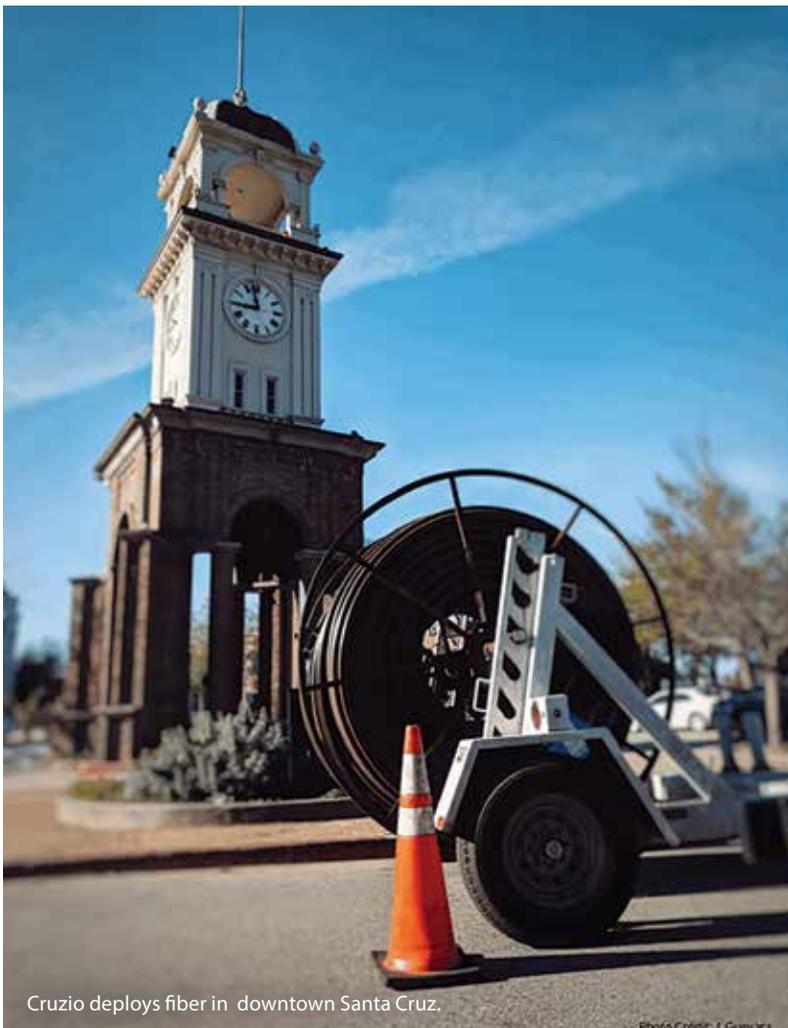# Cruzio Launches FTTH In Santa Cruz

Though its planned partnership with the city didn't materialize, Cruzio now has an ambitious plan to deliver high-speed broadband throughout much of Santa Cruz County.

By Masha Zager / *Broadband Communities*

Cruzio deploys fiber in downtown Santa Cruz.

Photo Credit: J. Guevara

In August 2018, the competitive provider Cruzio Internet lit the first residential fiber customer in its home city of Santa Cruz. The launch of fiber services, with gigabit speeds for $49.95 per month, marked the end of a long road for Cruzio – and the beginning of a new story.

A family-run ISP, Cruzio has provided internet services since 1989 (pre–World Wide Web) to Santa Cruz, a city of 65,000 on the coast of central California. It also serves parts of the Bay Area. Most of its business consists of reselling DSL and providing fixed wireless service, though it connects some enterprise customers with dedicated fiber lines.

Several years ago, Cruzio approached the Santa Cruz city government and proposed a public-private partnership – the Santa Cruz Fiber Project – that would wire nearly the entire city with fiber. The city responded with interest, and in June 2015, the parties announced a partnership. Both agreed on the broad outline: The city would finance the network through revenue bonds and own it; Cruzio would engineer, build and operate it. The particulars, however, were elusive. After spending a long time trying to hammer out details, Cruzio and the city concluded that they could not arrive at a mutually beneficial agreement.

