urbana currently expects their network to become part of UC2B, which will connect a few remaining facilities in Urbana, and all of the facilities in Champaign, to a similar backbone.

UC2B

UC2B will also offer basic broadband service to low-income areas of Champaign-Urbana, be it through UC2B as an ISP or another entity. UC2B's Policy Board has not yet decided on the complete list of institutions UC2B will provide service to, what services it will provide, and whether it will provide service to the community as a whole. Depending on the answer to these questions, UC2B may, in the end, be either a competitive ISP or a resource for smaller ISPs who can provide service over the UC2B network. Unfortunately, those roles are not easily compatible.

The original plan for UC2B was to provide Internet service to 54% of the households in specific underserved areas, while fostering a marketplace of independent service providers that will use the UC2B network to provide services to the remaining 46% of the population in that area, and other areas as those providers or the cities make possible. However, many are concerned UC2B will not be financially sustainable. (Concerns stem from the observation that 54% is an extremely high adoption rate for a new market entrant to expect to achieve, especially since UC2B will be offering 5mbps service for $20/mo in areas where AT&T Direct Elite DSL, which provides 6mbps for $19.99/mo, is already available.) To improve its sustainability outlook, the UC2B plan was changed to include directly providing service to cherry-picked businesses along its path.

Unfortunately, both the goal of 54% direct subscribership, and cherry-picking to enhance sustainability will put UC2B directly in competition with the service providers it was originally supposed to empower. With UC2B serving most of the underserved population and cherry-picking the most lucrative businesses, other service providers will have little incentive to roll out services on the network.

Over the next 22 months, UC2B will decide on a method for navigating these conflicts, hopefully finding a long-term sustainable business model that improves the speed, availability, affordability, equitable distribution, and the competitive options for broadband access in Champaign-Urbana.

In relation to the BAC's 10 core values, the UC2B network is unique in two ways: First, it is the only publicly owned network in this area. The public, users and potential users have the opportunity to provide input to a much greater extent than with other local networks. Second, UC2B has been developed with the goal of making it sustainable, and therefore a long-term investment. Though decisions are still being made about its sustainability, we are glad to see progress towards the goals of a public network that is a long-term community investment.

A.1.6 New Providers

The other new entrant to the ISP arena is ClearWire, the nation's largest wireless internet service provider. Their services, based on the WiMAX standard with speeds and price points similar to residential DSL and cable internet service, were slated to be deployed in late 2010 but have not yet appeared.

A.1.7 Summary

In summary, advanced broadband services are universally available to residents of Champaign-Urbana, and faster services are on the way:

Projected 2012 low and high-speed service options by provider (includes readily-available promotional rates)

	Lowest cost service			Highest speed service		
	Speed	**Availability**	**Cost**	**Speed**	**Availability**	**Cost**
Comcast	10-20mbps	Universal	$20-60/mo	150mbps	Universal	$279/mo
AT&T	.8-1.5mbps	Most areas	$15-20/mo	30mbps	27%	$65/mo
Volo	3-25mbps	Some areas	$32/mo	75mbps	Some areas	$100/mo
Verizon, T-Mobile, AT&T wireless, etc	.5-3mbps (3G limited usage)	Universal	$20/mo (plus phone plan)	30mbps (3.5G unlimited usage)	Universal	$40/mo
UC2B	5mbps	Limited	$20/mo	40mbps	Limited	TBD
Clearwire	5mbps	Most areas	$25/mo	50mbps	Most areas	$80/mo

A.1.8 Open access networks

Most networks are owned, operated, and usable by only one company. Recently, other countries and a few domestic municipal broadband projects have had some success improving competition by establishing "open access" policies on their networks, where multiple providers use the same infrastructure but compete for customers based on service offerings and quality. The federal funding that UC2B is using encouraged awardees to create "open access" networks, and, when operational, UC2B will be the only open-access network in the area.

Open Access networks appear to be an effective mechanism for increasing competition, with all the attendant improvements in cost, performance, support quality and access offerings. These are indirect benefits—open access provisions of networks do not directly benefit consumers. Because the benefits are indirect, we are not grading separately the amount of "open access" connectivity available.

Note that an "open access" provision is related to the providers that have access to a network, not the content that users can access on the network. (A network that does not limit use of legal applications and content is known as an "open"—but not necessarily "open access"—network!) We do grade the openness of networks below, as that has a direct impact on the benefit a network provides to its users.

