

Connecting Underground In a City That Never Sleeps

Thanks to an innovative public-private partnership, New York City subway passengers finally have cellular and Wi-Fi connectivity in the stations.

By Jim Hintze / *Transit Wireless*

If you've ever texted, chatted on the phone or connected to Wi-Fi while you waited for a train in the New York City subway, you've used Transit Wireless's network. Thanks to Transit Wireless, the days of unceremoniously losing your connection while descending underground are over. In 2005, the Metropolitan Transportation Authority (MTA) had a vision of introducing connectivity in the underground subway stations for its 5.7 million daily riders, and Transit Wireless was the company selected to create this broadband wireless network as part of a public-private partnership. The company, which holds a 27-year contract with the MTA, designed, built and maintains a neutral-host cellular system and a public Wi-Fi network in all underground New York City subway stations. Though the underground station project is now complete, Transit Wireless's role in the subway system continues to evolve.

SEAMLESS CONNECTIVITY FOR STRAPHANGERS

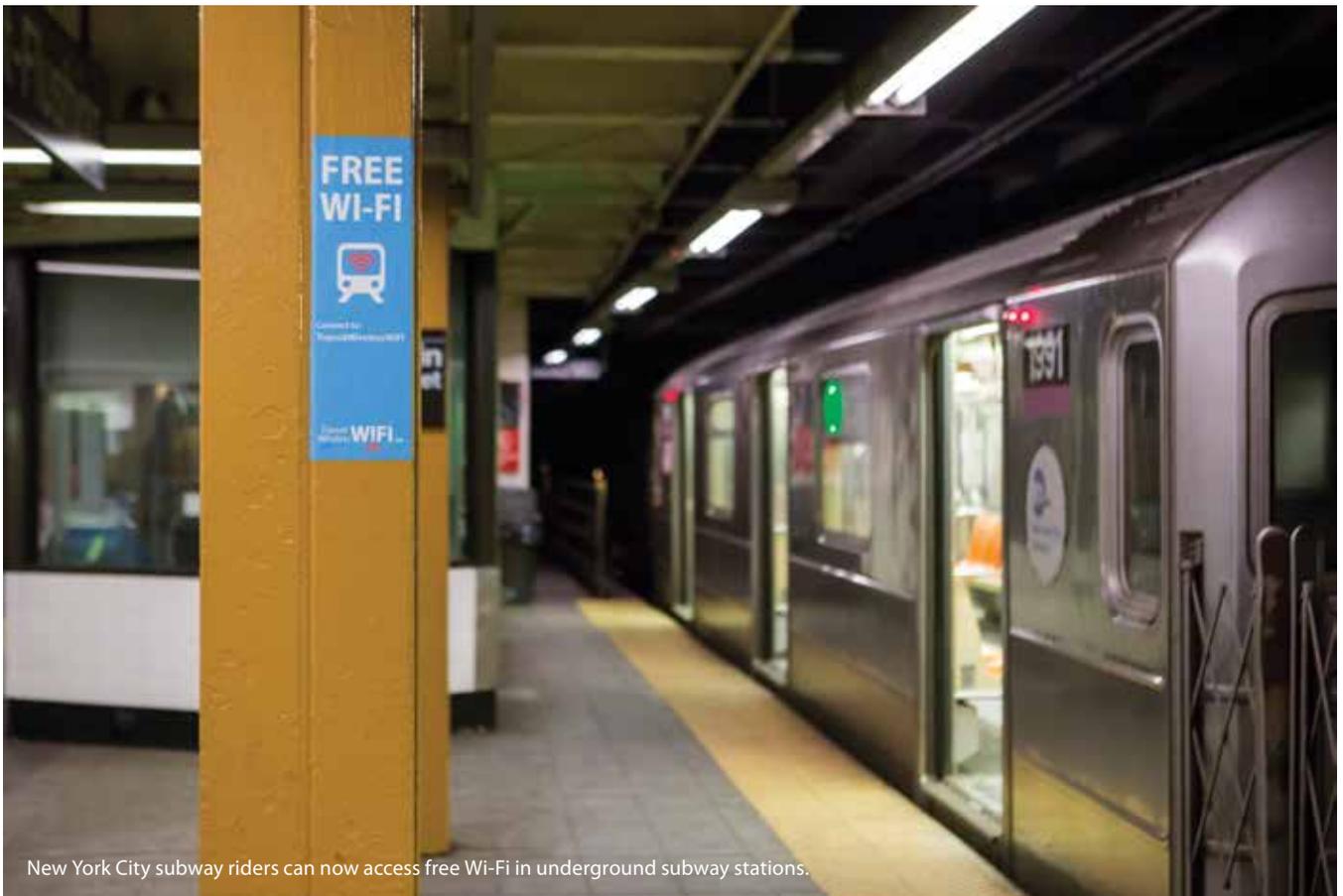
In 2011, Transit Wireless completed a proof-of-concept build and activated cellular and wireless connectivity in six subway stations in the Chelsea neighborhood of Manhattan. The installation included designing and building an indoor and outdoor, neutral host, multiband distributed antenna system. This demonstrated the company's capabilities to deploy broadband

wireless in underground subway stations in New York City.

