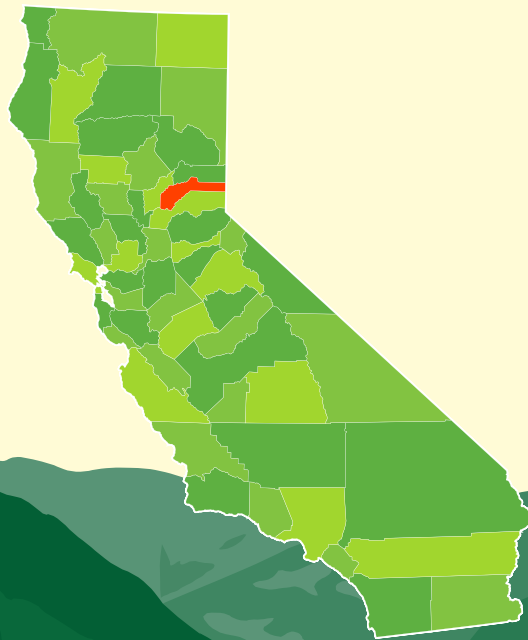


What will Nevada County, California look like in 2025 with a Gigabit 100% fiber optic Internet network in place?

Business ~ Education ~ Inclusivity ~ Infrastructure



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The results from the Gigabit Vision Workshop at the Spiral Gigabit Launch Conference

held on October 30, 2014 at the
Miners Foundry Cultural Center, Nevada City, California

Facilitated by ZingTrain, Ann Arbor, Michigan
Hosted and funded by Spiral Internet, Nevada City, California

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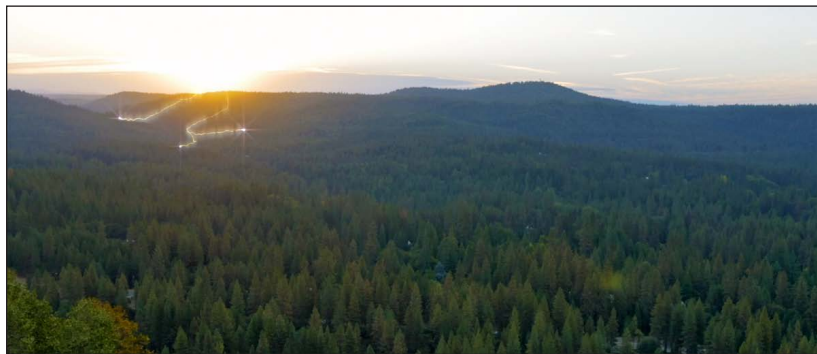
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OVERVIEW

The 2025 Gigabit Fiber Vision was compiled by 25 community leaders in a session led by ZingTrain of Ann Arbor, Michigan on October 30, 2014 at the Miners Foundry Cultural Center in Nevada City, California. The suggestions and projections of twelve break-out groups on such topics as education, infrastructure, healthcare, and civic engagement were merged into one narrative to give a picture of the potential impact Spiral's gigabit fiber optic Internet network might have on our community. From many different angles, outlined below, the plan has far-ranging positive effects.

Because we value livability and work-life balance as much as economic development, our community is thriving. Nevada County not only attracts diverse young families but it's also a place our children don't want to leave. Unemployment rates are the lowest in the state. The community is prosperous, with a median income 300% of minimum wage.

Thanks to a thriving high-tech industry, we see a lot of new, young talent in the community. Employers also recruit locally, giving Nevada County students a rewarding career path without requiring them



to leave home. Remote educational opportunities have expanded access to high-quality technical, trade, and entrepreneurship training. Our workforce is now prepared for employment in a variety of industries as well as for inevitable changes in the global job market.

Companies enjoy higher retention rates because of our community's strengths and overall quality of life. We're nationally known as an attractive destination for people seeking a work-life balance that takes advantage of great jobs as well as outdoor recreation, nationally-recognized public schools, and the cultural offerings of our unique community.

Access to high-speed Internet has improved the quality of life for the county's older demographic, providing opportunities for life-long learning, retraining, better connection to out-of-town relatives and friends, and better medical care. It's enhanced the experience of people with disabilities and people on the lower end of the socio-economic scale.

Spiral's gigabit network has made a huge impact on the infrastructure of Nevada County, improving safety, transportation, and utility generation and delivery. It's made the experience of tourists visiting the area richer, and done so without loss of the region's historical character.