A.2 Affordability and Equitable/Ubiquitous access (C+ - Stagnant)

On a less rosy note, we observe that despite significant competition and technological advancements, the cost of broadband access has not significantly changed, and does not appear likely to. Those who are unable to pay for service today will not have significantly cheaper options in the foreseeable future. As observed by media ranging from Scientific American to the online news outlet Ars Technica, this problem is not unique to Champaign-Urbana—it is our nation's highest hurdle in improving our internet competitiveness.

We believe that improving the affordability of access is **absolutely critical** to the equitable distribution of service throughout the community. Improving the affordability and equitable distribution of technical resources is this community's most critical need, and the focus of our first recommendation.

A.3 Reliability (B – Static)

None of the providers above release public information about the number of outages their customers see on average. That said, anecdotal evidence suggests that both of the primary internet providers support 99%-99.9% uptime.

99.9% uptime is adequate for most current usage of the internet, but not sufficient for mission-critical use of the internet, high-use entertainment (like cable TV), or lifeline services like 911. Due to the complexity of the system as much as provider reliability, we do not foresee internet access reliability ever improving to a point where alternative services are not needed. For example, you might be unable to dial 911 on your Internet Phone because your router is not working properly. This type of unavoidable equipment failure necessitates alternative systems like cell phone infrastructure.

In addition to reliable back-up systems, we would like to see residential broadband networks with 99.999% reliability for every user, and we encourage UC2B to make that a fundamental design goal. A competitive push from UC2B might be enough to make other providers take reliability more seriously. That said, we do not currently see much progress in that direction from existing providers. Current reliability appears adequate to meet most users' needs, and access from multiple providers is available to satisfy the need for truly mission-critical internet access whether each provider's theoretical reliability is 99.9% or 99.999%.

A.4 Privacy of communications (A – Static)

All of these services support a level of security that is sufficient for online banking, and with appropriate middleware, this level of security could progress to support everything from online voting to media distribution. Currently, the services are secure enough to meet the community's needs for private communications, but until middleware exists to allow local users to safely access critical institutions (governments and health care institutions first and foremost), and until that middleware is adopted by local critical institutions, our community will not see the full benefit these services can provide. Adding that last component is one focus of our second recommendation.

A.5 Connectedness of key services (C – Stagnant)

In addition to broadband access, online services are rapidly changing: in the last few years we have seen the explosion of Twitter, Facebook, video services like Hulu and Netflix, iTunes, and sundry other online services. Local online services, however, are developing much more slowly, and in a very haphazard manner. Technology offers a unique opportunity to make our lives easier by connecting services to the internet, but we are not taking full advantage of this locally.

Broadband access provides an opportunity to improve health, governmental, and educational services through the utilization of the local network. E-health, for example, can be used to remotely treat patients already receiving treatment for an ongoing problem, thus saving time and money to both the patient and the medical practitioner. Online educational services are also increasingly being recognized as key components of 21st Century education.

All of these services depend on nearly-ubiquitous access, for example in order for educators to fully utilize these tools without widening the digital divide they need to know that all of their students have reliable access to them. We address this problem with our first Recommendation. But even as that problem is being resolved, local providers need to develop compelling online services and training programs so that as more people get online, the promise of these technologies is realized in practice.

Local institutions have made small strides in this direction (online class resources in both school districts, comprehensive information on both cities' websites, and the ability to pay parking tickets online via both local governments' websites being representative examples) but there are still many governmental and other services that require an in-person trip. Bringing those services online could reduce the need for an in-person trip with the appropriate technology in the customer's home, coupled with an appropriate backend at the service provider. We would like to see a more concerted, systematic, and rigorous effort to develop these services. We believe that the support for collaboration that makes up our second recommendation will prime that pump.

In addition to public services, entertainment and news can be much more local and personal online than they have been since the advent of radio and television. Almost all local media outlets—local television, radio, and newspapers—have some online presence, but two issues prevent them from having the impact on the media landscape that we would hope.

The first barrier is that there is no cohesive portal or "TV guide"-like system that allows access to the online content provided by local media outlets. Instead, potential readers and watchers must largely know what they are looking for before they find it. Creating such a portal that integrates streams of content from old-media online resources with new local media initiatives like SmilePolitely.com and CU-CitizenAccess.org (implicitly encouraging collaboration among media outlets) is also included in our recommendations.

