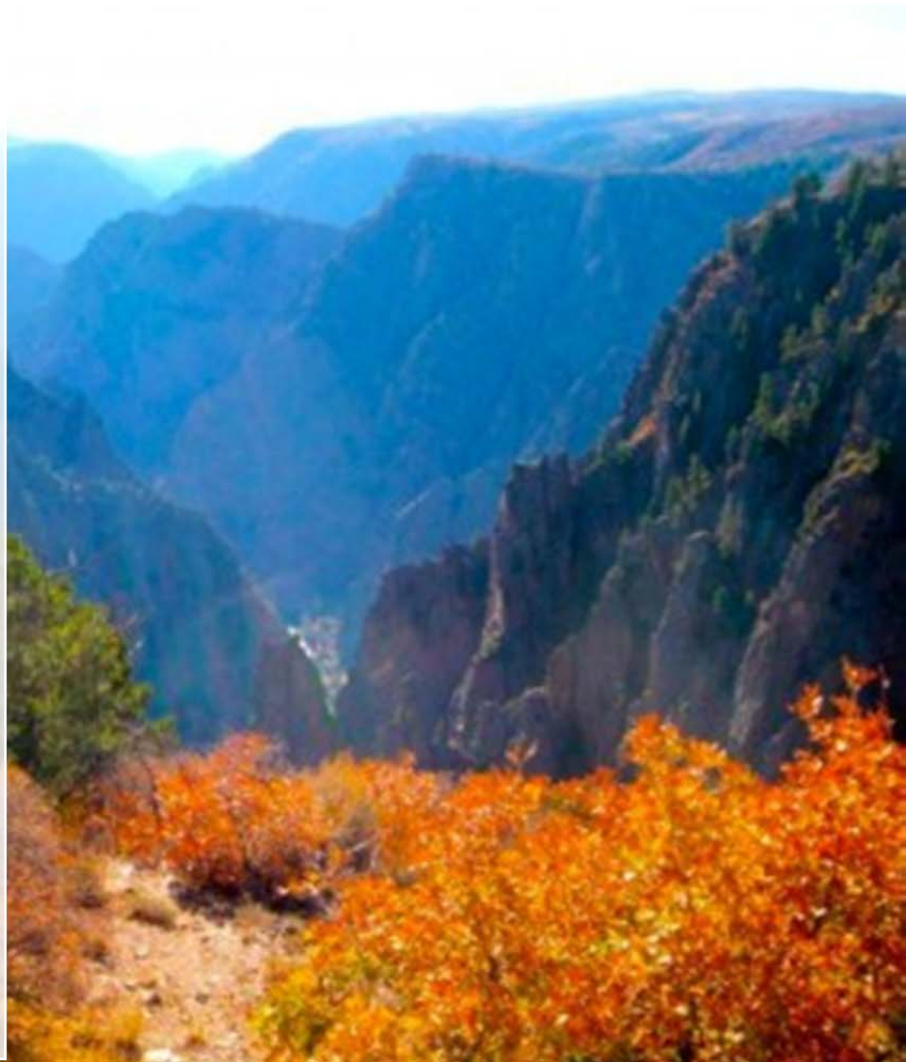


Region 10 Telecommunications Planning

Mid-State Consultants

25 October 2011



Advanced telecommunications services offered through true broadband networks represent a significant foundational element for economic development and quality of life in the 21st Century. Unfortunately, too many rural communities have been overlooked by the status quo. This report outlines one potential path available to Montrose, Montrose County and the Region 10 Economic League for Economic Assistance & Planning.



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The Need

For more than 40 years, IBM dominated all aspects of the computing business. IBM maintained their dominance in part by tying application software to hardware and individual hardware components together in tightly controlled proprietary packages. In the mid-1970's, IBM misread the growing demand for smaller, more accessible computing services. A grass roots revolution to create "personal" computers with interchangeable components and application software that could run on multiple vendors' hardware platforms grew in basements and garages across the country. This "open" model was a disruptive force in the computing world and ultimately led to the marginalization of mainframe computers and of IBM as a computer manufacturer.

