INNOVATIVE USES OF BROADBAND IN YOUR COMMUNITY

A guide to the many uses of broadband in Western Massachusetts’ communities

November 2012

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The MassBroadband 123 network will provide the necessary broadband infrastructure to foster economic growth, improve health care, education, and municipal government, and strengthen public safety.

The MassBroadband 123 Network will:
- Connect approximately 1,300 public safety entities, community colleges, libraries, medical facilities, and municipal facilities. These facilities will receive a direct fiber connection and electronics ready to receive service from Internet Service Providers.

Connected community anchor institutions can procure internet access, telephone service, hosted PBX and a wide array of web-based services from a large selection of Participating Internet Service Providers, all of which can provide services over the Commonwealth’s fiber network.

**MBI Networks**

MBI signed an agreement with Axia NGNetworks USA to serve as the network operator for the MassBroadband 123 fiber-optic network. Under the agreement, Axia will manage and maintain the backbone network in communities throughout western and northern central Massachusetts and provide wholesale access to the network to dozens of internet service providers.

Axia currently operates fiber optic networks in Canada, France, Singapore and Spain. As the operator of the MassBroadband 123 network, Axia will offer wholesale services to broadband service providers using its open access approach. A growing list of potential service providers is available on the Axia website. Axia also plans to invest in the ongoing operations of MassBroadband 123 and provide fiber extensions to the network in response to market demand.

**WesternMA Connect, Inc.**

WesternMA Connect, Inc. is a regional initiative with the mission to create a more competitive and robust telecommunications landscape in the four counties of the western Massachusetts region to achieve broadband access equity. Connect’s early work on broadband access in western Massachusetts helped pave the way for the development of the MBI. Connect is continuing work to bring high-speed internet service to all western Massachusetts and provide communities with information about the next generation network.

**The Community Anchor Institution (CAI): Your Role in the Network**

Community Anchor Institutions (CAIs) are entities serving the public interest such as schools, libraries, universities, healthcare centers (hospitals, clinics, etc.), public safety centers (police and fire stations), town halls, state offices, and senior centers. CAIs are labeled “anchor institutions” because of their prominent role in a community. These institutions, like other organizations, businesses or individuals, rely more and more on high-speed internet connections to continue providing services to the community. The MassBroadband 123 will allow public and governmental facilities to migrate their internet and networking needs onto a publicly owned, state of the art next generation fiber optic network.

Where are our CAIs located?

The MBI has identified various locations as CAIs in your community and has provided that information to local officials.

How were CAIs chosen?

The MBI developed a list of possible CAIs in western Massachusetts during the ARRA grant application process. The list was based on the federal definition of CAIs, work with the MA Geographic Information Service, and other state offices. The MassBroadband 123 network received a $45.4 million grant from the National Telecommunications and Information Administration and an additional $26.2 million from the Commonwealth. These grants were able to fund the connection of over 120 CAIs, which is approximately 60 percent of the eligible CAIs in the region. MassBroadband 123 is connecting more CAIs than any other project in the nation but did not receive enough grant funding to connect all.

How will CAIs be connected to the next generation network?

All CAIs will have a direct connection to the next generation network. Fiber optic cable and equipment are being installed directly into the buildings from the MassBroadband 123 Network where other communications services enter the building. One panel with fiber optic connection equipment will be installed by the MBI or their sub-contractor at each CAI building. Each panel will also have an Ethernet switch installed to easily facilitate connecting to the network.

How do CAIs obtain internet service over the new fiber connection?

CAIs can procure internet access or other network services from one of the numerous retail providers that use the MassBroadband123 Network. An updated list is available on the Axia website. CAIs can obtain service individually or can bundle together in larger groups (all CAIs in a municipality, or groups of municipalities) and procure service for a large number of sites in attempts of achieving the cost efficiencies of buying in bulk.

Am I required to commit to buying services prior to installation?

The MassBroadband123 network is being built with funds from the American Recovery and Reinvestment Act (ARRA) and no funds were awarded for anything other than constructing the network. CAIs are not required to commit to buying services prior to installation, but bandwidth offered over the MassBroadband 121 Network will have higher speeds and be more affordable than current services.

