Developing Broadband Networks in the Public Interest
Community Wireless Infrastructure Research Project
Amelia Bryne Potter and Andrew Clement

Broadband Networks That Benefit Users

There are currently a range of initiatives in North America, and worldwide, attempting to develop public internet infrastructures. The term "public" seems to imply that there are only two options: public or private broadband, when, in reality, there is a wide range of public/private models for broadband networks. While some broadband models could arguably be more appropriately called public than others, a more useful definition is of what a broadband network *in the public interest* may look like. A broadband network in the public interest may be publicly or privately owned, publicly or privately operated, or any combination of the two. Such a network could be achieved with many types of business models, and may be achieved differently in each community, perhaps using different technologies, based on local priorities and constraints.

This paper presents a list of a checklist of principles, a "desiderata" for building and operating broadband infrastructures that benefit users, and shows how this checklist can be used as a tool for designing and assessing broadband networks.

We believe that this tool can play a valuable role now – a time when broadband infrastructure is being shaped. We hope that it will give guidance to the development process of broadband networks and that it will help to shift the debate away from whether the public or private sector is better suited to own and operate these networks, to what network characteristics, regardless of public/private involvement, are in the best interest of users. As a key infrastructure for citizen economic, social, and civic participation it matters over the long term how these networks are being designed, built, and managed.

Principles for Broadband Networks in the Public Interest

We argue that broadband networks designed to benefit users should be:

Ubiquitous & Universal: Service coverage should include every household, business, organization, public space, tourist destination, and public transit corridor in the network's coverage area, within the limits of what is technically feasible. Ultimately, the service should be *universal*, that is, it should reach every person when and where they need it.

Widely Useful: Good infrastructures allow for a wide range of applications that people find useful in conducting their daily affairs. While some of the most important ones can be anticipated and designed for, others will emerge over time.

Useable: Ideally infrastructures 'disappear' in the sense that they can be taken for granted – always ready to be used effortlessly, but never getting in the way of the immediate task at hand.

Accessible: Access to the system should be as barrier-free as possible, accommodating a wide range of cognitive and physical disabilities. The service should also

accommodate a community's linguistic diversity. Conducting user needs analysis at the design stage and providing technical support can help to ensure that a network is accessible.

Affordable: In order to ensure universal access for all, including low-income households, the service should be available at affordable rates (e.g. <$10 per month) and preferably for free. Ideally, the service should provide free access to basic broadband service (e.g. 1.5 Mbps, bi-directional as specified by National Broadband Task Force, 2001), with the possibility of fees for premium, higher speed services to support high bandwidth uses.

Reliable: The service should be as reliable as the other common utilities, such as water, power, and the telephone, with clear performance standards established (99.99% availability, 4 hours mean time to repair).

High Quality: The service should maintain a good standard of throughput and response time for streaming or other time sensitive transmissions requiring particular Quality of Service (QoS) standards (e.g. public emergency, telemedicine). However, these should not be discriminatory in the sense of allowing the network provider to favor arbitrarily some communicants over others or permit inspection of packet content.

Healthy: Electromagnetic radiation emissions associated with network equipment shall be within known safe limits, and should be routinely monitored.

Cost-effective: Independent of the pricing for affordability mentioned above, public infrastructures should make efficient and effective use of the resources they require to offer service.

Accountable & Responsive: Mechanisms of governance and citizen oversight and control to ensure that the service and its operator are responsive to citizen input and needs on issues ranging from network repairs to new service innovation.

Secure: State of the art technology and best practices should be adopted to ensure that personal communication and internet browsing are secure against unwarranted interception. Non-intrusive means should be incorporated into the service to protect users against spam, viruses, spyware, etc. Reasonable, lawful means should be adopted to protect users against illegal content (e.g. child pornography, hate speech).

Privacy Enabling: Operation of the service shall be fully compliant with applicable privacy laws and best practices. No personally identifying information shall be collected beyond that which is necessary to ensure access to and operation of the network. The service should enable both pseudonymous and anonymous use. Location-based and other services requiring additional personal information may be offered on a strictly voluntary, opt-in basis.

Open: The service should be designed to maximize openness at various levels (e.g. openness to a variety of access devices, the use of open source software, and all kinds of content, applications and services).

Neutral & Non-discriminatory: No restrictions on access to lawful content/services, and no discrimination on the basis of content or services (e.g. P2P networks) beyond what is necessary for efficient network operations.

The paper examines the principles named above, describing what is meant by each term, and how it has been used in policy development and research. These characteristics are further illustrated using case studies of community/municipal wireless initiatives in North America.

Applying the Principles

The paper also proposes how this tool – the checklist of principles defined above – can be used for designing and assessing broadband networks, in terms of their relevance and benefit to members of the public. In short:

→ The tool can be used by people with various relationships to a project, such as: those directly involved in the network design and deployment, policymakers, consulting partners, researchers, independent assessors, and community members.

→ The tool can be used at different stages of a project, including: network design, assessing a business plan, developing and assessing RFPs, long-term planning, and evaluating a planned or operational network.

→ The tool helps its users to think through the complexities that result from the fact that the network characteristics prioritized on the checklist are not achieved in isolation from each other. These characteristics can be mutually reinforcing, for example, a ubiquitous, open network is likely to also be widely useful. However, in many situations network designers will face trade-offs between desired characteristics. For instance, many of the desired features of broadband networks in the public interest, notably universality, ubiquity, and high quality may be costly to achieve, potentially undermining affordability. Because public wireless networks should be cost effective, the development of viable business models for service provision is essential. Thus, when assessing business models, an understanding of the context of the network deployment, and a balance between the principles, is crucial.

→ In summary, the tool does not provide communities with a one-size-fits-all model for network building, but with a set of core principles that can help communities to develop their own strategies to build the best networks for users. The tool can help planners to determine and prioritize goals for a local broadband network, to develop network design principles that meet multiple objectives at one time, and to assess trade-offs between desired network characteristics to create a network that fits the needs of the community.

Read the Paper

"A Desiderata for Wireless Broadband Networks in the Public Interest." By Amelia Bryne Potter and Andrew Clement. Community Wireless Infrastructure Research Project. Presented at the 35th Research Conference on Communication, Information and Internet Policy, September 28-30, 2007, Washington, DC. The paper can be found at: http://web.si.umich.edu/tprc/papers/2007/727/Desiderata.pdf