Today, a similar revolution is growing in the telecommunications industry. For decades, Bell Telephone, the "Baby Bells" and a handful of cable providers have maintained monopolistic control of telecommunications networks throughout the country. While the components to build a telecommunications network cannot easily be stored in one's garage, many municipalities, cooperatives and other organizations are recognizing the growing grass roots demand for true consumer choice on true broadband networks. The disruptive business model represented by public/private partnership open access fiber to the premises networks stands as the best model to answer this grass roots demand and to revolutionize the delivery of telecommunications services.

What is the Problem

Much like the rail systems of the late 1800's, today's advanced communications infrastructures represent a means by which communities may participate in, or find themselves left out of, the global economy. Many communities, especially those in rural areas, are discovering that critical telecommunications needs in their business and residential markets are going unmet. Incumbent network owners consume limited public easement space with monopoly controlled networks. Quarterly reporting requirements encourage these companies to maximize apparent profits by delaying infrastructure upgrades in order to maintain the appearance of scarcity. However, advanced communications infrastructures are essential for the current and future economic vitality of their communities. Communities have begun to see the need to break the cycle of monopoly driven scarcity. Just as city councils have traditionally grappled with municipal infrastructure issues including, roads, electricity, and water, they now find themselves adding broadband availability to that list.

Policy/Community Objectives

Elected representatives and city staff must base their decisions on the public policy objectives of the communities they serve. Cities generally attempt to capture their public policy philosophy in mission statements, "report card" objectives, or in other forms. Sometimes a city's objectives are very specific to the affected community but usually municipal objectives can be categorized as economic development, public safety, infrastructure development and maintenance, building a sense of community, education, quality of life, and so forth. The National Broadband Plan identifies critical broadband needs across health care, economic opportunity, education, energy and the environment, government performance, and other areas. In all areas, service levels (consider a 28.8 baud mode m) considered more than adequate just ten or fifteen years ago are now considered archaic and prohibitively slow.

True Choice on True Broadband

Having suggested the need for government intervention, what should that intervention look like? Public policy suggests true choice on true broadband is the best telecommunications solution available to meet

the needs of residents and the objectives of governments. True choice of true broadband should conform to certain principles: 1) open and wholesale, 2) “carrier class”, 3) high scalable bandwidth, and 4) open and independent architecture.

Open and Wholesale

By definition, "open" implies that the system facilitate a true public/private partnership. Philosophically, open access networks should oppose the idea of delivering retail services themselves. Rather, they should perceive for themselves a more traditional municipal role – providing infrastructure. The actual delivery of services should be left to private service providers – as many as are qualified to service the market. The municipal open access model recommends that publicly-owned infrastructure is made available to a wide variety of competing private firms for the delivery of goods and services.

“Carrier-Class”

This requirement, though seemingly obvious, is sustained as a guiding principle through market research. Scientifically administered surveys have been used to determine the characteristics markets demand in networks. In nearly every case, the number one or two concern for businesses and residents is reliability. Reliability along with security (consistently in the top five desired characteristics for both businesses and residents) are the fundamental characteristics of a carrier class system.

An open and wholesale network depends on retail service providers. Service providers require the network to perform with carrier class reliability. From the smallest start-up to global giants with international reputations, each is willing to entrust those reputations to the network only if they are guaranteed carrier class reliability. From the physical design to the overarching operational model, the infrastructure must deliver exceptional performance and offer absolute security.

High Scalable Bandwidth

In addressing the first principle – opening the system to multiple service providers – municipal open access networks have to meet the needs of multiple service providers simultaneously. In other words, they have to be capable of delivering all the current services available as well as higher-bandwidth consuming future services from all service providers on the network. Thus, the system has to start out with tremendous bandwidth capacity and be able to grow larger still. And in growing, it has to also evolve. In a way, this is a requirement to make the system "future proof," meaning that it is capable of adapting to new and emerging technologies that otherwise might obsolete the investment.