The second barrier is that current copyright law makes it hard for equivalent content to be made available in online and offline media streams. We believe that appropriate technology (only allowing verified-local users access to certain content) can dramatically reduce the hurdle that traditional media sources must jump to present compelling online offerings. That's why we recommend developing a provider-neutral local-access infrastructure that is well integrated with traditional internet service, and advocating that current local media outlets collaborate through the use of that service.

A.6 Public Interest Network Management (F - Improving)

A public network is one whose primary mission is to benefit the community. Such networks allow the users and potential users to guide the network's development, and only profit in accordance with their success in providing measurable community benefit.

No current providers offer a direct mechanism for users to influence the network's direction, and all current providers are for-profit companies with a presumable profit motive. Comcast and AT&T operate with little to no public input. Local providers like Volo Broadband maintain local support staff and tend to be more open about their planning processes, with more opportunity for direct user input, but have no formal public guidance initiatives. Even UC2B, which will be controlled by public entities, as yet has no mechanism for potential users to give coherent feedback on the network's direction.

If UC2B develops significant public input procedures to guide its development, as has been discussed informally, public interest network management will be more available. But until Comcast and AT&T adopt similar procedures, most users will have little input in the development of the networks they use and depend on.

This is the subject of our third recommendation.

A.7 Openness (B- - Improving)

Open networks are ones that do not significantly restrict the content, applications, or equipment and modes of communication their users can take advantage of. (This is different from networks with "open access" provisions, which allow any provider to use the network but don't usually specify anything about users' ability to access content.)

The Network Neutrality debate is all about openness of networks—a neutral network is an open network. On December 21, 2010, the FCC passed Order 10-201[8] which, while less rigorous than many would like, is a step in the right direction. The order:

- Bans content blocking
- Requires transparency from ISPs
- Requires network management and packet discrimination to be "reasonable"
- Allows services delivered over the last-mile broadband pipe to be "Managed," but requires that management to be monitored for anti-competitive behavior
- Exempts wireless technologies (mobile phones, for example) from all but the transparency and blocking rules

Then, on January 18, 2011, the Department of Justice (DOJ) approved Comcast's merger with NBC/Universal, a move that many feared would significantly limit Comcast users' access to competitive content and non-Comcast users' access to NBC/Universal content.

To prevent harm to consumers, the DOJ imposed some restrictions on Comcast post-merger, requiring that Comcast:

1. licenses programming to online competitors to Comcast's cable TV services
2. subjects themselves to anti-retaliation provisions, and
3. adheres to Open Internet requirements

The FCC[9] and Federal Trade Commission (FTC)[10] have also imposed several restrictions on the new Comcast/NBC-U. In addition to offering free and discounted services to some areas and populations, and growing their network to some underserved areas, Comcast will be required to:

- Offer standalone broadband internet access services at reasonable prices and of sufficient bandwidth so that customers can access online video services without needing to purchase a cable television subscription from Comcast
- Make $10/mo Internet and $150 personal computers available to 2.5 million low income households
- Not enter into agreements to unreasonably restrict online distribution of its own video programming or programming of other providers
- Not disadvantage competitors to Hulu (which NBC partially owns) over its broadband internet access services and/or set-top boxes
- Not unreasonably discriminate in the transmission of an independent online video distributor's legal network stream to a Comcast broadband subscriber
- Make 12mbps or faster service available in all markets they are able to

[8] http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-201A1.pdf

[9] http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-304134A1.pdf

[10] http://www.justice.gov/opa/pr/2011/January/11-at-061.html

- Give the content of other firms equal treatment if Comcast imposes caps, tiers, or metered usage pricing on subscribers
- Refrain from most licensing terms that seek to limit online distributors' access to content

Together, these would—if enforced—go a long way to ensuring that Comcast's network is open at least to all video providers.

Whether or not they are legally considered as common carriers, networks should operate in a similar fashion in that information should be transported without being manipulated or blocked by the ISP. In general, there have been very few infractions on user privacy, and the current trend appears to be towards more enforced openness. We view that as progress, but not yet a situation where we can be certain that all providers will treat user content fairly.

