

Supporting the Broadband Needs of Modern (or Modernized) MDU Buildings with Wireless Backhaul for Interior Spaces

New all-wireless backhaul/backbone networks help deliver today's digital/smart world to new and upgraded MDUs.

By Sandy Jack / *Airvine*

Taking inspiration from the “outside world,” where wireless technologies are used to backhaul traffic from cellular base stations and deployed when wireline networks need upgrading or where there is no wireline infrastructure at all, a new wireless method using the high-frequency, license-free and virtually interference-free millimeter wave 60 GHz frequency band has been developed: all-wireless backhaul/backbone networks. They provide a fast, simple, secure high-performance solution to connecting Wi-Fi access points and other broadband networking equipment, such as routers and switches, inside such large structures as public venues, convention centers, hotels and multiple-dwelling-unit (MDU) buildings.

In an increasingly connected world, MDU property management companies are becoming de facto technology companies, as seen in their deployment of more network gear within their properties to meet the needs of tenants and advanced building operations. This transition or new role comes because of several “digital/smart” trends over recent years:

- Higher growth rates in the MDU population as compared with single-family homes and the surge in the average number of connected devices per home
- MDU residents' expectations for pervasive and always-on Wi-Fi and other high-tech amenities, such as IP-based, IoT-connected video security
- Automated building operations capabilities for facilities managers and remote access to smart-home features for residents
- The COVID-19-induced work-from-home requirement, now a permanent option requiring higher broadband speeds for each unit
- AI-enabled smart-building features regarding energy management and residential amenities.

A HOLISTIC WI-FI PLATFORM

To address the need for more network gear, more property owners are looking into a holistic managed Wi-Fi network

platform and service offering rather than the alternative “BYOI” (bring your own internet) approach for each resident or family and their respective units. Furthermore, managed Wi-Fi appeals to MDU owners because of its significant financial advantage – it improves property values, reduces tenant churn, and adds certain revenue-generating, value-added amenities.

Managed Wi-Fi entails pre-planning a property's Wi-Fi network and deploying all access points to ensure optimal coverage everywhere in the apartment complex or multistory building. The goal is to reduce interference and ensure that tenants have strong Wi-Fi signals anywhere on the property or in the building. This is an attractive feature for current and prospective tenants, and reliable Wi-Fi infrastructure can create new smart-home solutions and develop facility management efficiencies.

Other benefits in upgrading an MDU network infrastructure in this manner include adding value to the property itself; supporting the new Wi-Fi 6 and the upcoming Wi-Fi 7 standards and their gigabit capacities; and enabling an expanded IoT connectivity for more efficient operations of HVAC systems, access control, thermostats and other energy management systems, interior and exterior lighting, security systems and more.

For owners and managed service providers, upgrading and owning network infrastructure opens the door to additional revenue – but the necessary upgrades might be budget busters. For instance, if the building was constructed before 2000, the in-building wiring is likely twisted-pair running G.Fast technology at single-digit Mbps rates. Even property owners prescient enough to install Ethernet CAT 5 have only a 1 Gbps backbone throughout a building or property, which is not nearly enough capacity for today's digital requirements.

Upgrading an entire property by laying new wire or fiber is typically done in one shot, presenting a huge bill and a significant capex investment that takes years to recoup. Furthermore, this scenario could be a non-starter in certain



Worry-free Wi-Fi is a key consideration for families and other MDU residents.

situations, such as in older heritage buildings. In addition to aesthetic concerns, construction concerns may create roadblocks to routing traditional infrastructure cable where it is needed. In historical or heritage buildings, various rules often govern what can and cannot be done when trying to pull wire. Drilling through walls is usually prohibited, forcing cable conduits to follow very circuitous paths to their destinations.

WIRELESS TO THE RESCUE FOR EXISTING AND NEW BUILDINGS

Until 2023, there were no options to upgrade the network backbone in an MDU – running new Ethernet or fiber was the only solution available. That changed with recent breakthrough advances concerning using the 60 GHz band, which has always offered much more spectrum than the lower frequency

bands, hence the ability to provide multi-gigabit connections. However, deployments have been hampered by strict line-of-sight (LOS) requirements and limited distances for connections.