The value of incorporating this principle is obvious. Just as "whistle stop" communities had an advantage over those bypassed by the railroad in the old west, cities with the ability to support multiple current and future services will have economic as well as quality-of-life advantages over other communities. And it ensures that the investment made today won't become outdated because the system is designed to scale to meet future demands.

Open and Independent Architecture

While many proprietary solutions could be employed to deliver the first three principles, this fourth principle aims at ensuring that the efficiencies of the system are always maximized. By requiring solutions to be standards-based and founded on open technologies, municipal network owners can "shop around" for the best deals and are not beholden to any one particular company or proprietary invention. While there is often a benefit to a proprietary solution that can outweigh the negatives of diminished choices, the ultimate benefits usually derive from vendors who are actively competing for business and responding to competition with efficient pricing and more innovative solutions.

The Solutions

Having established the need for true choice on true broadband let's now look at possible solutions. First, let us look briefly at the applicability of private enterprise telecommunications solutions.

Unfortunately, the public good often lies crossways with the interests of incumbent private network owners. The private sector typically under-invests in infrastructure – to the point of developing their economic models around the management of scarcity. Government, on the other hand, has historically provided the infrastructure to support business and residents: directly, as in the case of highways and airports, or indirectly through the support of monopolies such as industrial revolution era railroads or the 20th Century telephone companies. The reason for the different approaches to infrastructure between the public and private sectors is easy to explain: return on investment. Private companies are often driven by their quarterly reports; those capital investments with slow returns, such as telecommunications infrastructure, are usually abandoned in preference for those with higher and more rapid returns. Governments, by contrast, measure returns differently, looking at community impact and accomplishment of public policy objectives rather than profit.

With the private sector exhibiting some signs of market failure in the realm of delivering true choice of true broadband, what are some of the public sectors options?

Regulatory Solutions

Governments sometimes work to resolve the gap between private enterprise profit motives and public policy objectives through regulation.

Telecommunications regulation has been effectively used to extend voice services with a reasonable degree of equity, efficiency, security, and liberty. However, the new era of 21st Century true broadband need has come about in the era of deregulation. Even if the FCC were functioning in the same way it did during the Bell Telephone/AT&T sponsored monopoly years, it is questionable that a regulatory regime would result in the true choice of true broadband needed to meet today's telecommunications challenges.

Furthermore, telecommunications regulation is a patchwork of federal (through the FCC), state (through the PUC) and local (through franchise agreements and management of public rights of way) authority. The byzantine regulatory environment leaves many municipalities without effective means to drive their telecommunications future through local regulation. Many rural communities lack the staff and expertise to focus on their franchise agreement. Even the expertise exists, it is often difficult for a small community to leverage their franchise agreement to effect policy results. Cable companies are often very large with locations around the country. Montrose, for example, is served by Optimum (a division of Cablevision). Cablevision has nearly 20,000 employees. That is, the cable company employs as many people as live in Montrose. It would seem unrealistic that Montrose could wield a big regulatory stick to in order to influence Optimum to meet policy objectives.

Aggressive Private Enterprise Courtship

Many municipalities work to extend advanced telecommunications services throughout their communities by aggressively courting private enterprise network owners. The city offers tax advantages, uses franchise agreements as leverage, maximizes the use of lucrative government contracts, and leverages other tools to encourage private companies to build and upgrade networks suitable to today's needs.

This model is most effective in more urban areas where the city has significant potential revenue to offer the network owner.

“Dig Once” Policies

“Dig once” policies simply require new road construction, housing developments, utility work, and other work to include telecommunications conduit as part of the project. This conduit can then be used by an eventual public or private advanced telecommunications provider.

“Dig once” policies lower the barriers of entry for advanced telecommunications services but they do not implement a network or provide service. Some communities have found the gap between a “dig once” policy and actual service to be insurmountable. Nonetheless, “dig once” policies are inexpensive. Montrose and the other Region 10 communities could benefit by passing “dig once” ordinances.

