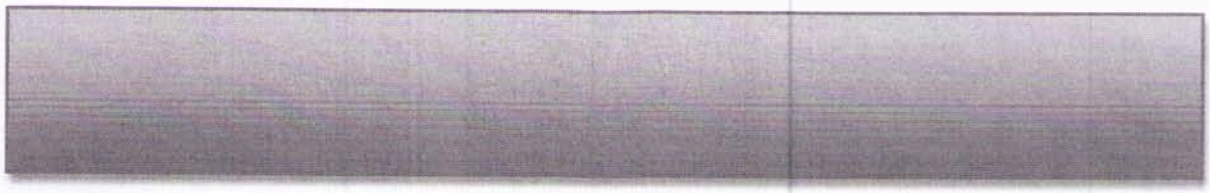
Executive Summary, Easygrants ID:2986
Pennsylvania: Broadband Internet Service to Schools, Libraries, and other Community Anchors
Applicant: Mushroom Networks, Inc.

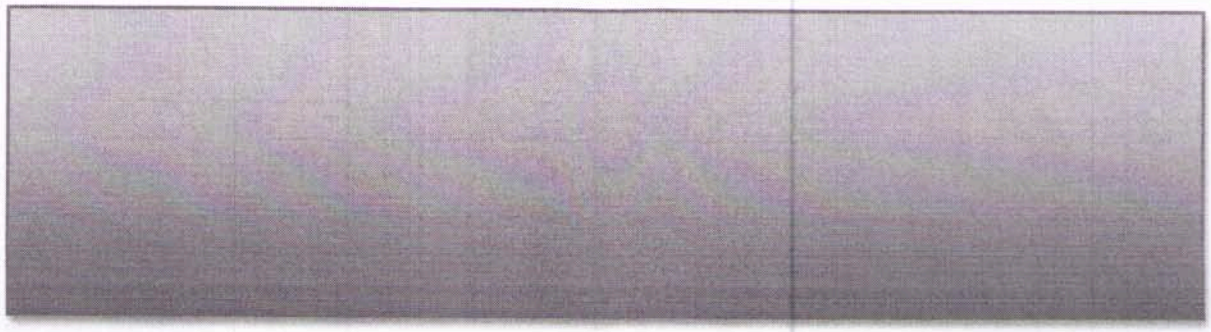
This project aims to reduce the cost of high-speed Internet access service to schools, libraries, and other community anchor institutions within the state of Pennsylvania. Initially targeted are zip- code areas with low household incomes. These zip-codes are claimed as under-served in the sense that the rate of broadband subscription among households is less than 40%, in accordance with BTOP program guidelines. This is project classified as a middle mile infrastructure project, in the sense that we propose to provide broadband access to community anchor institutions which in turn serve many people. The targeted community anchor institutions are primarily schools and libraries that are currently using T1 lines, or who have Internet access with even less capacity than a T1 line. Internet access using T1 lines is expensive and therefore budgetary constraints usually limit their deployment to only a few T1 lines per site, and in many cases only one or two.

A single T1 line provides 1.5Mbps per second in both the uplink and downlink directions, and usually costs between $550 - $1200 per month before any educational discounts are taken, usually through the E-rate discount program of the Universal Service Fund. Our base service offering, called the Fusion Internet access service, has a speed of up to 36Mbps in the downlink direction and up to 3Mbps in the uplink direction, and the planned offering price that would be enabled under this program is $550 per month. Our service can be enabled wherever there is DSL service available, which is essentially in any non-rural area.

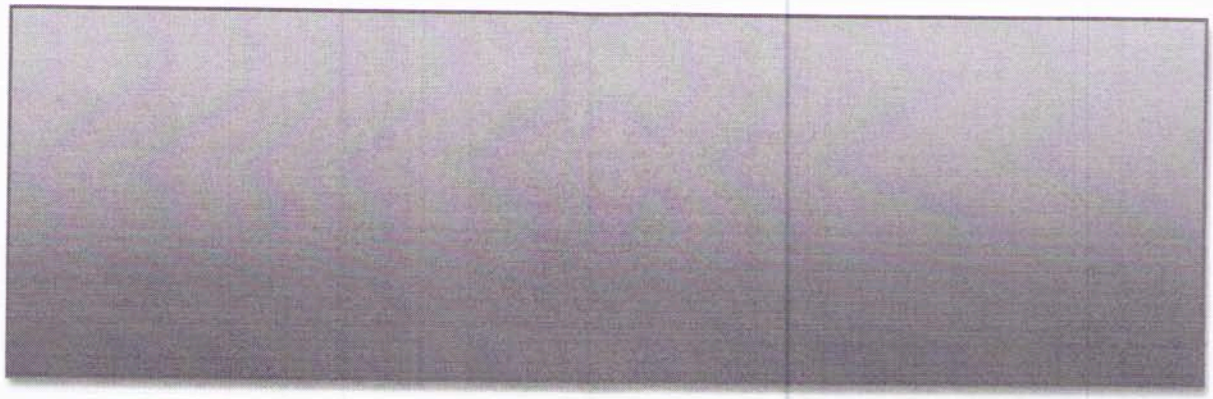
The Fusion Internet access works by combining many DSL lines together. This is done with a special gateway modem, called a Fusion gateway modem, that resides at the customer premises. Each Fusion gateway modem is able to combine many DSL lines together for a data transfer capacity which is close to the sum of the data transfer capacities of each DSL line used.