Along the way, Cruzio collaborated with the city and wireless equipment vendor Siklu to connect Siklu millimeter-wave radios to existing Cruzio fiber and deliver wireless connectivity to

more than a dozen multiple-dwelling-unit (MDU) properties in Santa Cruz. The deployment, which also made connectivity available to several community anchor institutions, was completed in less than three months and went live in June 2016. "It gave them a great taste of that gigabit connectivity," says James Hackett, director of business operations and development at Cruzio.

FIBER DOWNTOWN – AND IN THE MOBILE HOME PARK

Without the city as a partner for its FTTH plan, Cruzio decided to go it alone because, as Hackett puts it, "it's existential for our business." However, the company altered the original plan. Instead of a citywide deployment, it began with a fiber buildout in downtown Santa Cruz only, to be followed by a fiber-and-wireless push throughout as much of Santa Cruz County as possible. "We'll use fiber where it makes sense and wireless where that makes sense," Hackett says.

The downtown build took about two years to complete. The fiber is entirely underground, and deployment was facilitated by the city's dig-once policies. Now, Cruzio fiber passes about 1,200 buildings in the downtown area, including public facilities, commercial buildings, MDUs and single-family homes.

Somewhat surprisingly, the initial build also includes a mobile home park close to the downtown area. Neighborhood fiber champions in the mobile home park reached out to Cruzio to ask whether the plan could be extended to include them; they drummed up excitement about fiber to the home and gathered enough commitments from residents to give Cruzio confidence about wiring the park. "It's a great example of what can happen," Hackett says. (You can learn more details about this project in a delightful video at https://cruzio. com/2018/09/the-best-connected-mobile-home-park-in-the-country-and-the-woman-who-made-it-happen/.)

A second mobile home park, inspired by the first one and also close

Cruzio technicians at work in a customer's yard

to Cruzio's backbone fiber, is now organizing to get FTTH connections.

Feedback about the new service has been positive, and customers are lining up to get connected to the fiber network. However, in a city with two extremely competitive options, Cruzio does not expect take rates to reach those that FTTH providers see in rural, underserved areas. "Going head-to-head with Comcast and AT&T is not a slam dunk," Hackett says, especially after these competitors responded to the announcement of the fiber build by upgrading their networks. The incumbents also have the advantage of offering video, which Cruzio is reluctant to invest in, believing its long-term future is dim now that even live sports events are available over the top.

What Cruzio has going for it – besides gigabit speeds – is excellent customer service, local involvement, and a commitment to net neutrality and customer privacy, which are "a big deal" to Santa Cruz residents.

COVERING THE COUNTY

With the downtown build complete, Cruzio turned its attention to expanding its network. Because fiber backhaul – both Cruzio's own fiber and other suppliers' fiber – is now

available through much of the county, providing high-speed wireless internet is feasible in many localities. Cruzio's strategy is to cover the county by establishing fiber-fed wireless networks that can generate revenue quickly, enabling it to upgrade them to all-fiber as appropriate.

It has already lit new fiber hubs on the east and west sides of Santa Cruz and in Watsonville, a city about 18 miles down Highway 1 from Santa Cruz, and will begin connecting customers from those hubs with 100 Mbps and 1 Gbps point-to-point wireless connections. Hackett says new millimeter-wave radios are capable of extremely reliable, 10 Gbps full-duplex connections, which can handle gigabit service to individual customers.

"We trust those gigabit links as much as, if not more than, fiber," he says, "but there's a limit to the amount we can scale wirelessly, so we're always going to need to keep expanding the fiber network to meet demand."

One of the three new wireless networks will become the next FTTH build – the choice will be determined by the level of demand – and Cruzio will then extend wireless coverage outward from the edge of *that* network; eventually other wireless builds will be converted to fiber, and

more wireless networks will be built outward from them.

The Highway 1 corridor that runs northwest-to-southeast along the coast in Santa Cruz County is fairly densely populated, and Hackett says that, step by step, over the next 10 years, Cruzio can cover most of that corridor with fiber and point-to-point wireless without any government loans or grants.