**WEB RESOURCES**

- MassBroadband
  - http://www.massbroadband.org
- Axia Networks
  - www.axiamassbroadband123.com
- WesternMA Connect, Inc.
  - www.westernmaconnect.org
High speed internet improves local government’s ability to respond to and meet constituent needs. Benefits range from allowing for greater citizen involvement and increased transparency to more efficient and effective internal processes and potential cost-savings. Robust site to site connectivity within a community can increase efficiency and allow for data backup at multiple locations. General benefits include:

- Local site to site connectivity
- Local or regional offsite data backup
- Virtually unlimited and future proof bandwidth, local and internet
- Ability to complete forms online 24 hours a day with less paper waste
- Many government services can be completed online (for example billing and car registration)

**EXAMPLES OF BROADBAND**

**MUNICIPAL ELECTRONIC RECORDS PRESERVATION**

Digitization of government provides local government with efficiency, improved searchability and accessibility. A major issue is the long-term preservation of electronic records, as more and more information is available electronically developing an electronic records management system to preserve these records is necessary.

**VIRTUAL PRIVATE NETWORK (VPN)**

A VPN is a technology that allows the Internet or some other network to connect computers to remote computer networks that would otherwise be inaccessible. A VPN provides security so that traffic sent through the VPN connection stays isolated from other computers on the intermediate network. VPNs can connect individual users to a remote network or connect multiple networks together. For example, a user may use a VPN to connect to their work computer terminal from home and access their email, files, images, etc.

Many towns and cities have implemented VPNs to assist their employees and others using their internal network to connect remotely. For example, the Town of Acton, MA IT department maintains the town’s VPN allowing staff to use the town’s network over a wireless connection or remotely.

**E-PROCUREMENT**

E-procurement is the purchase and sale of supplies, work, and services through the Internet and other networking systems. E-procurement is done with a software application that includes features for supplier management and complex auctions. E-procurement generally refers to on-demand or a software-as-a-service (SaaS).

Benefits of e-procurement in the public sector include increased efficiency and cost savings and improved transparency. E-procurement in the public sector has seen rapid growth in recent years.

**Example:** The MassBid Program is a Software-as-a-Service (SaaS) solution providing an end-to-end integrated solution for e-procurement. The Program serves as a centralized and easy-to-use software system for managing Requests-for-Information (RFI), Requests-for-Proposal (RFP), and Requests-for-Quotation (RFQ) - from public advertisement through award and document retention.

**ELECTRONIC TIMESHEETS**

Electronic timesheets generally refer to web-based timesheets. Data can be more easily entered from anywhere by employees and managers have easy and immediate access to timesheets. Other benefits include greater accuracy of employee hours, less time wasted entering data, timesheets that are stored in specific files with backups so missing sheets are rare, compliance with legal requirements is easier to monitor.

**Example:** Anchorage, Alaska implemented the Building Efficient Services Today (BEST) initiative that included leveraging technology to improve efficiency, accountability, and achieve cost savings. One process currently being implemented under BEST is electronic timesheets and absence management.

**VIRTUAL SENIOR CENTER**

High speed internet allows for the existence of virtual senior centers. The goal of a virtual senior center is to enhance the experience of homebound seniors who are unable to participate in programs generally offered by brick and mortar senior centers. Broadband offers the potential to increase the number and types of programs offered by senior centers and increase the number of participating seniors.

**Example:** The Virtual Senior Center initiative in New York City is a public-private partnership with Microsoft, the NYC Department for the Aging, and the NYC Department of Information Technology and Telecommunications. The program puts easy-to-use, large touch screen devices with webcams into the homes of socially isolated older New Yorkers. The program allows participants to engage in activities like discussion groups, museum lectures, and music classes from their own home. The program helps to relieve social isolation, promote wellness, and provides homebound elders access to community services.

**OFF-SITE DATA STORAGE**

Beginning in 2013, the new Springfield Data Center (SDC), located in Springfield, MA, will be open for business. The SDC will offer strategically aligned, cost-competitive services, flexible space, 10GB fiber (internal and external), redundant power conduit, full data backup and Disaster Recovery services. Common Commonwealth department tenants include the Department of Revenue, Public Safety & Security, Health and Human Services, Administration & Finance, Office of State Comptroller, Treasury, and Labor and Workforce Development.

