



## Case Study

# Roadstar Internet

### Roadstar Internet Speeds Delivery of High-Capacity Broadband Services to Residents and Businesses in Loudoun County, Va. Using BridgeWave's Reliable GigE Wireless Links



Loudoun County, Va., is located just 25 miles from Washington, D.C., amid rolling hills and beautiful scenery including the Blue Ridge Mountains and the Potomac River. The home of Dulles International Airport, the county's population has quadrupled over the past three decades, keeping pace with continuing growth throughout the metropolitan D.C. area. Today, as one of the fastest growing counties in the nation, Loudoun is an international center for technology, communications and transportation.

Since 2003, Roadstar Internet has relied heavily on leading-edge wireless technology to drive the availability of broadband services for Loudoun County's residents and businesses. Based in Leesburg, Va., Roadstar's unique business model fulfills the collective vision of the company's experienced team of telecommunications industry veterans. According to Marty Dougherty, CEO and founder of Roadstar, a compelling business opportunity arose from the realization that traditional copper-based technologies, such as T1 leased lines and digital subscriber line (DSL) services, along with cable-based services would prove too expensive and time-consuming to deploy throughout the county's rural terrain. "From day one, I firmly believed that a state-of-the-art wireless backbone was the only way to build a scalable and reliable network to deliver truly competitive services," he explains.

***"The combination of BridgeWave's AdaptRate and AdaptPath features took us well beyond what's currently available in the industry. By proactively switching between data rates and paths before network outages occur, we can guarantee the level of extended availability our business customers' demand."***

*- Marty Dougherty  
CEO and Founder, Roadstar Internet*

As the area's largest independent wireless broadband service provider, Roadstar has successfully leveraged wireless communications to extend high-speed, affordable Internet services to more than 2,000 customers who were previously underserved or neglected by local exchange carrier Verizon and cable provider Comcast. To stay ahead of its massive rivals, Roadstar's engineers constantly research and test the latest licensed and license-free wireless equipment to provide the fastest, most dependable broadband services possible.

#### THE CHALLENGE

Roadstar initially rolled out a series of cost-effective, DSL-like residential services that caught on quickly, enabling the company to create a hybrid mesh wireless network infrastructure comprising 75 "micro PoPs" or multiple points of presence for aggregating and backhauling Internet traffic. A variety of 2.4GHz, 5.xGHz and 18GHz technologies were used, depending on the characteristics of the terrain, since some frequencies are more ideally suited for open areas whereas others are more effective carrying signals in mountainous or heavily wooded regions.

After gaining significant traction in the residential market, Roadstar started focusing on the needs of Loudoun County's thriving business community. As more high-tech organizations moved in, requirements for highly dependable broadband services escalated. "Lots of businesses started clamoring for higher capacity services since their DSL and T1 links proved inadequate," says Dougherty. "They were hard pressed to find any high-capacity broadband connection options, much less at a reasonable price."

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So in 2005, Loudoun County commissioned a study to determine the viability of building a county-wide fiber-based network to link county operations while also offering local businesses access to ultra high-speed connectivity. The findings of the year-long study revealed a price tag of \$350 million for constructing a fiber network backbone. The inordinate upfront costs, along with high monthly fees, were cost prohibitive, so the county decided against building its own network. This decision created an immediate opportunity for Roadstar to offer a much more economically feasible solution. It also sparked an urgent technology challenge to find the highest capacity wireless solution with 99.999 percent (“five nines”) network availability.

### THE SOLUTION

Stepping up efforts to meet the escalating bandwidth demands of Loudoun County’s businesses, Roadstar began acquiring towers and rooftop rights while also researching the viability of gigabit wireless solutions operating in the licensed 80GHz spectrum. In particular, Roadstar’s wireless experts knew that 80GHz GigE was gaining interest from service providers as a cost-effective wireless fiber alternative. The ability to deliver full-rate Gigabit Ethernet speeds without the costs and time delays of running fiber was undeniably appealing from a competitive standpoint. “Deploying wireless fiber would enable us to expand our network in a fraction of the time—and with much less expense—than it would take to build out a traditional fiber-based network,” explains Dougherty.



Roadstar evaluated GigE products from major players in this space, namely BridgeWave Communications, Loea Corp. and GigaBeam. The team really liked the “light licensing” on the BridgeWave links, which also would help expedite deployments and contain costs.

