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Cellular communication is already an integral component of our digital lives and will become even more so as 5G technologies and the Internet of Things (IoT) turn everyday objects into connected data points.

This presents a significant challenge going forward: What to do about the large number of "dead spots" that exist within buildings? By some estimates, more than 80 percent of cellular communication takes place indoors, which means virtually everyone has experienced the dreaded "zero bars" phenomenon within a supermarket, shopping mall, in the office, at home, or on the factory floor. In a 5G universe, however, failure to connect wirelessly is not just an inconvenience but could become a matter of life and death.

This puts building owners and managers– particularly those in the hospitality and multiunit housing sectors–under pressure to provide universal connectivity throughout their facilities. At first glance, this problem should be easily solvable with either Wi-Fi repeaters or cellular signal boosters, both of which are designed to push connectivity into areas that are currently blocked. But as experience is already starting to show, these are incomplete solutions at best and quickly become extremely costly as data demands and traffic flows scale upward.

This e-book will examine the shortfalls that repeaters encounter on the road to full indoor wireless connectivity and how much more elegant and cost-effective solutions are available like Private LTE or a Distributed Antenna System (DAS).



The problem with boosting

Wi-Fi is a local area network (LAN) solution designed to provide Internet access within a limited range. It typically operates in the 2.4 and 5.0 GHz frequency ranges and is available in various standards to make use of crowded bandwidth.

Meanwhile, cell boosters amplify weak cellular signals that are being obstructed in some way. In the case of an indoor setting, these obstructions range from simple iron and concrete to newer building materials and even eco-friendly glass.

The main problem with both of these solutions is that while they are relatively cheap and easy to implement, they provide only a temporary fix to what is likely to be a long-term challenge. In both cases, the connectivity provided to indoor users is shared, which means that as the number of users increase along with the demand for overall data, both Wi-Fi and boosted cell service can be hit with traffic congestion, latency issues, or even dropped or unavailable service altogether.

This forces building owners and business leaders to deploy additional Wi-Fi and/or cell-boosting equipment throughout the facility, which drives up costs and creates issues like signal interference and resource contention. The end result is less reliable connectivity and dissatisfied users.

So what's the answer?

A private in-building wireless network, such as Private LTE or a Distributed Antenna System, can help you prepare for the future by providing robust and reliable connectivity for everything from cell phones and IoT devices to sensors and analytics.

Private LTE

Private LTE is a local cellular network that features cell sites and core network servers dedicated to supporting the connectivity of a specific organization's requirements independent of public cellular service providers. It enables organizations to customize their networks for mission-critical applications, optimize the network for low latency, and support specific SLAs–all without interference from the often-congested public wireless spectrum.

Private LTE can be the better choice when large amounts of data are transferred that stress the public network in a given area. It can be deployed anywhere, including areas beyond the reach of public carriers, and can keep data on-site for security reasons. And private LTE can be optimized to handle traffic types with specific requirements. For example, real-time IoT applications can be guaranteed with extremely low latency for immediate response. Private LTE is an important alternative option or even replacement for Wi-Fi, especially in situations where Wi-Fi has shortcomings, and can best be thought of as complementary to Wi-Fi. It is a good choice when Wi-Fi does not provide the



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connectivity required in certain use cases such as supporting mobile deployments. Wi-Fi can also be susceptible to spectrum noise and interference from steel walls.



Distributed Antenna System

A distributed antenna system (DAS) is essentially a network of spatially or geographically distributed antenna nodes connected to a common controller. This gives it the ability to extend strong, reliable cellular service throughout a building or campus without



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encountering the latency or interference issues present in repeater or booster Wi-Fi and cellular solutions.

When deployed properly, all antennas in the system provide full coverage to all areas within range, with little or no overlap with other antennas. Since the entire array is connected to a single controller, traffic is efficiently managed to the cell carrier's base station. Meanwhile, the RF spectrum used by the DAS array is licensed to the wireless carrier as well, meaning that it cannot interfere with its own antennas nor those present in nearby buildings. DAS architectures are far more energy-efficient than Wi-Fi or cell repeaters as well. In order to penetrate RF-blocking building materials, booster technology often requires a high signal strength, which requires high power consumption. DAS antenna nodes are compact, so they can be placed within buildings at signal strengths low enough to allow their use in areas that are restricted for higher-powered solutions. In this way, DAS is able to provide full coverage without the high energy draw of a traditional cellular solution but without the signal loss that typically accompanies a low-power solution like Wi-Fi.

DAS also provides a number of other advantages over Wi-Fi and cell repeaters. For one, user location can be more accurately determined using DAS, which can be an important factor in an emergency situation. Additionally, DAS is highly scalable, allowing operators to add or subtract nodes according to service needs in a highly granular manner. This is far superior to the traditional practice of over-provisioning coverage to handle peak periods only to wind up paying for unused resources during the sometimes hours-long periods of off-peak usage. Still, few building owners and managers have the skillsets to deploy and manage hightech communications networks, which is why partnering with an experienced technology expert remains the fastest and easiest way to get started. CBTS has been a leader in advanced communications technologies for more than two decades, and our fiber-based Private LTE and DAS systems are designed from the ground up to provide full wireless coverage at low cost while still retaining a high degree of customization and flexibility.

Clients receive a thorough needs assessment followed by a custom-designed and engineered solution. We also take care of carrier onboarding and management, 24x7 monitoring, and monthly status and analytics reporting.

Whether it's in the home, in the office or out on the town, reliable connectivity to 5G and other wireless services will become non-negotiable within the next year or two. With lifestyles continually gravitating toward data-centric activities, people will naturally favor locations where they can get the best levels of services, avoiding dead areas altogether.

For building owners, this will likely have a major impact on the bottom line, given that empty seats, retail space, offices, or dwellings will cease to be revenue generators. Those at the forefront of this connectivity curve, in fact, will likely excel well into the future due to the loyalty that customers will feel knowing that their service needs are being met no matter where they roam within a given building.



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The immediate call to action, then, is not just to enable full indoor connectivity, but to do it quickly. With CBTS as your in-building wireless partner, you can ensure your connectivity needs will be met now and well into the future.



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About CBTS

CBTS is a leading technology provider to more than 3,000 organizations in all industries, including dozens of Fortune 500 and Global 2000 companies. From Unified Communications to Cloud Services and beyond, CBTS combines deep technical expertise with a full suite of flexible technology solutions to mitigate risk, optimize collaboration, drive innovation, and leverage intelligence for its clients.



Contact us for further information on how CBTS can quickly implement an in-building wireless solution in your building.



