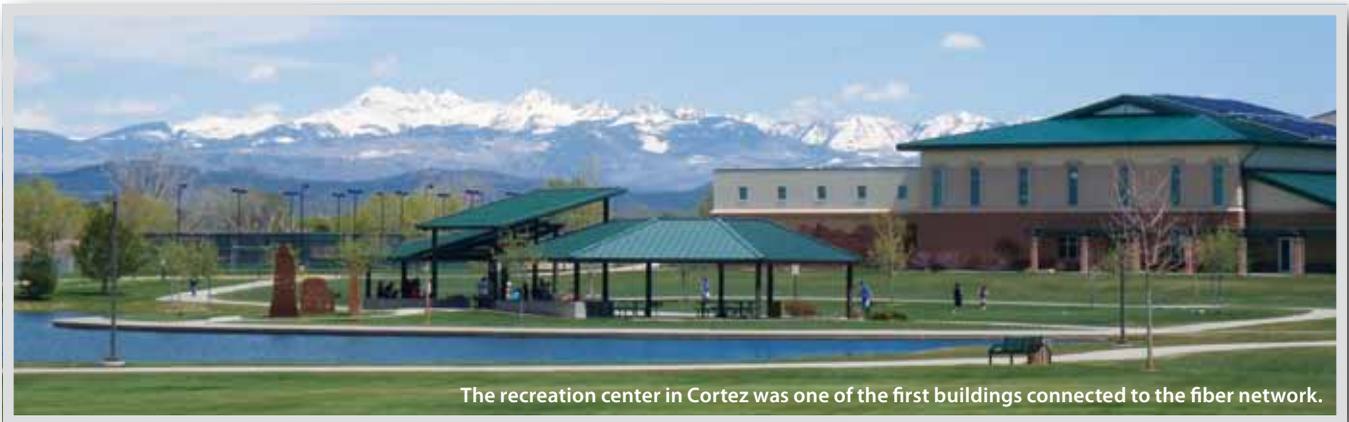


Building an Open-Access Network in a Small City

Showing a true pioneering spirit, the city of Cortez, Colo., built a fiber network to support its business community. With expert advice, prudent decision making and a little luck, the network is on its way to success.

By Rick Smith ■ *City of Cortez*



The recreation center in Cortez was one of the first buildings connected to the fiber network.

The city of Cortez, with a population of 8,300, is located in the southwest corner of Colorado next to Mesa Verde National Park. Agriculture, tourism and some light industries are the basis of its economy. Like most rural cities, Cortez does not have the numbers for the incumbent provider to make a business case for a next-generation network.

The city's network efforts have always been about economic development. In the pioneering spirit of the western United States, the city council decided in early 2000 to take the city's destiny into its own hands: If the big guys are not going to solve our connectivity problem, the council thought, we might as well solve it for ourselves.

So the city started the Cortez Fiber Network. None of us involved in the project knew what a fiber network would look like; we only knew we wanted better services and options. We

also needed an internal network to connect all the city facilities. Because the city was building a new service center for its vehicle fleet and public works operations at that time, we decided to make that location the hub of our new network.

A LUCKY BREAK: JOINT TRENCHING

Building a fiber network in a small community sometimes requires a little luck. Ours came in the form of the regional electric transmission company's building a fiber route that included connectivity to the incumbent carrier's central office. The city was offered a chance to put empty conduit in the same trench

the electric transmission company was using. Thus began our fiber network. We didn't even have a budget for the conduit, but our city council saw the value in getting started.

City staff attended several day-long seminars on the benefits of fiber and became familiar with basic fiber networking. During the next budget cycle, we were able to start our fiber network with connections to our city facilities, in-town county facilities and the local hospital. We named this network Govnet because it connected most of the anchor institutions. Later, we were able to connect all the schools within city limits.

About the Author

Rick Smith is general services director of the city of Cortez, Colo. He has been responsible for several fiber projects in Cortez and the surrounding county, beginning with the local government and school network in 2001 and including most recently the open-access fiber-to-the-business project. You can reach him at rsmith@cityofcortez.com.

We oversized the fiber cable plant during the initial buildout to allow for expansion later. We operated the network as a co-op, sharing aggregation of demand, cost and upstream connectivity among the city, county, school district and hospital.

