

Rajant and Accelecom Bring Downtown Wi-Fi to Eastern Kentucky's Harlan County

Amid the rolling peaks of the Appalachian Mountains in southeastern Kentucky, Harlan County is a testament to the enduring spirit of its people. Initially shaped by the coal industry, this tight-knit community embarked on a modernization journey, seeking to preserve its cultural legacy while embracing the modern era. A crucial need for enhanced connectivity within Harlan County arose as part of the ongoing modernization efforts, fostering stronger ties among its residents and facilitating interaction with the broader world. In response, a pioneering initiative was launched, spearheaded by Harlan One, and collaborative efforts from other various local entities. Partnering with Accelecom and Rajant, this innovative endeavor addressed the community's evolving connectivity requirements, paving the way for a brighter future for Harlan, its inhabitants, and visitors.

The Challenge

Addressing the connectivity challenge in Harlan presents numerous hurdles, the most significant being the sparse and unreliable cell coverage typical of rural America. Establishing basic infrastructure for cell towers becomes prohibitively costly with lower population densities and rugged terrain like mountainous areas. Harlan, with a population size ranking of 45 out of 120 counties in Kentucky (25K residents), faces these challenges acutely. Consequently, resolving the connectivity issue transcends merely relying on the cellular network to bridge the gap. There are parts of the city where cell service is inferior, including areas around the Harlan independent school district building and public library building. This problem is further exacerbated during public events held in Harlan, where the number of users on the cellular network can easily double. This usually leads to a loss of connectivity for vendors and visitors alike.

The Solution

Networking gaps can be addressed in several ways. The first option is to add more cell towers. This involves placing new towers or modifying existing ones to improve coverage. However, this option is often not feasible because building new cell towers in rugged terrain requires substantial investment, as the construction and permitting costs are prohibitively high. Additionally, the environmental impact on the sensitive ecosystems in mountainous regions can often prevent tower construction. Further, limited power supply and challenging



Customer Description

- **Location:** Harlan Kentucky
- **Customer:** Harlan County

The Partners

- **Rajant** - Pioneers of peer-to-peer radio communications enabling real-time voice, video, and data to connect machines, robots, and people together as part of a secure private mobile network.
- **Accelecom** - Symmetrical high-speed, high-capacity fiber internet and ethernet solutions for healthcare, education, enterprise, agriculture, government, & carriers.

Solution Components

Kinetic Mesh Components:

Rajant Hawk BreadCrumb®

ES1 BreadCrumb

access to these remote towers make maintaining existing infrastructure significantly challenging for the operating companies.

A more cost-effective option is to implement a secondary method of communication besides cell coverage. The method must be reliable, secure, easily managed, and adaptable as exemplified by Rajant Kinetic Mesh®. Public Wi-Fi, especially when serving as the primary communication method for businesses and individuals, must ensure that all data—whether voice, video, or other types—always reaches its destination. The network should allow for maintenance teams to service it promptly, incorporate robust security measures to protect both residents and businesses, and be scalable to accommodate growth. Even in rural areas, the network must meet the increasing coverage demands as the town expands. While many technologies can fulfill some of these requirements, few can effectively meet all of them.

One of the key requirements for a robust communication solution is interoperability. Given that each technology has its own strengths and weaknesses, the ability to integrate multiple technologies becomes essential. In the case of Harlan, the network needed to serve dual purposes, functioning effectively as both a static and a mobile system. Further, it needed the capacity to handle a wide range of client demands, from serving tens of users during quieter periods to accommodating thousands during peak times.

With such flexibility, Harlan would avoid significant challenges. If the network were overbuilt always to handle peak demand, the costs would be prohibitively high, resulting in an inefficient allocation of resources. On the other hand, if the network were designed only to meet average demand, it would become overwhelmed during busy periods, failing to provide the necessary level of service. This would negate the benefits of having a secondary communication method, as the network could not scale according to the community's needs.

Thus, the Harlan solution had to incorporate various technologies seamlessly working together to ensure reliability, security, and ease of management while also being

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Our new free downtown Wi-Fi is a game-changer for Harlan, ensuring visitors stay connected and can easily share their experiences in real time. Additionally, the Wi-Fi network supports local businesses by attracting more visitors who can engage with our unique shops and restaurants. We foster a more connected and informed community by bridging the connectivity gap for locals and tourists, ultimately enhancing our tourism product!”

— **Brandon Pennington,**

Executive Director, City of Harlan Tourist
Convention Commission

scalable and adaptable to the town's fluctuating requirements. This multi-faceted approach ensures that the network remains cost-effective, robust, and capable of providing consistent, high-quality service regardless of the situation.

The Results

Rajant, in partnership with Accelecom, successfully met the demanding requirements of Harlan's public Wi-Fi by leveraging Accelecom's fiber internet access and Rajant's InstaMesh® technology. Network coverage extends from the courthouse, where Accelecom's fiber terminates, using Rajant BreadCrumbs as the medium. The network coverage is then provided to the residents of Harlan through consumer-grade access points.

This integration of technologies has enabled Harlan to enjoy high-speed downtown internet. The coverage extends three blocks in front of the courthouse and can be expanded further using two existing mobile units.

The network has proved reliable, serving as a secondary communication method during special events. Due to the project's success, plans are underway to expand coverage to address other connectivity gaps across Harlan. Another Rajant node is also slated for installation near the baseball fields for patron connectivity during sports events.



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