The network infrastructure features more than 160 miles of carrier-grade, 864-count fiber optics, which connect to Transit Wireless's five base station hotels that house cellular carrier equipment. The fiber optic network covers communications needs, such as carrier-grade, high-speed Ethernet; internet connectivity; critical fiber applications and data co-location. It provides wave-division multiplexing transport for applications that demand high bandwidth as well as dark fiber services for optimal capacity, control and security. The fiber optic network also delivers a private, dedicated omnibus LAN (a LAN that can be used for multiple applications) within the subway system and enables New York City Train Control to control and manage its own network as needed.

Following the initial opening of the six stations in 2011, installation continued throughout the city until January 2017, when Transit Wireless successfully completed the deployment of the entire network. This accomplishment resulted in full cellular capabilities with the four major carriers – AT&T, Sprint, T-Mobile and Verizon Wireless – as well as Wi-Fi connectivity in 282 of the MTA's underground stations, two years ahead of schedule.

Designing and building the wireless infrastructure in subway stations more than a century old was no easy task. With harsh



New York City subway riders can now access free Wi-Fi in underground subway stations.

environmental conditions, such as high heat, moisture and water intrusion, customized equipment was required. There were also many structural challenges, such as low ceilings and narrow platforms, and 24/7 train traffic restricted the hours during which construction could take place. The constant flow of 5.7 million daily riders was also considered to ensure subway riders' safety while workers constructed and installed equipment.

Unbeknownst to the NYC subway riders who enjoy seamless cellular connectivity as they move from street to station, this now expected utility began as a service enhancement. Throughout the subway system, more than 3,000 strategically placed antenna connection points allow for uninterrupted phone conversations, media streaming, texting and more. More than 2,500 Wi-Fi access points offer the free Transit Wireless Wi-Fi network, allowing anyone who has an enabled device to connect while waiting for a train.

In addition to being an effective communications system, the network is scalable, thus future-proofing the stations for technological advancements to come. Anticipating future needs is critical as New York City looks to bring smart-city applications online.

SAFETY AND IMPROVED COMMUNICATIONS

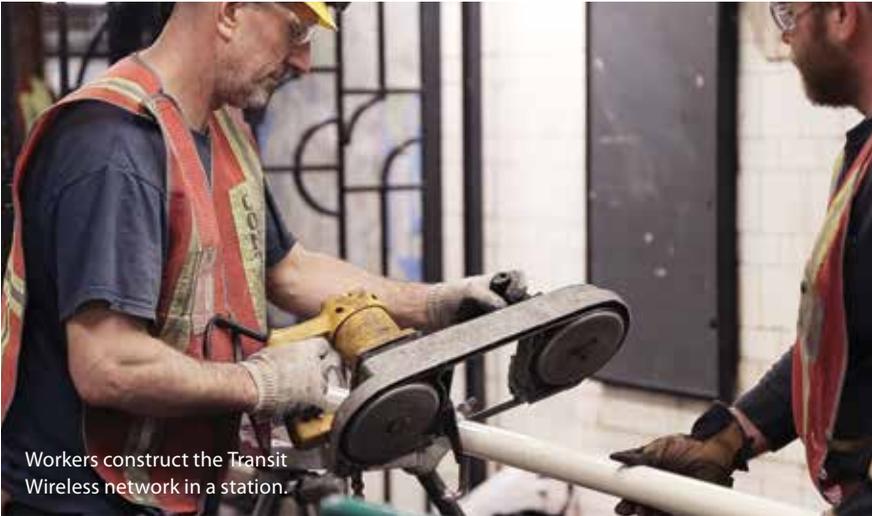
Transit Wireless does not just provide cellular and Wi-Fi capabilities for riders but also helps enhance public safety in the subway stations. The Transit Wireless network has a dedicated 4.9 GHz band dedicated to first responder communications. This network supports the use of Enhanced 911 (E911), a cellular capability that enables public safety authorities to pinpoint the location of an underground 911 caller in the event of an emergency. Transit Wireless's network also supports more than 1,200 help point kiosks in stations that can provide transit information and emergency services with the push of a button.

Furthermore, Transit Wireless Wi-Fi provides connectivity for more than

450 train arrival countdown clocks installed throughout the underground system. The system incorporates train-mounted Bluetooth technology that relays arrival and departure information through the network to the MTA, which can then predict when the next train will arrive based on the collected data.