To be honest, Govnet struggled a bit until the state put an Internet point of presence in each county seat. This helped give us enough upstream bandwidth, and Govnet was able to deliver greater value to its members.

An important step was to get approved as a service provider for the federal E-Rate program, which allowed us to provide services to local libraries and schools at a discounted rate. We also partnered with a local ISP to provide services to a few businesses that were easily connected to the fiber network. This step would later become very important to our overall network strategy.

In 2005, Colorado passed a law that prohibited municipalities from providing communications services to non-governmental entities without approval in a referendum. Because Cortez already provided transport services to a few businesses, the city was grandfathered in.

GOVNET GROWS UP

In 2008, Cortez hired a progressive new city manager, who asked our fiber network team, “What do you want to be when you grow up?” Our response was, “We would like to build a fiber-to-the-home system.” Our view was that the businesses and citizens of Cortez should

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be able to enjoy the same connectivity and pricing that large metro areas had.

The city manager agreed, and we met during the next several months to lay out a conservative plan to move forward. I think that may have been the last time the city manager asked the question about growing up!

To kick off our plan, we invited Dr. Andrew Cohill, CEO of the consulting firm Design Nine, to speak at a community meet-and-greet about broadband and fiber networks. The meeting was attended by potential service providers, city council members, county commissioners and county staff, members of Govnet and leaders of the community, such as prominent business owners and bankers. Cohill introduced the concept of a community network and the benefits of open access and open services.

We realized early on that building a fiber network was an educational process. People want improved bandwidth and capabilities. The participants understood this project was about economic development for the community, even if it helped a business get better connections for the same dollars spent.

ENLISTING LOCAL SUPPORT

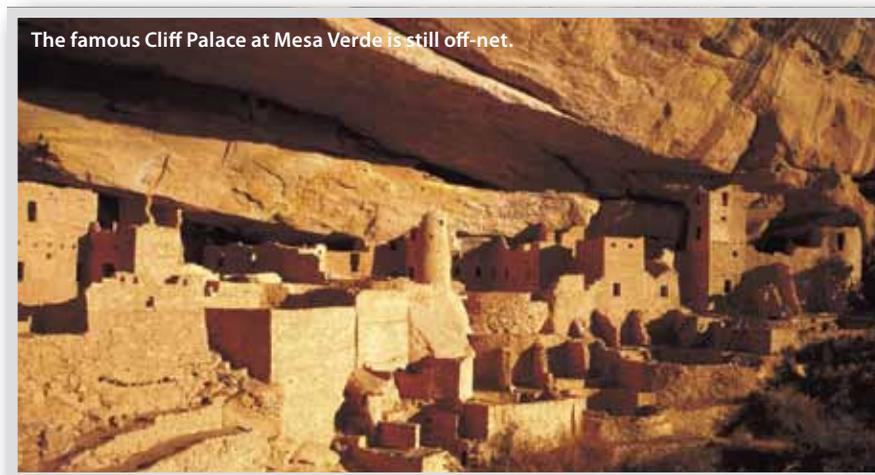
We knew we had to enlist the support of volunteers from each community segment – such as a leader from the real estate board. Now we call these people “local broadband planning groups.” Advocates who care about broadband and believe in the future that a network can bring are critically important. We held monthly meetings with each of the advocates to solidify support for the project. We also involved the potential service providers throughout the whole process. We wanted them to understand what we were trying to accomplish and our vision for our community.

The writings of Hans Bleiker of the Institute for Participatory Management and Planning were also very helpful to us. Bleiker studied what makes public projects successful and what makes them fail. His Bleiker Life Preserver worksheet asks very hard questions – for example, whether some potentially affected interests don’t understand that the effort addresses a serious problem or an important opportunity that has to be addressed.

Once we went through this exercise, we had a good idea of the issues that would be raised and the likely positive and negative reactions to the project. This educational process forced us to look at our project critically and identify weaknesses in our plan. We shared the completed Life Preserver with our local broadband planning teams and boards.

Throughout this period, we also held monthly meetings with our city council. Many council members were not tech-savvy, so educating them about all aspects of the network was up to us. After all, they were the people we needed to support and understand the project.