A MICRO-ISP IN THE MOUNTAINS

If anyone in the world is qualified to run an ISP, it's Kenneth Adelman. How many people, when asked by tech support staff if they know how to run a traceroute, can answer, "Look at the traceroute source code – it has my name in it"? Adelman co-founded two internet software companies in the 1990s, sold them and retired in his 30s to devote himself to artistic, athletic and environmental pursuits. Now, in addition, he runs a small ISP in his spare time.

Nearly 20 years ago, when he moved up into the mountains near Santa Cruz, Adelman had a T1 line connected to his house to communicate with Cisco, which had bought his first company, TGV. His neighbors, who were struggling to find internet service, pleaded to share his connection, and he obliged. Then *their* neighbors started asking. As time went on, he incorporated the business, acquired six more T1 lines and shared service wirelessly with 12 households.

As he began to serve farther-away customers, the load grew, and so did his payments to the telephone company. By 2017, putting up a wireless tower made sense. Cruzio was willing to provide 500 Mbps of wireless backhaul to the tower for less than the cost of T1 service, and Adelman now distributes this bandwidth to 35 customers, using primarily Ubiquiti wireless gear. (One customer actually has a fiber optic connection from the tower.) He charges customers between $130 and $300 per month, depending on speeds. Several customers get discounts for relaying services to others.

Connecting each customer takes a lot of work – way more than what a "real ISP" would do, according to Adelman. For liability reasons, he doesn't install wireless dishes, but he goes up onto rooftops with his neighbors or their contractors and shows them how to do it, and he often adjusts their Wi-Fi for them. He estimates that this upfront work pays off after a year – and keeps on paying. (He has essentially zero churn.)

"Cruzio was interested in supporting people with my business model," Adelman says. Cruzio offers not only backhaul but also expertise, helping him select hardware, wiring and so forth. "It's beneficial for both of us because if I sell to them, they get a network built to spec," he points out. The other benefit Cruzio would get is a group of happy customers it could acquire without marketing costs.

With 35 customers, Adelman is still able to work in an informal, neighborly way. There are no written contracts. One customer pays him in fresh fish. Another helped him with tower work when he broke his leg. For now, he has plenty of bandwidth, and Cruzio could easily double what it supplies him.

So when will he give up his ISP hobby? Not until it starts to seem like real work, Adelman says. If the business keeps growing, he will eventually have to put in a real billing system and hire someone to help with installation – and then it won't be fun anymore. At that point, it will be time to start talking with Cruzio about selling the system.

THE FINAL FRONTIER

"The areas farther away from the corridor, in the mountains, are those we're most concerned about," Hackett says. Cruzio serves these areas with old ADSL and ADSL2 networks, and the incumbent that owns the copper is pulling out the infrastructure and replacing it with only cellular service. In these areas, making a business case for a new high-speed network is difficult.

One strategy for the rural areas is to work with "micro-ISPs." These are founded by tech-savvy residents who lease backhaul from Cruzio to serve themselves and a group of neighbors. (See the sidebar for an example of one.) "There are retired technologists in our mountains – throw a rock and you'll hit one," Hackett says. "They are our dream come true."

Cruzio gives them advice about which protocols and equipment they should use, advises them about network management and even helps them market their services so that eventually, when these micro-networks become too large for the founders to manage, they can be folded into Cruzio's network.

But despite the prevalence of retired Silicon Valley folks, most rural residents don't want to manage their own internet connections. The more scalable solution for these areas, Hackett says, is to develop public-private partnerships with local governments or the county government. Another possibility is to obtain grants from the California Advanced Services Fund, which just received new funding.

The county government recently set up a series of rural community meetings, and residents eager for better broadband showed up in large numbers. Hackett says Cruzio is willing to partner with any community that takes the initiative to invest in broadband and gather precommitments to demonstrate interest. "The joy of a public-private partnership is that the whole community can get built," he says. ❖

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