BUSINESS

High-Tech Industry Mecca

Nevada County has the new buzz as a destination for entrepreneurs and high growth companies seeking a superior work-life balance in one of the most scenic areas of the country. Due to a perfect storm of cultural trends, with proximity to world-renowned outdoor recreation and a brand new fiber network, Nevada County has become the hotspot for a creative tech-based youth migration movement. It began with the spontaneous formation of “hacker houses” where young adults formed self-operating collectives, living simply and consciously in a region with an ideal rural-urban balance. Adding next-generation Internet speeds was the spark needed to attract young, talented adults to the area. Once they moved in, serious investment capital soon followed.

This has had a very positive domino effect on the community: We’ve stopped the leakage of talent — kids are coming back to Nevada County after leaving to earn four-year degrees. We’ve developed a



strong high-tech start-up community, one that is small but scalable and similar to Kansas City and Austin, the first two Google Fiber communities. We facilitated and supported local business incubators to match capital with ideas, and investment has followed talent. 80% of all businesses are B corporations — businesses that help to solve social and environmental problems — emphasizing our commitment to community development and well-being. The county’s unemployment rate is below 4%.

In the last 10 years, the Digital Media Campus has successfully trained and spawned many start-ups including one that developed a cutting-edge ultra-high definition immersive online service platform. Built and launched by a team of local and geographically dispersed entrepreneurs, the gigabit network helped them develop advanced video collaborative tools that provide world-class, high-tech facilities for visualization, application sharing, human interaction, and modeling. This new technology has created an enormous competitive edge by providing an interactive experience for their customers that’s literally better than face-to-face.

Green Tech/Food/Energy

The gigabit network has benefited tech, food, and energy industries in Nevada County enormously. A local start-up, in collaboration with UC Davis’ Agricultural program, has succeeded in developing a system to help increase farm productivity, lowering and optimizing energy use. This public/private enterprise has pioneered a system for synthesizing real-time environmental data in concert with a network of

ground-based sensors in a manner that optimizes energy-use appropriate to the crop and the specific location. The model has attracted the attention of the clean-tech community, bringing associated industries into the area where they can be close to the innovators.

There's been an exponential increase in the number of tech companies focused on solar energy in Nevada County. Since 2014, the County has invested in a solar power facility to power the county offices using local companies for the system's design and construction. New industries based on bio fuel and wind power have emerged. Nevada County is now one of the leading counties in California in the use of green energy.

In keeping with the new green face of Nevada County, public transportation has become efficient. There are new charging stations for electric cars and refueling stations using bio fuel. In a



corollary investment, stakeholders in the region have pioneered a highly efficient e-commerce food distribution management system to provide a "farm-to-table" (as well as restaurant and retailer) pipeline, lowering costs and broadening the market for local produce.

Access to Capital

We've written a strong success story, in which all sources of funding take our community seriously. Angels and Venture Capitalists see Nevada County as a business hub. All levels of government help local endeavors to get grants funded successfully.

Some examples of this are that innovative start-ups have demonstrated success, attracting further innovation and creating a snowball effect. As successful start-ups have matured, they attract more higher-skilled employees and further investment, and continue to innovate. This creates a robust, attractive environment for Fortune 500 companies to relocate here.

With an increased workforce, a broader tax base for schools and services is available. We now have a vibrant incubator for new businesses. Our small businesses are not only successful in design and prototype, but also in their ability to scale. We have a strong mentorship program from established companies for local startups. Our county has been successful at attracting businesses by offering incentives, support, and collaboration, which further interests funders. Nevada County has a visible and active investment community.

A community foundation is available to support non-profits, which makes the community stronger. The foundation has cultivated an active local donor base, in



particular from the tech community. A local crowd-funding platform has been created which is unique to the agricultural, video-graphic, and cultural aspects of the region. A revolving loan fund has been established to support those businesses that aren't bankable or able to use venture capital (often because they aren't tech related).

EDUCATION

Higher Quality; Higher Level; 21st Century Skills

With the success of the Spiral gigabit project over the past ten years, we've seen the quality of education in Nevada County grow by leaps and bounds. Distance learning and technological resources have helped our public schools become ranked top in the nation. We have more magnet schools. Technology in the classroom has allowed a holistic educational approach, starting in primary school and continuing through secondary education and beyond. The pace of student achievement has far exceeded national standards in a variety of areas — language, math, science, innovation, entrepreneurship, and the arts. We are now producing students able to compete with peers from top national schools. Nevada County has continued to attract top-quality teachers because of the proliferation of advanced learning techniques and tools.