High Value Target Programs

High value target programs typically build network infrastructure to reach out to high value target facilities. Value can be determined by type of entity or potential revenue. The Southwest Colorado Council of Governments (SWCCOG) Southwest Colorado Access Network (SCAN) represents an example of a high value target program with the SCAN defining community anchor institutions (CAIs) as the high value targets.

In 2010, the Southwest Colorado Council of Governments, with the assistance of the Region 9 Economic Development District, applied for and received a grant for the Colorado Department of Local Affairs. The premise of the grant was to create local community or intra-community networks connecting the various CAIs in towns throughout the region in order to aggregate their data traffic. The aggregated customers could then work as a purchasing consortium to lower data costs and improve access to advanced telecommunications services.

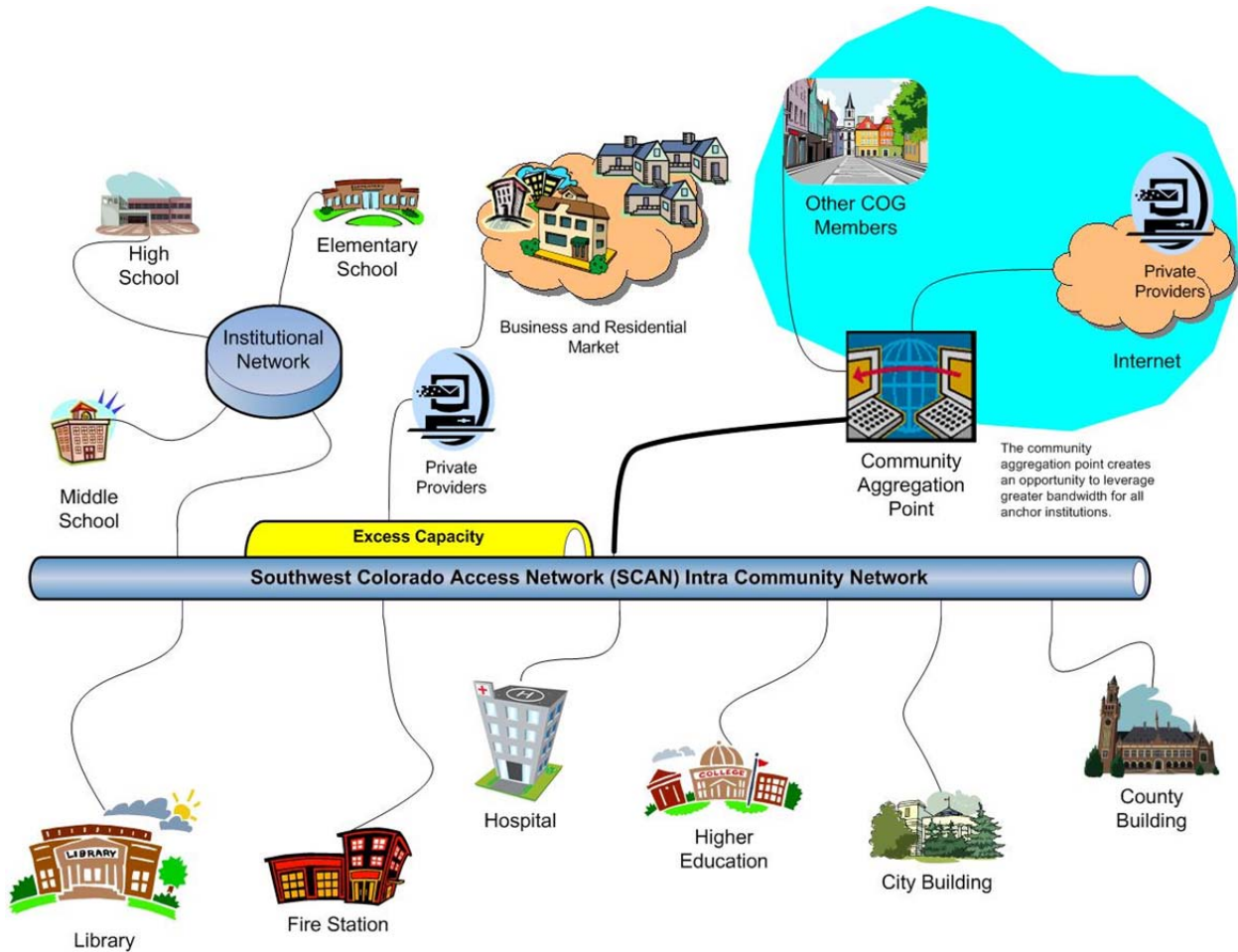


Figure 1 – Community Aggregation

The SCAN network hopes to further add value to the region by capitalizing on the middle mile network EAGLE-Net intends to deploy with its federal grant. The SCAN hopes to connect the various community aggregation points throughout the region to regional aggregation points. These regional aggregation points serve to greatly expand the purchasing consortium and significantly increase the SCAN's purchasing power.

Furthermore, the SCAN hopes to spur economic development in the region and to improve quality of life. To do this, the SCAN will make excess capacity on the SCAN network available to private providers with the hope that the additional reach the SCAN provides will entice existing private providers to offer service in new areas and may even encourage the development of new services.

Mid-State Consultants and OHlvey are working to help the SCAN coordinate the efforts of key stakeholders and to move the project forward.

Modest Scale Pilot Programs

Some communities are working to deploy modest scale fiber to the premises pilot projects they intend to capitalize on in similar manner as described above.

Publicly Owned and Operated Fiber to the Premises

Communities like Lafayette, Louisiana have elected to deploy full service telecommunications enterprises similar to municipally owned power or garbage collection divisions.

Deployment of a full service telecommunications enterprise is a bold initiative often times restricted by state law – in Colorado, a ballot initiative is required before a city can follow this course.

Unfortunately, in most cases, cities with publicly owned and operated fiber to the premises have chosen to simply compete with private providers and offer another monopoly network. While the city's network may offer true broadband, choice is still limited to three or four providers.