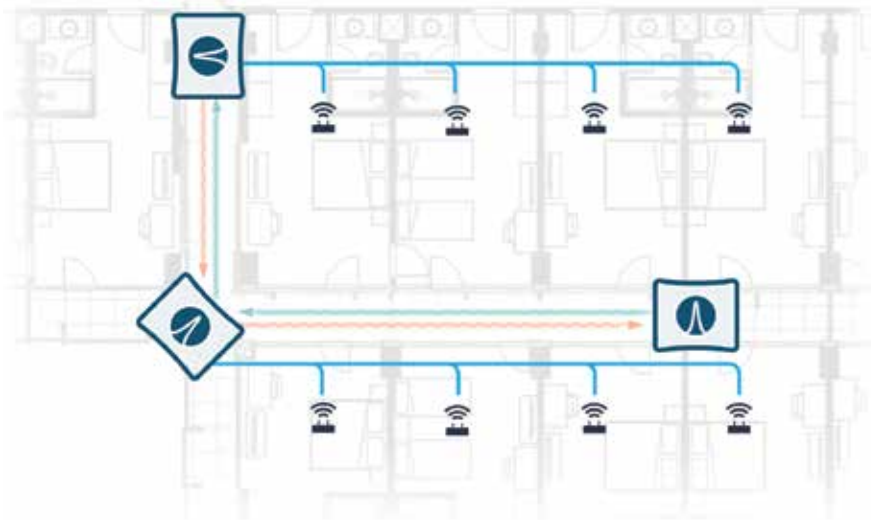
Patented advances in the RF front-end and beam-steering capabilities enable the new 60 GHz systems to offer non-LOS (NLOS) connectivity. In other words, the connections can bend around corners or penetrate most



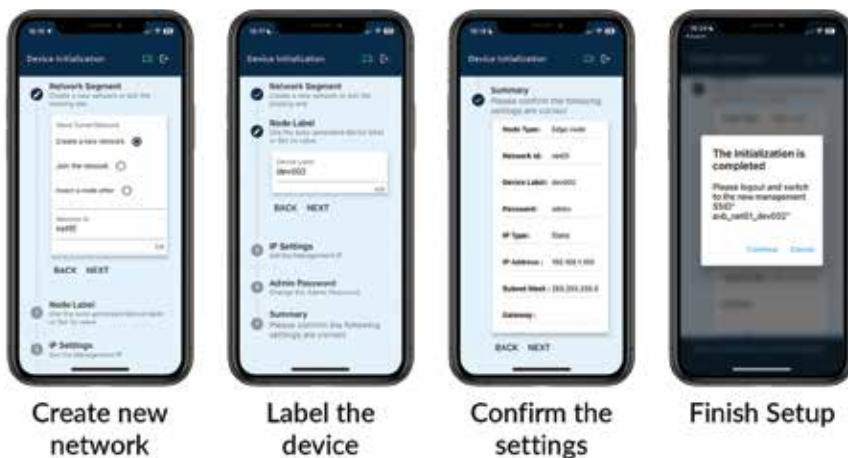
Airvine's WaveTunnel nodes feature PoE and four Ethernet ports to facilitate the creation of a multi-gigabit interior backhaul network.



WaveTunnel nodes can be mounted unobtrusively on ceilings.



Sample WaveTunnel in-building network diagram.



WaveTunnel nodes can be configured and connected via a smartphone app.

interior barriers – meaning they can go everywhere a cable could go, but with minimal construction work – no drilling, sawing, patching or painting over holes in walls. Minimizing construction is also crucial in terms of avoiding possible asbestos issues.

As one would imagine, this breakthrough capability and the flexibility of NLOS simplifies network setup and reduces installation time and cost. The network nodes can be deployed where needed, and the new wireless backbone does not have to conform to hardwired, static cable locations – which has almost always

been the case to date when it comes to unknown wireless networks. Trial deployments of this system have also demonstrated the system’s effectiveness in complementing or retrofitting existing LANs or boosting the performance of legacy 1 Gbps CAT 5 Ethernet cables.

To further emphasize the cost and time savings – and minimize inconvenience to residents – consider the issue of pulling cable and skilled technicians. Delays can result in getting a technician on-site to pull wire through walls and ceilings, and each somewhat complex cable drop can cost anywhere

from \$200 to \$500. The new all-wireless backhaul/backbone network makes moving, adding equipment or changing the network configuration easier.

All that is required is to unplug the Wi-Fi 6 access point and the backhaul node and move both to a new location. The node will reacquire a signal at its new location, and the system will be up and running in a matter of minutes.

Furthermore, a node installation typically requires only a screwdriver and a smartphone app to make the network connections and can be completed in 15 minutes or less. No highly skilled technician is needed. This raises another important issue because the entire infrastructure is almost wireless: One crew can do both jobs (backbone/backhaul network install and Wi-Fi access points install) simultaneously or, as it’s known in the industry, with only one “truck roll.”

In conclusion, as seen in enterprise LANs, networks servicing MDUs are being pushed to do more and provide a foundation of connectivity for more devices and applications than ever before. Leveraging the new capabilities of 60 GHz systems in indoor environments to offer multi-gigabit capacity where rewiring is cost-prohibitive can be seen as a game-changer. It is state-of-the-art for new buildings and a very effective way to complement or retrofit existing networks, whether a LAN backbone is cable or fiber. It also helps improve overall indoor network flexibility. 🙌



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