Every project on the scale of a fiber network build has political aspects. Network engineers are familiar with the



The famous Cliff Palace at Mesa Verde is still off-net.

The city council created the Fiber Enterprise Fund, which allows any revenue generated by the fiber system to be reinvested in network infrastructure.

seven-layer OSI network model. I suggest there is another layer that is much harder to negotiate. Locally, we call this Layer 8 – the political layer. Layer 8 comes into play throughout the life of a fiber project. Fortunately, our new city manager took on the responsibility of all Layer 8 issues with the boards and other key institutions.

THE IMPORTANCE OF DESIGN

Like most towns contemplating a fiber network, we worked closely with our public works department and instituted an aggressive conduit program. Any time the city dug up a street, we installed conduit at logical locations. However, because we had no network design, we were not always sure whether we needed to go down a particular alley or along a particular street.

To solve this problem, we contracted with OFS to do two things for us. First, David Stallworth, technical service manager at OFS, performed a “windshield design,” or high-level design, of our whole community. This gave us a road map for our network plant. Now when Public Works is going to dig up a road or install a water line, we have a logical, well-thought-out design on which to base our decisions. This answers a lot of questions about routes and fiber counts.

This design work does not need to cost a great deal. Our public works engineering staff can translate the windshield design and concepts into project drawings. They may have to move a fiber run across the street, but we end up with a working outside plant.

Next, Stallworth gave a basic fiber-to-the-home design class for city staff and potential service providers. The service providers had a chance to understand our network design and see that it was indeed designed for open access. Staff members gained basic knowledge

of all components of the network. They also understood why a cabinet was placed in a specific location to serve a particular area.

PLANNING AND BUILDING

We were surprised at some of the knowledge base and expertise that already existed in our area. We were lucky to find a retired professor of statistics, Jack Schuenmeyer, in our community, and we contracted with him to oversee surveys of potential residential and business customers. The local Chamber of Commerce conducted the business surveys, and citizens were mailed surveys. We also had an online Web survey that anyone could log on to.

Once we had the city design and the survey data, we contracted with Design Nine to develop a business plan for our network. We based the business plan on both active and PON architectures so we could compare the two. (Both types of architecture are used in the network.) The business plan proved to be an important milestone.

In 2010, we received a grant for \$1 million, including the local 25 percent match, and we were able to start our network build with a pilot fiber-to-the-business project. In the pilot service area, we identified approximately 250 potential businesses, and we installed 115 fiber drops that can serve 150 of those businesses. We went live in September 2011, and 36 businesses are now live and taking service, with another two or three being added each month. Three service providers are currently offering voice and data services on the network.

The city council had the foresight to create a Fiber Enterprise Fund, similar to our local water fund, which allows any revenue generated by the fiber system to be reinvested in network infrastructure. Our fiber enterprise currently generates revenue from the government

network and E-Rate services, city departments and anchor institutions, the pilot fiber-to-the-business project and dark fiber leases.

LESSONS LEARNED

Some of the lessons we learned through this journey are

- Market to the lowest pre-existing business service because many small businesses can afford only a DSL price point.
- To avoid allowing a cutthroat provider, or piranha in the fish bowl, to put the other providers out of business, establish a minimum performance level with acceptable oversubscription rates.
- Set fiber drop installation fees at an attractive price point. We treat fiber drops like water taps – they stay with the property and become a building asset.
- Be mindful that a municipal provider wears two hats – it is both an advocate for citizens and businesses and also an enterprise that must maximize revenue to support the network.
- Don't be surprised if an incumbent tries to sign as many customers as possible to long-term contracts, making it difficult for them to migrate to the new network.
- When service providers try to drive your prices down, remind them that about one-third of their costs are covered by your maintaining the outside plant for them.
- Because government enterprises must operate transparently, potential service providers may attend meetings just to learn what their new competitor is doing. They may act interested and then back out at the last moment.
- A colocation facility at the network hub, sometimes called a carrier-neutral location or a meet-me room, makes it easy for service providers to connect to the network and offer advanced services to citizens and businesses. It also opens the door for cooperative bandwidth purchases, ultimately lowering costs for users.
- Control your own destiny. Choices are good. ❖