Municipal Open Access Fiber to the Premises

An alternative that appears to resolve the policy objectives, the demands of the people, and the needs of private enterprise appears to be one in which governments build, manage, and maintain the natural monopoly element in the telecommunications environment (that is the transport mechanism) as a public utility. This utility is then made available to private service providers who can then offer retail services. The hallmarks of this solution are that it is financially responsible ubiquitously deployed public/private partnership open access fiber to the premises.

Next Steps

Developing a local or regional telecommunications plan involves certain known steps. These known steps provide the information that determines a future course.

Preparation and Planning

Determine Needs and Objectives

Too many communities embark on telecommunications projects based simply on a vague notion of advancing economic development or improving education. Unfortunately, vague notions most often lead to vague results. Before embarking on a telecommunications project the governing authority should be clear on what needs they intend to satisfy and how they will measure progress towards meeting those needs.

Define the Status Quo

Once a good understanding of objectives is agreed upon, the next step is to evaluate existing available resources. This evaluation is of critical use to define the gap between the status quo and meeting needs and objectives. In some cases, existing infrastructure and services can easily be repurposed to close the need gap. In other cases, a survey of existing available resources may expose the need for significant capital improvement and business development before the community can be served at its desired level.

Resolve on a Course of Action

If a gap between needs and available services exists, the community should then resolve on a course of action. This resolve may be that no action is feasible or it may be to deploy a fiber to the premises network or anything in between. Further, the course of action may identify multiple phases needed to achieve the defined objectives.

Some communities are tempted to jump to a course of action without a full understanding of the needs and objectives or of the status quo. This usually leads to failure. We have also seen communities flounder on defining objectives and defining the status quo for years and years.

Implementation

Develop a Plan

The first step towards bringing the resolved upon course of action to reality is to develop a plan. The plan will determine funding requirements and will establish realistic timelines. Of

How Can a Consultant Help?

