

Building Connectivity

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Background

In an increasingly tech-driven economy, building connectivity is becoming among the most important considerations for tenants when selecting office space. Building connectivity, also commonly referred to as In-Building Wireless (IBW), has been in wide use in institutions of higher learning since the mid-1990's, where large numbers of students are able to access a local, reliable network, and enjoy its benefits. The IBW concept has recently been employed in many office buildings with large populations of tenants who have immediate access to a centralized, high-quality network. According to the online panel of 150 leasing decision-makers, the quality of a building's internet connection (87%) was edged only slightly by its location (90%) as factors when choosing an office location.



Benefits of IBW

The connectivity infrastructure of an office building is critical to office tenants, and studies show that tenants are willing to pay more to be in a "connected" building.

When connectivity issues occur, the company's employees are mostly impacted by increased stress level, frustration in helping customers and lower

productivity. Over 75% of tenants state that poor connectivity impacts company profitability.

Many municipal agencies and building jurisdictions now require enterprise spaces of a minimum size to support licensed public safety frequencies so police, firefighters and paramedics can communicate indoors in the event of an emergency.

IBW, coupled with independent certification and testing generates more interest in tenant spaces, and specifically, tenants prefer leasing office space in a building that is certified, and would pay more, and sign leases faster.



Wired Certification is the internationally recognized rating system that helps landlords design and promote their buildings' great digital connectivity to tenants. Over 4 million tenants in more than 1,000 buildings globally trust Wired Certification as the

benchmark for internet that meets their needs. WiredScore is the organization behind Wired Certification, the internationally recognized digital connectivity rating system for commercial real estate that helps landlords design and promote their buildings' great digital connectivity to tenants. WiredScore launched Wired Certification in partnership with Mayor Bloomberg and the City of New York in 2013. Since then, more than 350,000,000 square feet of office space has been certified across North America and Europe, including buildings owned by premier landlords such as Blackstone, Brookfield, and Hines. Wired Certification seal is a trusted symbol that identifies buildings that have been independently certified to provide the best-in-class connectivity infrastructure that businesses require to thrive.

IBW isn't Wi-Fi

It's important to note that IBW solutions are not the same thing as Wi-Fi. While there are some superficial similarities in the functions they perform, there are radical differences in how they are designed, deployed and managed. The basic distinction boils down to using a cellular network—3G or, more commonly, 4G/LTE—to connect for data and voice instead of their device's Wi-Fi service. Since cell service providers cannot deploy IBW in every building they serve, it falls to the owner to judge if an IBW solution is needed, and what kind is best for the circumstances. By taking ownership of the infrastructure—and connecting to one or more operators' core networks—the owner, manager or architect has access to a range of options. IBW systems could include multiple facets of wireless such as Cellular, Public Safety radio, Wi-Fi and building monitoring and control. There are Hybrid systems and opportunities that are available from 3POs like Airwavz.

A common misconception is that IBW is just another name for Wi-Fi. After all, one of the first things a wireless user does when entering a building is to check for an accessible Wi-Fi network. Generally speaking, Wi-Fi is not built to carry cellular network traffic. Voice is still generally handled by the macro cellular network. The macro network is designed to cover wide swathes of outdoor space, but cellular frequencies have difficulty penetrating buildings effectively. Some construction materials, such as energy-saving Low-E window glass, are actually designed to reflect radiation away, including some RF signals. While Wi-Fi has played a critical role in the provision of traditional indoor connectivity to date, as future capacity demands rise, it will prove insufficient to meet said cellular requirements. That's why the inclusion of a dedicated IBW solution is an important priority for enterprise owners and building managers; it should be included at the architectural design stage of new commercial, industrial and enterprise spaces. Wi-Fi deployments are generally plug-and-play solutions that use unlicensed frequencies and require little skilled labor to install. In contrast, IBW deployments can be complex and difficult to provision. Because they interface with wireless operators' macro networks, IBW solutions must meet more stringent requirements and use licensed frequencies. This demands infrastructure that includes specialized RF equipment and cabling, and requires expensive, highly-skilled labor to install.

Funding for IBW systems by wireless operators has become less available, as funding for these initiatives has been diverted to other business priorities. As a result, wireless operators now typically only extend this support to large venues such as stadiums. In some cases, operators are willing to enter into negotiations to provide single-operator IBW solutions for smaller, less lucrative enterprise spaces. The downside is that only one operator's network is supported. Customers using other operator networks are left with pre-IBW conditions.