**WEB RESOURCES**

- **MassBid Program**
  - http://www.massbid.net/?page=public_agency

- **BEST Initiative from Anchorage, AK**
  - http://www.sec.state.ma.us/arc/arcpdf/

- **Virtual Senior Center Example from NYC, NY**
  - http://selfhelp.net/virtual

- **Off-Site Data Storage**
  - https://wiki.state.ma.us/confluence/display/isp/OffSite
High-speed internet is an integral part of enhancing education, and K-12 institutions can fully use the E-Rate system for all services delivered over the fiber optic network. The construction of fiber connections to schools not part of the initial build are also partially reimbursable under E-Rate. Schools can use the fiber network for robust internet access, site to site connectivity, configuration of a district wide network, and for on-net connectivity to local higher education facilities or hosted digital content. General benefits include:

- Virtual classrooms allow students to attend class and collaborate from a distance
- Ability to access dynamic tools to help enhance studying
- Enhance school curricula by allowing for more dynamic and interactive online applications
- Use of online and digital media to create educational opportunities
- Learn a language through interactive rich media websites and the ability to communicate with and learn from native speakers.
- Video parent-teacher conferencing
- Students can form online study groups and work on school projects
- Students living in remote areas will have access to online tools and education specialists
- Greater access to school libraries
- Online learning benefits people who are unable to participate in classroom-based programs
- Two-way communications allow students and teachers to communicate

**EXAMPLES OF BROADBAND**

**BUYING DIGITAL CONTENT IN AGGREGATE**

Schools may be able to work together to buy digital content as a single user group resulting in cost savings. Schools may also purchase digital licensing together, with the goal of reducing costs. Schools and other organizations can for consortium purchase in bulk to receive a discount on licenses.

**Example:** In Alberta, schools connected on the Alberta SuperNet are able to buy digital content in aggregate. Schools have worked extensively with Discovery and have placed 8 TB of Discovery content in a third party data center. Axis has invested in some electronics that they call "SuperNet Direct" which allows content to be served directly to each school in the province. This is a much higher performing and lower cost solution than Internet delivery.

The Alberta Video Co-Acquisition Consortium (COAC) is a partnership between school districts, regions, learning centers, regional resource centers and Alberta Education. Its purpose is to jointly purchase provincial licensing for educational videos so that all COAC member teachers and students have free online access to more high quality resources. Purchasing as a consortium reduces costs.

**BRING YOUR OWN DEVICE (BYOD)**

Also known as Bring Your Own Technology, BYOD is one cost effective method for schools to bring technology into the classroom. One reason behind introducing BYOD into classrooms is the number of students currently using hand held technology devices (phones, iPads, etc.) in the classrooms. Teachers and administrators can be encouraged to develop ways of using technology already available to students to enhance learning. In many BYOD programs, students are required to sign an agreement that they will use the device only during class time on specific projects.

One major issue is providing training to teachers on how to use the technology and how best to incorporate it into their classroom. Another significant issue is providing students without access to devices, ways to borrow from the school without facing any stigma from other students.

**Example:** Notre Dame High School in New Jersey implemented a BYOD pilot program for the 2012-2013 school year, with the goal of expanding the program to the entire school the following year. They developed a FAQ guide for the program.

**TEACHING LONG-DISTANCE CLASSES**

An instructor in one town can teach students in multiple other towns, providing the same quality of instruction as face-to-face, and freeing the instructor of some of the constraints of location and time. Long-distance teaching enables the sharing a teacher’s expertise with a geographically dispersed community. This is particularly beneficial for rural communities.

**Example:** The USC Thornton and Manhattan School of Music (on opposite sides of the country) partnered together to co-host a vocal arts master class using Internet2 technology. Faculty and students from both schools were able to interact online, providing students with a richer learning experience.

**AUGMENTED REALITY FOR TEACHING**

Augmented reality is a network-based application that adds an information layer on top of what the student is seeing or hearing. Students are able to receive information regarding the particular location or environment they are in.

**Example:** The USC Thornton and Manhattan School of Music (on opposite sides of the country) partnered together to co-host a vocal arts master class using Internet2 technology. Faculty and students from both schools were able to interact online, providing students with a richer learning experience.
**Examples:**  

iTacitus was a European research project from 2006 to 2009 that explored ways in which information technology could be used to encourage cultural tourism. In a similar way, this technology could be used to enhance educational experience. iTacitus explored ways of using augmented reality to provide compelling experiences at cultural heritage sites.