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The city or region may choose to work through most of the process on their own or they can use consulting services in any number of ways. Some suggestions for consulting services are included in this sidebar.

Determine needs and objectives

Key stakeholders in the community and region need to take the lead in determining needs and objectives. Consultants can be used to conduct surveys and gather other community input. Consultants may also help refine objectives and develop success measures.

Define the Status Quo

Consultants can be effectively used to complete a survey of existing services and to document the need gap.

Resolve on a course of Action

It is up to the key stakeholders in the community to resolve on a course of action. Consultants can be used to identify options, document the pros and cons of these options, and answer questions about potential courses of action. The key stakeholders should carefully ensure they own the decision and that they are not being unduly influenced by their consulting team.

Develop a Plan

Most telecommunications consultants have significant expertise when it comes to developing implementation project plans.

course all parties must have realistic expectations of the plan at this point. General Dwight Eisenhower is quoted as saying, "No battle was ever won according to plan, but no battle was ever won without one." The network project will not be completed according to the plan developed at this juncture but it will never get done without this plan.

Identify and Secure Funding

With a plan in hand, the next step is to determine how to pay for it. Potential funding sources include, among others:

- Federal grant programs
- State grant programs
- Private investments and joint ventures
- Local subsidies
- Loans

In most cases projects will need to combine a variety of funding sources.

Project Implementation

Once the objective is fully defined, a plan is developed and funding secured, the actual work of the project can begin. Of course, throughout the project the scope, schedule and budget must be carefully managed.

Operations and Maintenance

From the beginning, the municipality or region should be aware of future ongoing operations and maintenance needs. Part of the plan should include sustainability planning to ensure the newly implemented infrastructure is utilitarian through time.

Identify and Secure Funding

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Consultants can help identify funding sources, develop grant applications, provide data and narratives to help justify funding and otherwise support the funding process.

Project Implementation

Many consulting firms specialize in telecommunications project implementation. Consultants provide a wealth of information and expertise in this area.

Operations and Maintenance

Some projects choose to develop in-house resources to manage ongoing operations and maintenance. Others outsource these functions.

Appendixes

Appendix A – Consulting Firms

Mid-State Consultants and OHlvey are capable of providing the consulting services suggested in this report and eager to provide a response to any proposed work. However, we recognize each community must find a team that fits well with their culture and environment. To that end, we have pulled together information on some consulting firms we are familiar with. This list does not represent a complete list of consulting firms with some or all of the capabilities needed to complete the work described in this report. This list simply represents some of the organizations Mid-State Consultants and OHlvey are familiar with.

Mid-State Consultants (www.mscon.com)

Mid-State Consultants, Inc. specializes in providing comprehensive communication systems engineering. Our service offerings range from project inception to final close-out, and all of the steps in between. Our singular focus is to provide the engineering services and support that will guarantee the successful outcome of each project entrusted to us.

On municipal and other government projects, we often work with OHlvey (www.ohivey.com).

Municipal Solutions (www.municipalsolutions.org)

We are not familiar with the specific work of Municipal Solutions. We include them on the list because we are familiar with the work of one of their Senior Associates, Kevin Manweiler. Mr. Manweiler is very familiar with telecommunication in Colorado and has done some significant work in the region.

Design Nine (www.designnine.com)

Design Nine is a Virginia corporation, and was founded in 1987 by Andrew Cohill to provide technology advice and services to community, business, and public clients. Over the years, the company has grown steadily and now offers a comprehensive array of technology advisory services, telecommunications project management, and broadband design assistance. Design Nine is one of a very few firms in the United States with experience in open access broadband networks.

Uptown Services (www.uptownservices.com)

Uptown's principals are highly skilled in all critical phases of developing and implementing a broadband strategy. We have served as the implementation consultant on 6 FTTP start-ups.

IBI Group (www.ibigroup.com)

The IBI Group has recently completed some significant strategic development and broadband planning work for the city of Portland, Oregon.

G4S (www.g4s.com)

G4S is heavily involved with the EAGLE-Net project.