Reliability and the “Rule Of Nines”

How many “nines” do you really need? Operator-grade IBW solutions are generally built to deliver “five nines” of availability and reliability; that is, a given access point will be available 99.999 percent of the time. To put that into more relatable terms, that equates to approximately five minutes of downtime per year. Even the best Wi-Fi solutions, properly installed, optimized and managed, rarely achieve “three nine” or 99.9% availability. While this seems to be a modest difference, three nines means you can expect almost nine hours of downtime annually. The more common 99 percent (“two nines”) yields a staggering 83 hours of downtime per year—enough to cause minor annoyance to a retail customer checking his email, but a potential disaster for a bank, hospital or other connectivity-critical enterprise. In these cases, downtime can lead to lost revenue—or worse.

In most enterprise spaces, the best strategy is a mix of Wi-Fi and IBW solutions. Each has its place, and, in complex enterprise environments, you'll likely need both to keep tenants happy and productive.

A New Generation of Acronyms

The in-building wireless infrastructure market is still relatively new for commercial real estate owners and managers, so here a few of the new terms and jargon that only insiders understand at first; we anticipate that these will become more familiar as the technology advances:

- 3PO (3rd Party Operator) Companies who operate an end-to-end, unique, secure and proprietary in-building wireless mobile network for their customers.
- DAS (distributed antenna system) – a series of active connected antennas inside of a commercial building.
- D-RAN (distributed radio access network) – similar to a DAS, but passive antennas connected to carriers' radios inside of building instead of elsewhere.
- Femtocell - a small, low-power cellular base station, typically designed for use in a home or small business.
- PIM (passive intermodulation) – interference in a wireless system that drives building tenants crazy and keeps wireless network engineers busy. Well-meaning tenants putting femtocells in their offices are a big cause of PIM.
- Macro Cell (cell tower) – basically one of the big cell towers we see dotting the landscape that have trouble penetrating tall commercial buildings in dense metro areas.
- Small Cell – not a big antenna like the macro cell, but a smaller one typically found on a building or streetlight focusing on providing cellular service in a small area.

The Next Generation...already?

Real Estate Weekly Magazine reports that wireless carriers are getting ready for the first wave of their fifth generation (5G) cellular technologies. Meanwhile, properties are deploying extensive, in-building networks to ensure their buildings are ready as well. Companies are moving forward with 5G preparation despite the changing technology. For example, World Trade Center towers Three, Four and Seven have installed distributed antenna systems (DAS) to carry cell service throughout all three towers. Developers are doing the same with

Manhattan's One Vanderbilt as are developers in Hudson Yards, where office tenants are reviewing their leases to ensure their spaces will be ready for 5G by the time their move-in date approaches. Done properly, 5G should be an add-on technology to these systems. When 5G is released, carriers say it will bring seamless streaming and the ability to reach to a broader spectrum of devices like self-driving vehicles, smart home appliances and building infrastructure. The article also notes that network carriers had traditionally paid for in-building DAS Systems. While that's no longer the case, owners are increasingly responsible for preparing their buildings to meet the demand now and in the future. When the time comes where more equipment and wiring is needed for 5G DAS, it is unknown how much carriers can help commercial real estate owners. The big four carriers are strapped for cash and already have funds committed to building up their outdoor networks. The chance of any of them investing more towards indoor networks in the future is questionable.

Quick IBW Facts

- 80% of calls and cellular data sessions are initiated in buildings
- 2% of commercial buildings have addressed in-building wireless control, and tens of thousands of buildings are demanding service. With growth of data use up 40% every year, carriers capital can't keep up.
- Typical costs for operating an IBW system in an office building in the range of 500,000 rentable square feet are 10 cents per square foot per year, or less.

Among CODA's network of real estate industry resources are experts in IBW who design, develop, own and operate wireless infrastructure platforms as a service for building owners and enterprise customers. These experts can help building managers flexibly and economically solve the coverage and capacity challenge created by the exponential explosion of mobile consumption. A holistic, solutions-driven approach delivers a customized end-to-end wireless technology platform that aligns with a building's financial and performance requirements. CODA thanks Airwavz (www.airwavz.com) for its assistance in contributing to this White Paper.