The State of Tennessee maintains an online STEM resources website. Through the site, Tennessee teachers can gain quick and easy access to standards-based instructional tools, quality curriculum materials, and the latest Internet materials. STEM resources.com includes a section on virtual field trips.

The JASON Project is a non-profit organization that works to bring the STEM curriculum (Science, Technology, Engineering, and Math) to students in a creative and interactive way. The Project connects students with scientists and researchers in real- or near-real time, both virtually and physically, to provide real life learning experiences. JASON and its partners work with students through platforms and technologies, including Science, Technology, Engineering and Math (STEM) curricula; after-school and out-of-school activities; camp experiences; and exploration programs for museums, aquariums, libraries and community centers. The result is a year-round continuum of classroom and out-of-classroom learning. For more information, see http://www.jason.org/

**BROADBAND AND STEM EDUCATION**

STEM education stands for Science, Technology, Engineering and Math Education. High speed internet enhances the teaching of these vital subjects to students.

Examples: The Fairfax County Schools in Annandale, Virginia, provide students with a Career Day series. The series supports efforts to increase student interest and performance STEM fields through virtual field trips into various days in the lives of experts.

The Alberta Video Co-Acquisition Consortium (COAC)  
http://coac.learnalberta.ca/About.aspx

Notre Dame High School BYOD Program  

USC Thornton and Manhattan School of Music  
http://www.usc.edu/schools/music/news/usc_thornton_news/internet2_master_class.html

iTacitus  
http://www.itacitus.org/

Environmental Detectives Program at MIT  
http://education.mit.edu/projects/mitar-games

Fairfax County Schools (VA) Career Day Series  
http://www.fcps.edu/fairfaxnetwork/career_day/

State of Tennessee online STEM Resources  
http://www.stemresources.com

JASON Project  
http://www.jason.org/

HyperCities Platform  
http://hypercities.com/

Glenbow Museum in Calgary  

**OTHER INNOVATIVE USES OF BROADBAND FOR EDUCATION**

HyperCities is a collaborative research and educational platform for traveling back in time to explore the historical layers of city spaces in an interactive, hypermedia environment.

The Glenbow Museum in Calgary provides virtual access to its galleries and displays through the AXIA Next Generation Network. The Museum provides online learning programs to students who were unable to physically visit the museum.
LIBRARIES

Libraries are information hubs, and with the increase in technology and internet use, the amount of available information has increased dramatically. Libraries also offer community members a location for free internet access. As high speed internet becomes more and more vital in all aspects of life, the importance of providing high speed internet services at libraries only increases. Benefits of broadband include:

- Students (particularly those without access to high speed internet in their home) have a place to download course materials, videos, and other educational materials
- Business functions for librarians (video conferencing, running online catalogues, managing digital content, etc.)
- High reliance in rural areas by people without high speed connection in their home
- Location for seniors, many of whom may not have a computer or high speed connection, to find beneficial information (regarding health, programs in the area targeted to seniors, etc.)
- Provide digital literacy classes

EXAMPLES OF BROADBAND

In Colorado, the Colorado Library Consortium (CLiC) and the Colorado State Library have leveraged the internet to develop programs and services such as AspenCat, for rural libraries. AspenCat is a catalog of almost 540,000 books, DVDs, CDs and other items from thirty-five different libraries in Colorado. The major benefit is the ability of member libraries to easily borrow from other member libraries. A member library vastly multiplies the number of items that are available to their patrons.

Digital literacy is the ability to locate, organize, understand, evaluate, and analyze information using digital technology. It involves a working knowledge of current technology, and an understanding of how it can be used. Digital literacy involves a consciousness of the technological forces that affect culture and human behavior. Benefits of digital literacy include:

- Greater ability to communicate and work more efficiently
- Tool for students to access information, coursework, etc.
- Tool for potential employees searching for jobs, resume building, etc.
- Training specialists can more easily reach workers through online trainings
- Social networks allow for quicker and more efficient sharing of educational and training resources
- Increase services for low-income workers seeking advanced job skills, rural students unable to reach city libraries, and training for inmates for future employment

EXAMPLES OF BROADBAND

Broadband Rhode Island, in collaboration with four other organizations (two libraries, a housing authority, and a community development center), developed and implemented a digital literacy pilot program. The goal was to establish a model that involved community organizations that view digital literacy as part of their core mission. The program also included trainers whose role involves digital literacy or who would like to provide this training, a curriculum that provides beginner Internet users the knowledge needed to learn more advanced applications, and students who are familiar with computers but have little or no experience using the Internet.