If a given site needs more bandwidth than provided by a single Fusion account, the CPE units can be stacked on each other to combine together multiple Fusion accounts into a single service that has a data transfer capacity close to that of the sum of all Fusion accounts.



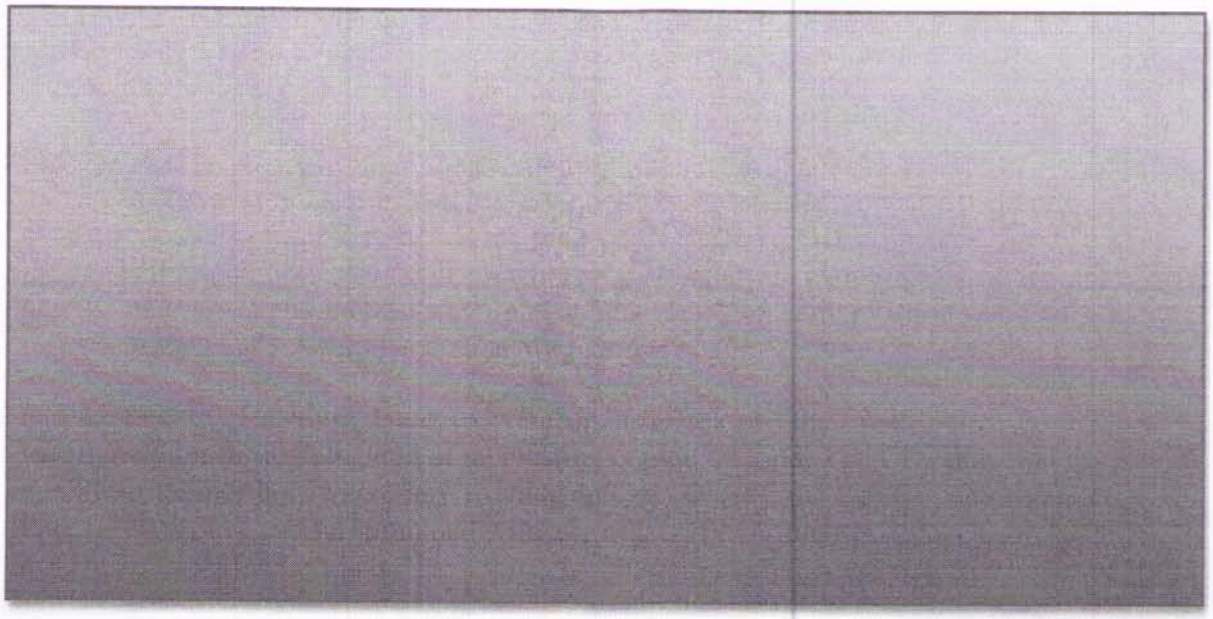
855 CPE units would be deployed by the end of year 5.



As a middle mile service provider, the applicant has an open interconnection policy with last mile providers. In particular, Fusion subscribers may resell services to end users. Mushroom Networks will be actively seeking wireless ISPs who may wish to provide Internet access to users in the service area, using the Fusion service as a backhaul Internet connection.

Indeed, sharing a single high speed Internet connection among a cluster of residential units can be a very cost-effective way to deliver Internet access. The applicant is currently collaborating on the development of other BTOP proposals which would promote the creation of small neighborhood ISPs or cooperatives, and promote entrepreneurialism and initiative in young adults. It is hoped that Fusion accounts will be offered to such ISPs during the course of the project.

Some sites may already have existing Internet access that will either be retained indefinitely, or through the end of an existing contract period. The CPE devices also have an extra Ethernet port where any existing Internet access line can be connected, so that the Fusion service can be combined with any other type of Internet access service.



of California, San Diego. One of the main founders of the company, Rene Cruz, is well

Our project is vitally important to the viability of delivering high performance broadband to community anchor institutions that serve low income populations. We do not claim that our solution will be the best choice in every instance. However, our solution should be strongly considered in situations where it is not economically viable to secure fiber access or other connectivity to a high bandwidth connection point. Instead of relying on new bandwidth resources, our approach is able to combine together the existing bandwidth resources together in a useful way. Thus, additional bandwidth can be deployed quickly and cost effectively, and can serve as an interim solution until another type of solution becomes more economically viable.

Indeed, the construction process of laying new fiber in an urban area is expensive not only financially, but expensive in an environmental sense as well, requiring large amounts of energy and time. Before such an expensive undertaking is initiated, it is important to consider the existing massive copper plant infrastructure and investments that have already been made over the past several decades. There are ample copper resources available already, and we believe it is far more economical and practical to upgrade the surrounding networking infrastructure so that the existing copper plant can be more efficiently used. For example, most community anchor institutions could easily be wired with between ten to thirty telephone lines, each of which could support a DSL service account.

Finally, we remark that recent marketing studies (i.e. the Pew report) have documented that the average price of Internet access in general has increased in the recent past, and that the average price charged for Internet access tends to be lower in markets where there are more choices for Internet access. If this proposal is funded, effectively in most geographic areas, there will be one more choice for high-speed business class Internet service, and hence this will exert a downward pressure on Internet access prices in general.