A.8 Long-term nature of public investment (B – Improving)

Urbana and Champaign both have recognized the need to ensure that public money is invested in long-lasting technologies. That was the basis for Urbana's decision to deploy fiber to its governmental buildings and schools, and Champaign's development of its Fiber Master Plan. UC2B inherits that value from the two cities in the design goals developed by its Technical Committee, which include creating "a flexible, standards-based network topology that might last for the next 50+ years."

Developing UC2B appears to be the conduit through which both cities will invest in networks, at least for the next few years. The trends visible in UC2B appear to be taking into account the long-term nature of public investment, but it is too soon to judge whether the result will in fact be a good long-term investment. We believe that it will be important to evaluate the long-term viability and value of UC2B over the next 5 years.

Commercial providers do not spend public money but use public rights-of-way and serve the public, so we believe they deserve scrutiny in terms of whether they are using that right-of-way and userbase to support long-term investments. Commercial providers generally build infrastructure designed to support a long-term business model, though the technologies they deploy may not last particularly long. We would like to see more long-term technology deployed by both Comcast and AT&T, compared with the incremental upgrades we have seen so far, but we do not expect Comcast or AT&T to invest in major upgrades for several years because their recent incremental upgrades are only now beginning to provide the companies a return on their investment. That said, their incremental upgrades validate their long-term business models, and are therefore themselves a form of long-term investment.

A.9 Support for innovation (C – Improving)

In order to maximize the long-term benefit network technologies provide to our community, our networks need to make it easy for people to develop and use new services and find new uses for technology (social, governmental, economic, educational, and technical). Innovation is one key to maintaining the economic, social, and educational benefits of networks in the face of ongoing technological progress nation- and world-wide.

The typical barriers to innovation are:

- High cost of initial infrastructure
- Lack of access to or small size of initial market
- Lack of access to best practices
- Need for technical expertise to deploy social, governmental, economic, or educational services
- Need for business and social expertise to deploy technical services
- Lack of wide agreement on need for new services and technologies

Champaign-Urbana has three initiatives that are working to lower these barriers to innovation:

- The EnterpriseWorks building in the University of Illinois South Research Park serves as an incubator, improving technical innovators' access to business and social expertise, and reducing the cost of some facilities
- UC2B will reduce the cost of accessing a small test market with advanced connectivity
- The Graduate School of Library and Information Science's Community Informatics students provide technical expertise to nontechnical innovators, through a variety of programs

None of these is as rigorous as the Case Western Reserve University "Case Connection Zone"[11], which is approaching these problems by establishing a research testbed network where they can observe the success of various approaches. That said, we see some progress and with proper collaboration (hopefully encouraged by systems set up due to our other recommendations), we are optimistic that opportunities for innovation will continue to grow.

A.10 Support for collaboration (D – Stagnant)

The ability to learn from and build on others' efforts is key to making more and more services—local and remote—available online. Unfortunately, local collaboration is minimal:

- Both local governments have recently rolled out new websites with significantly more easily accessible content, and new features for keeping citizens informed and engaged, but the development of those websites is private, separate and independent, so many lessons learned stay within each government's Information Technology or Services department.
- Local public, government, and educational access television channels have websites and some video-on-demand features, but those features are all being developed independently with little idea and resource sharing between them and different feature sets.
- The local Chamber of Commerce maintains a web site with local business listings, but there is little in the way of online collaboration between those businesses.
- The Independent Media Center has a selection of programs like the Chambana.net datacenter, the CU Community Helpdesk, and the Makerspace Urbana, but most have little reach into the community.
- The University of Illinois has some training programs and volunteers through the Graduate School of Library and Information Science, Illinois Informatics Initiative and the Informatics Club, but these programs, whose goals often overlap, are all being executed without collaboration.
- The Champaign and Urbana school districts and Parkland each have significant online presences for disseminating information, online coursework, and electronically-facilitated student/parent/teacher interaction, but each entity innovates independently.

We see two local initiatives that are promising, because they are bringing together diverse information sources and encouraging collaboration:

- The cucabletv.com site brings together channel listings and contact information for the local public, educational, and governmental (PEG) access television channels.
- The Champaign County Arts, Culture and Entertainment Council's 40north.org website has developed into a local hub for arts and cultural information.

This is the kind of collaborative innovation we need more of in our community. Promoting those collaborations, which cut across many of the items above, is the focus of our second recommendation.

[11] http://caseconnectionzone.org/