THE SUCCESS OF THE P3

Perhaps one of the most impressive aspects of the project is that it was accomplished at no cost to taxpayers. This landmark undertaking was made possible thanks to a public-private partnership (P3) between Transit Wireless and the MTA through which Transit Wireless has made an investment of more than \$350 million to date. Through its work and as part of the partnership, it shouldered the financial, scheduling and business development responsibilities of the project. The P3 between Transit Wireless and the MTA succeeded in delivering a highly desirable service to the public without fare hikes or an increased tax burden. In



Workers construct the Transit Wireless network in a station.

return, Transit Wireless shares revenues with the MTA as it monetizes the network through business partnerships such as advertising.

There is no question that the cellular and Wi-Fi networks are a huge success. In just one year, the networks handled more than 280 million cellular calls and more than 120 million Wi-Fi logins. Network popularity has soared, with customers consuming more than 500 terabytes of data monthly. The overall initiative was named Best Wi-Fi Deployment to Connect the Unconnected in an Urban Environment by the Wireless Broadband Alliance and was recognized again with a nomination for IDC'S 2018 Smart Cities Award in the Digital Equity and Accessibility category. The success of the networks demonstrates how constant connectivity has become essential for commuters and New York City visitors alike.

NEW OPPORTUNITIES AND USAGES

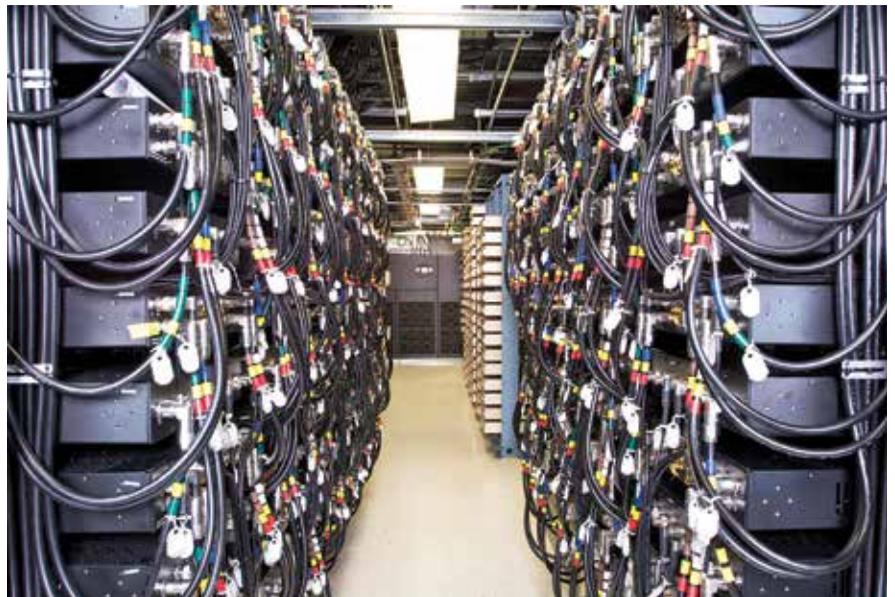
The Wi-Fi network allows for various additional partnership opportunities, such as the Subway Library initiative with the New York Public Library in the summer of 2017. This partnership allowed subway riders to use the network to download free e-books from the New York Public Library while in the underground subway stations to enjoy during summer commutes.

Transit Wireless continues to propose innovative technology and applications that could further modernize the subway system. Most recently, the company received an Honorable Mention in the MTA Genius Transit Challenge in the category Increase Communications Infrastructure in the Subway System. Transit Wireless proposed the installation of a trackside LTE network that would provide uninterrupted connectivity for trains in tunnels, allowing for continuous communications for train operators

and subway riders. This expansion would build upon the Wi-Fi network infrastructure that Transit Wireless installed in the underground subway stations. The combined Wi-Fi and LTE networks could also support train control and signal systems, as well as digital advertising and public and operational Wi-Fi services in the train cars.

Transit Wireless has had an indispensable role in modernizing New York City's subway system by ensuring that its installation is equipped to handle evolving technologies and innovations. With the success of the P3 with the MTA and its continued efforts to develop future-forward ideas, Transit Wireless will continue to have a vital role in connecting subway riders during their commutes. It has already met demands for increased public safety, streamlined operations and constant cellular access, and it will continue to support the MTA's initiatives. ❖

Jim Hintze is vice president of business development for Transit Wireless, which designs, deploys and operates open-access advanced communications infrastructure solutions in unique environments. Learn more at www.transitwireless.com.



One of the base station hotels that house cellular equipment for the subway stations