The federal government also provides information and resources on digital literacy.

WEB RESOURCES

Federal Government Digital Literacy
http://www.DigitalLiteracy.gov

Broadband Rhode Island
http://broadband.ri.gov/OurPrograms/DigitalLiteracy/Fall2011Pilot/tabid/238/Default.aspx
HEALTH + EMERGENCY PREPAREDNESS

Broadband can help public health agencies get real-time information on patient monitoring while public safety officials can more effectively communicate during emergencies.

**HEALTH**

Of all the community anchor institutions, health care facilities, as large bandwidth users, perhaps benefit most from access to improved broadband facilities. Along with robust internet access, health care institutions can use the fiber network to transfer large quantities of data from site to site, and to participate in off-site electronic medical records programs. The benefits of broadband in healthcare are enormous. Benefits of broadband include:

- Replacing paper records with electronic medical records
- Real-time transmission of medical imagery, allowing MRIs, ultrasounds, X-rays, etc. to be viewed and interpreted remotely
- Accessing new expertise via teleradiology
- Keeping people out of the ER through remote monitoring
- Improving recovery by linking patients into social networks, and empowering them to better manage their own health.
- Remote monitoring of patients, reducing the number of strenuous patient transfers
- Allows for real-time guidance and information sharing between physicians and remote specialists in an emergency

**NORTH CAROLINA DIVISION OF PUBLIC HEALTH “BE READY!” KIOSKS**

“Be Ready!” kiosks are portable touch-screen computers designed to increase public interaction with preparedness information and stimulate ongoing household preparedness activities. Sharing the kiosks helps develop links between decentralized local health departments. The kiosks are usable at health fairs, conferences, clinics, and other locations.

**KANSAS COLLABORATIVE SPECIAL NEEDS POPULATIONS ASSESSMENT TOOLKIT AND GIS MAPPING TOOL**

The toolkit is a guide for developing a Web-based GIS system for tracking facilities that serve at-risk populations. It is connected to broader efforts at Kansas Association of Local Health Departments (KALHD) that use GIS mapping to assist with the pandemic influenza response in identifying people in their community who will need assistance during evacuation or shelter-in-place.

**EMERGENCY PREPAREDNESS + PUBLIC SAFETY**

High speed internet provides a number of benefits for the emergency preparedness and public safety sectors. Many of the benefits of broadband in the public safety field involve improved communication and effective data sharing. Benefits of broadband include:

- Emergency notifications to the public
- Improve situational awareness with real-time information
- Assist in resource deployment to improve response times
- Improve and expand communication capabilities
- Enhance data sharing ability
- Enhance training resources by providing ability to utilize training videos

**EXAMPLES OF BROADBAND**

**CITY OF BOSTON**

Boston has developed a number of innovative uses for broadband in the public safety sector.

VoIP for Public Safety Agencies

A VoIP (or Voice over IP) telephone system was installed at the new Police district B-2 station. This is the first public safety facility in the City to be 100% VoIP enabled reducing the operating expense of what would have been a traditional CENTREX installation.

Public Safety Incident Data Warehousing

The City has begun to store daily Computer Aided Dispatch (CAD) incident data in the City’s data warehouse. This data is used for metric analysis on numerous initiatives in Boston. It will also serve as incident history for the new CAD system when fully implemented. This provides cost savings for the City.

**WASHINGTON COUNTY, ME MOBILE BROADBAND PUBLIC SAFETY PILOT PROJECT**

The goal of the pilot program was to build a Mobile Broadband Infrastructure in Washington County to develop real-time mobile connectivity to transmit data to office and other public safety entities including hospitals. Many organizations participated including the Washington County Emergency Management Agency, the Sheriff’s Department, the ambulance, police and fire departments, and Axiom Technologies.