Our children have greater access to higher education options without the need to leave the community. New telepresence tools let students connect with other cultures through virtual "field trips,"



and video pen pals have allowed students of all ages to meet their peers around the world, lending a global perspective to their thought processes. Through online learning, our children have access to classes the community could not previously sustain, such as foreign language and financial literacy courses.

The schools have been able to offer a more inclusive learning environment in which each student is able to access the resources necessary to thrive, irrespective of family income or parental level of education. This access has encouraged family involvement on a broad level. Parent participation, both in person and through technology, is at an all time high. Technology in the classroom has given students a chance to engage with their education in new ways, which has increased student control over the learning process, and reduced truancy.

Partnerships with local high-tech businesses have paid significant educational dividends: As business leaders act as mentors and companies donate funds and equipment to our schools, students are introduced to a wider variety of opportunities and are well trained to become leaders in many fields. Our schools have successfully prepared students for work in the 21st century.

INCLUSIVITY

Government Accountability/Transparency & Civic Engagement

Citizens of Nevada County have online access to all the proceedings of every local government entity, including county, city, school board, and special districts. All public government documentation and all data, both static and streaming, is published online. Local citizens have access to online educational materials relating to local government services and issues, enabling them to be more civically invested, informed, engaged, and solution-oriented.

Each citizen is able to act online on all civic functions that were previously executed in person. We've implemented online voting, building application submissions, and even remote participation in



civic meetings where people can comment on issues such as budget development. This improvement is the result of gigabit technology and the new virtual meeting spaces it's able to support.

Access Across Socio-Economic Lines & Access for People with Disabilities

Spiral's gigabit fiber optic Internet network has made Nevada County accessible in the broadest sense of the word. All people have access to the network through a wide range of assistive technologies suited to their needs according to Section 508 of the Rehabilitation Act (29 U.S.C. '794 d), as amended by the Workforce Investment Act of 1998 (P.L. 105 - 220). In addition, all businesses, educational institutions, healthcare facilities and public offices are connected. All city, rural, and unincorporated-area citizens have access to the network as a resource for social, economic, educational, healthcare, and civic engagement activities at a price appropriate to their means. Everyone has access with or without their own device and regardless of skill level, from the technology novice to the rocket scientist.

INFRASTRUCTURE

Attractiveness & Quality of Place

Spiral's gigabit fiber optic Internet network has greatly improved the quality of life and attractiveness of Nevada County. Increased access to technology and an influx of capital has made for a more vibrant and interesting community, economically, socially, and culturally.

Numerous sensor programs have made the region safer and more environmentally friendly. Traffic cams along major roads automatically detect



accidents and wandering wildlife, and alert drivers to slow down or take alternate routes. Fire sensors allow immediate response to home fires and have increased the speed and efficacy of locating and fighting large wildfires. Residents are alerted well in advance of hazardous weather and water-release events, and can track conditions in real time.

As a result of the gigabit network, Nevada County has become a best-in-class example of a rural community melding with new technology, adopting and integrating it without compromising the historical identity of the community or its traditionally affordable nature. The majority of county residents are successfully combining work, quality of life, and care for the environment.



Technological investment has spurred improved infrastructure, including transportation, a more robust electrical grid, and greater access to a variety of community resources including parks, theaters, and trails.

Gigabit and faster speeds have allowed a great expansion of telecommuting options. Unlike the early 2000's, now the community can welcome workers from all over the world and a variety of industries who are committed to enjoying, building, and sustaining the unique flavor of our community.

Tourists are pleased at how easily they can take advantage of the rich beauty of the area as a result of clear and transparent information on the web. Mobile apps are plentiful for local scenic opportunities and historical walking/biking/driving tours.

The community's long-standing commitment to the arts has been enhanced by the technology that gigabit service enables. Major local events such as the Wild and Scenic Film Festival, California WorldFest, the Celtic Festival, and big-name community concerts are live-streamed around the world. Ubiquitous broadband offers mobile e-commerce and streamlined payment options to Victorian Christmas, farmers markets, and more.

Improvements & Maintenance

Nevada County has reduced energy consumption in the last 10 years by 33%, lowering overall stress on its infrastructure. We now have several alternative energy sources available on demand, including solar, biomass, and more efficient hydroelectric sources that don't affect our important steelhead, trout, and salmon fisheries. We've torn down defunct and ineffective dams and returned fish to their natural environments. The county generates 85% of its electrical needs through strategically placed solar generation technology, effectively creating Nevada County's own solar grid and eliminating the need for outside power providers such as PG&E.



To create a more stable power and communication infrastructure, overhead utilities have been placed underground in the same trenches as the gigabit fiber. This has made Nevada County one of the most stable power grids in the country, with no recorded power outage in more than a 1% area over the last five years.