Additionally, only BridgeWave’s AdaptRate™ 80GHz Extended Range (AR80X) link could deliver the desired availability at distances over two miles, which was imperative. With two-foot antennas, BridgeWave’s extended range product would enable Roadstar to reach 40 percent farther than other 80GHz GigE links. Another advantage: BridgeWave’s unique AdaptRate capability

enables the link to dynamically switch between GigE and 100Mbps data rates to provide continuous all-weather operation, even during momentarily intense downpours.

In addition to AdaptRate, BridgeWave has launched its new AdaptPath™ technology, which provides unprecedented levels of network availability and range by pairing the GigE primary link with a secondary connection using an alternate wired or wireless technology. For Roadstar, this capability permits combining a GigE link with a 40Mbps, highly rain tolerant 5GHz wireless bridge, which serves as an alternate path to ensure uninterrupted connectivity during occasional cloudbursts. Roadstar worked with BridgeWave to determine rain fade calculations for its region, factoring in summer periods when thunderstorms are common. When exceptional rain events occur, the BridgeWave link’s AdaptRate feature first switches from GigE to a 100Mbps data rate; then, if needed, the AdaptPath capability switches traffic to the secondary 40Mbps 5GHz bridge. As the storm cell passes, the link immediately returns to full GigE speed.

“We did our homework and studied the projections carefully to determine optimum uptime,” explains Dougherty. “The combination of BridgeWave’s AdaptRate and AdaptPath features took us well beyond what’s currently available in the industry. By proactively switching between data rates and paths *before* network outages occur, we can guarantee the level of extended availability our business customers demand. Moreover, the AdaptPath configuration provides a measure of



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path redundancy as we incrementally deploy links, prior to completing a full ring topology build-out.” Convinced that BridgeWave’s AR80X met its requirements for uptime, capacity and low latency, Roadstar installed GigE links as part of a field trial for its new INET Loudoun™ ultra high-speed Internet business service.

### THE BENEFITS

Following the highly successful field trial, Roadstar now is proceeding with full-scale deployment of its wireless-fiber network. Companies in one of its OnNet™ buildings can subscribe to 10Mbps services for the price of comparable T1 (1.54Mbps) service. Customers can choose 50Mbps services for \$4,000 per month—a hefty savings over the incumbent telco’s \$15,000–to–\$18,000 DS3 (45Mbps) service.

Early business customers, such as Telos Corporation, a leading provider of innovative IT solutions and services to the federal government for more than 30 years, have enjoyed a substantial increase in network bandwidth without having to build out their own networks to gain access to higher-speed services. After struggling with severely limited multiple T1 links, Telos migrated to Roadstar’s 50Mbps services to meet its burgeoning communications requirements. “INET Loudoun removes all previous boundaries by giving businesses the capacity they need at a price they can afford,” says Dougherty. “Our state-of-the-art GigE wireless backbone enables us to be first in delivering next-generation access services in this fast growing region.”

Roadstar plans to connect hundreds of buildings to its new INET Loudoun™ network using BridgeWave’s AR80X gigabit wireless links over the next 18-to-24 months. “BridgeWave’s AR80X links will let us scale our network faster and more economically than any other technology,” says Dougherty. Furthermore, the service provider estimates that its wireless fiber backbone can be deployed for a tenth of the cost and much less time and effort than was estimated for implementing the wired fiber alternative. “When it comes to carrier-class solutions, capacity and uptime are paramount,” he concludes. “BridgeWave excels at both while also providing the lowest latency backbone connection we’ve seen so it won’t matter what data, voice or video traffic comes our way—we can handle it all.”

### CUSTOMER QUOTE

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**- Marty Dougherty**  
CEO and Founder  
Roadstar Internet

CASE STUDY



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#### CUSTOMER:

Roadstar Internet, a leading wireless broadband service provider based in Leesburg, VA.  
[www.roadstarinternet.com](http://www.roadstarinternet.com).

#### INDUSTRY:

Telecommunications

#### CHALLENGES:

- Incumbent service providers offered severely limited access options for area businesses
- Loudoun County needed an economically feasible and highly reliable alternative to a cost-prohibitive proposed fiber backbone
- In expanding into business-class offerings, Roadstar required gigabit capacity and “five nines” network availability

#### SOLUTION:

Initial deployment of two BridgeWave AR80X GigE links with AdaptRate and AdaptPath capabilities

#### BENEFITS:

- High-speed, carrier-class services can be rolled out for a tenth of the cost and a fraction of the time of wired fiber alternatives
- Economical, expedited network deployment will facilitate the connection of hundreds of buildings to a GigE backbone within the next 18-to-24 months
- Unique AdaptRate and AdaptPath capabilities ensure continuous all-weather operation —at distances far-beyond traditional gigabit connectivity limits