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Street Smarts: Cincinnati Creates Opportunities with a Strong Fiber Backbone

Smart technology is helping the Ohio city power utilities, innovation and other elements.

by Erin Brereton

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Robust fiber resources have helped position Cincinnati to enhance municipal operations with smart technology and potentially reduce the digital divide through increased Wi-Fi accessibility.

The city's fiber network, supplied by communication services provider [altafiber](#) (formerly Cincinnati Bell), provides high-speed internet access to nearly 70 percent of the city.

Free public Wi-Fi access is available in several popular areas, including Washington Park, Fountain Square and Cincinnati's [riverfront entertainment district The Banks](#), which houses restaurants, bars and the Cincinnati Reds' baseball stadium. That access is enabled by fiber-fed commercial-grade outdoor [Aruba](#) 315 access points situated to support different use scenarios, according to Katie Meyer, policy and program manager for altafiber's UniCity smart city division.

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"At The Banks, we placed the access points actually on the properties, on the facade of those storefronts," Meyer says. "That fiber was brought in and wired through the front of the building. But at Fountain Square, for example, where there are large concert events, we installed new poles and hosted them there."

The communications company has also been working with the [Cincinnati Metropolitan Housing Authority](#) to establish additional large-scale Wi-Fi networks at public housing locations, partially funded with capital from the federal Coronavirus Aid, Relief and Economic Security Act, Meyer says.

Residents log in to the Wi-Fi through a portal, which the housing authority can use to share information with its constituents.

"We're doing a lot of work in the digital equity space," Meyer says. "In a high-rise with a central hallway and apartments on either side, we'd put in a high-powered Wi-Fi access point that would go down the hallway, so all of the public spaces are covered, and there's coverage at least somewhere in every unit."

Tech Efforts Support Employers and Future Employees

The city's connectivity capabilities have also helped facilitate both skill and product development within the [Cincinnati Innovation District](#), a research area overseen by the [University of Cincinnati's Office of Innovation](#). The district is funded in part by a \$100 million infusion from the nonprofit JobsOhio economic development organization, according to UC Chief Innovation Officer David J. Adams.

"If we're going to live in the digital world, individuals need to have the ability to connect to the internet," Adams says. "We're fortunate the altafiber leadership team has really been working with the city to help ensure individuals at all levels, from low-income to high-income, have physical connectivity within the city."

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Companies and researchers working in the university's 1819 Innovation Hub — a building within the Cincinnati Innovation District created to facilitate collaborative product design and testing — can take advantage of high-speed 5G internet access.

The hub is outfitted with a variety of tech tools participants can use, ranging from an [Epson](#) S60600 that produces large waterproof prints to a [Fluke](#) multimeter device that measures voltage, resistance and other properties.

Innovation Districts Draw Smart City Investment

Corporations such as Kroger have utilized lab space, Adams says, to rethink what a retail digital experience could look like in the next five to 10 years. They are tapping into student and researcher acumen to develop smart solutions that, for example, might harness intelligence built into refrigerators to automatically reorder milk when a container inside drops below the halfway point.

[The Digital Futures Complex](#), which will offer more than 180,000 square feet of additional research space, is scheduled to open later this year in the district.

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The new complex will support the district's goal of helping to attract, develop and retain STEM talent in the area, according to Adams. He notes that last year, Cleveland announced plans to create its own innovation district. And in Columbus, Ohio, tech provider [Intel](#) said in January that it will invest \$20 billion to construct two new semiconductor plants.

"The Cincinnati Innovation District has become the model for the state of Ohio," Adams says. "Lt. Gov. [Jon Husted](#) has indicated the innovation districts were a key selling point for Intel. That is a great example of working as a state to develop the talent necessary to build the new technologies that are going to be required as we keep moving forward."



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David J. Adams, Chief Innovation Officer, University of Cincinnati

A Smart Solution Helps Prioritize Wastewater Needs

In addition to playing a role in new product innovation, smart technology is helping Cincinnati increase efficiency through revised operational approaches, such as the smart sewer system it installed in 2015.

In Cincinnati, sewage from homes and industries, along with rainwater that has entered the storm system, is transported through one pipe to a treatment plant. Excessive weather events can overwhelm the process, says Reese Johnson, superintendent of compliance services for the [Metropolitan Sewer District of Greater Cincinnati \(MSD\)](#). For example, a rainstorm occurred several years ago at the same time residue from a heavy snowfall melted, causing flooding.

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To provide system operators with increased real-time visibility, MSD investigated low-cost sensor solutions, which Johnson says yielded "all sorts of responses, from glossy proposals to scribbles on the back of a napkin of how to monitor sewers." MSD eventually settled on a telemetry unit that aggregates data in the cloud.

The agency now gets up-to-the-minute information from the roughly 800 hydrostatic and ultrasonic level sensors, flow monitors and rain gauges it has deployed to measure water levels and flow characteristics.

"We realized what was lacking was the telemetry to connect those isolated individual sensors out in the system, miles away from power or any type of facility, and get that data back," Johnson says. "That was the real game changer that allowed us to take our monitoring and data collection to the next level."

Sewer System Infrastructure Connects to the Internet of Things

Today, information that's transmitted via a cellular connection flows through a supervisory control and data acquisition program that allows staff to control mechanical equipment such as pump skates and valves. They can also view graphics that show tank levels and pump status on standard computers, such as the [Dell laptop](#) on Johnson's desk.

Although the department had some concern that frequent, costly and time-consuming battery replacements would be necessary, the telemetry units' batteries can last for months, despite data being collected 24/7. Their ability to opt for the strongest signal also offers added flexibility, Johnson says.

"What's really neat about those units is that they can actually talk to different providers," Johnson says. "Our topography is pretty hilly; it's possible you could put a meter in a manhole that might be not visible by the [Verizon](#) tower, but hits the AT&T tower just fine. If a tower goes down, then we can bounce off another."

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Once MSD augmented its sensor resources, it was able to better track overflow conditions and confirm pockets of capacity existed within the system that it wasn't aware of. That helped the agency optimize its infrastructure and ultimately improve some of its wet-weather control facilities' performance by 15 percent the first year.

"We didn't change any concrete or steel, didn't put on new gates," he says. "Now, every time we build something, we're looking at how to make it interact with this smart sewer system to take advantage of having additional data and insights across the system, so we can see, 'Oh, wow, that interceptor is full. We need to shift flow into the other interceptor.' We're building things that have that capability baked into them."

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