A new, locally-developed technology has also been placed into the gigabit backbone that significantly and efficiently lessens our demand for electricity production. Street lighting, water meters, and homes



are connected to a centralized server which monitors neighborhoods in aggregate and sends the right amount of power and water to each one at the right times. This effectively load-balances the local grid system as a whole. The system utilizes gigabit-wired connectivity and speed to help reduce and eliminate hazardous microwave electromagnetic field effects (EMF), making Nevada County one of the most microwave-free (and thus healthier) places to live in California.

Efforts to conserve water have been very successful, and our demand on existing water sources has decreased by 25%. NID now provides potable water to over 95% of the population, cutting residential and commercial reliance on delicate underground aquifers. Ever since local ordinances for filtered gray-water reuse changed in 2015, annual residential permits for gray-water systems have increased 1000%. This gives ordinary citizens the ability to directly affect how much household water they reuse and how they use it—for landscape, lawn, and other irrigation needs. New state-mandated underground and aboveground holding tanks are commonplace. Rainwater collection systems leverage the 54 inches of precipitation per year that falls in the county, both for residents and agricultural businesses.

We've also revamped and retrofitted the Deer Creek Sewage Treatment Facility with the latest technology to reuse and deliver non-potable water to freeway and municipal parks for their water needs without dumping it directly into rivers and streams. The net impact of sewer waste is easily calculated and controlled via network-enabled sensors placed throughout the NID and city sewer systems. This upgrade has made Nevada County a zero-emission region for accidental release of wastewater into local waterways.

Every home has access to ultra-high speed Internet, which enables massive data transfers and instantaneous computing tasks, running remote server applications as if they were next door. This technology enhancement allows us to easily communicate and control our usage of resources. The Independent Privacy Alliance monitors local utilities and providers to ensure residents and businesses can conduct transactions and business without fear of unnecessary and unwanted government intrusions.

The county installed bike lanes and walking pathways beside every through road in the county by the time the gigabit conduit was finished. Developed here, the unique "Top Lid Grid" system enables any part of the conduit to be accessed for maintenance at almost any point in the county via the bike pathways. In addition, each town center has car-free pedestrian zones with easy access to automobile parking areas fed by walking paths and solar electric shuttles.

Cutting-edge technology and a new, high-tech workforce has created transportation opportunities that make non-combustion engine vehicles commonplace. Charging stations are everywhere, and free — powered by solar, biomass, and wind grids. Shared transportation programs are abundant county-wide such as shared cars, bicycles, buses, and trolleys. All agency, city, and utility vehicles are of the latest environmental and energy- efficient technology.

Access to healthcare / EMS

Our technology attracts medical professionals to Nevada County who want to create collaborative medical hubs for virtual clinics and treatment. We now have the Internet framework to create a comprehensive community wellness plan integrated with providers. Locations for both indoor and outdoor exercise, nutrition, mental health, religious/spiritual health, and information are well-established.

Every member of the community has access to healthcare at lower cost through

telemedicine. Sierra Nevada Memorial Hospital and regional medical clinics now have the high-speed Internet necessary to offer a variety of online services including: remote wellness consultations to prevent illness,



diagnostic services, integrated medical emergency systems for faster response times, better follow-up from healthcare professionals, public health alerts through mobile devices, access to the global medical community to respond to epidemics, access to specialists around the world, access to treatment technology, etc. Slow and inconsistent Internet service is no longer a barrier to use of electronic medical records by doctors and patients.

Medical professionals are able to keep their skills current through multiple continuing- education opportunities. Near-unlimited Internet speeds allow advanced medical research through sharing of large datasets and close collaboration between remote medical teams. Even laypeople can have access to the wide world of publicly accessible medical training and information due to our gigabit connection speeds.

CONCLUSION

Overall, the introduction of a Gigabit fiber optic Internet network has had a huge positive impact on Nevada County. Effects as unrelated as the retention of local young people, an increase in energy-efficient transportation, and a broader curriculum of on-line training for medical personnel have combined synergistically to boost the county's quality of life for current residents and its appeal as a destination to newcomers.

A skilled workforce, high- and low-tech businesses, investors, entrepreneurs, artists, and retirees have joined together to create the kind of community many are searching for: one that combines meaningful work, quality of life, and care for the environment – balancing a sense of history with future opportunity, and incorporating innovative tools and a global perspective into the process.



Over the course of ten years, the county has become a best-in-class example of a rural community melding with new technology, and is now reaching out to help other places achieve the same benefits.