

# The dynamic collaboration of carriers and the enterprise with in-building wireless

Authors:

Jill Rabach, Carrier Business Development

Troy Suddith, Director, Engineering and Services

Today, successful organizations seeking a strategic advantage are improving their businesses by leveraging technology – namely improved mobile connectivity which is enabled by in-building wireless (IBW) systems. New opportunities are being created through digitization and the establishment of smart buildings, which are not only intelligent but are also fully wirelessly connected, allowing users access to the network services and software applications they want and need. As enterprises find themselves connecting more devices, people, and processes, it's evident that telecommunication network infrastructures have become the fourth utility – crucial to not only the everyday operation of the business, but also tied to driving business objectives.

This paper will explore how the digital frontier is becoming the meeting ground for carrier and enterprise investments. Given the equitable value that communications infrastructure provides for connectivity, the increasing movement in collaboration comes as no surprise.

## Enterprise Challenges

Enterprises today face many challenges, such as creating multiple networks to manage various internet connections with different devices and numerous applications. Consider, for example, the traditional smartphones and hotspots, wearable technology, equipment tracking devices, and the all-encompassing Internet of Things (IoT); today more devices require connectivity than ever before. Even if that IoT sensor requires little data bandwidth, or merely checks in to its host once a day, the total mass of devices each requesting a little – and some a whole lot – add up to a tsunami of data needing to be delivered.

For enterprise IT networks, the primary challenge is delivering support for the myriad of enterprise applications and devices required to run day-to-day business operations, all which require some level of consistent connectivity and various, yet increasing, amounts of bandwidth.

Mission-critical applications including email, customer relationship management (CRM), enterprise resource planning (ERP), and instant messaging have migrated from local machines to local servers and are now served through the cloud, ready to be accessed by multiple platforms and devices wherever the user is located. As software as a service becomes more commonplace, so too will the need to deliver more connectivity and capacity for the enterprise users and the multitude of data transactions generated throughout the workday.

With the bring-your-own-device (BYOD) trend becoming the de facto standard for enterprise wireless mobility, IT teams are required to support connectivity for multiple wireless service providers, provide security across various device platforms, and deliver acceptable access and performance for the various enterprise applications. Fair or not, capacity and performance of a user's BYOD experience throughout the day falls on the shoulders of enterprise IT. Beyond WLAN and cellular support, IT is also taking on the traditional facilities-delivered applications such as building access, security cameras, automation, digital signage, and alarming, all which need to be planned and supported through the IT infrastructure.

Delivering support for the various applications and devices within the enterprise venue means providing multiple networks, and multiple networks mean more congestion. And it's not just congestion in the virtual sense from data traffic, but the physical congestion of various network appliances to deliver the disparate services.

Space within telecom closets has always been at a premium and as more demands for various IP-based solutions continue to increase, so does the need for hardware in a traditional copper switched enterprise environment. Providing power within a closet for multiple network hardware devices has become a huge consideration and, in many cases, a restraint within enterprise office environments. And with the increasing amount of active electronics in a limited space, appropriately sizing or modifying HVAC systems is an absolute necessity to support the environment.

As previously mentioned, cloud computing is a contributing factor. Mission-critical business applications are being moved out of the IT closets at headquarters and into the data center, redundantly served by another data center. Even if you're in the office and email the person in the next cube, that email may very well leave the building and travel a fair distance before arriving down the hall. That's a long distance problem for the ISP, a short-haul problem for the CLEC, and a last few yards problem for the enterprise.

## Carrier Challenges

Network demand is driving cost via spectrum and infrastructure needs, which in turn is adding significant cost and complexity to managing and maintaining the network. The same drivers are impacting the carriers, albeit from the opposite side. Carriers, who own the wireless spectrum, are in the business of delivering all that data the enterprise generates. As the capacity increases, they need to do it more efficiently, and at a lower cost-per-bit than ever before. The expectation of a mobile workforce is that a user will have coverage everywhere, which increases the number of places where coverage is needed. Combine that with the amount of data that needs to be pushed over those systems, and the need is immense.

Carriers are addressing this challenge in a few ways. As they work to use their spectrum in the most efficient way, licensed spectrum is a limiting factor for all wireless carriers. Low-band spectrum propagates longer distances and through more walls, but for most carriers, there's not enough of it. A balance of multiple spectrum bands is needed in each market and in each deployment to get the best result, and the ability to change these allocations gives any carrier solution a longer life span.

Another way carriers cost-effectively manage the increases in traffic is to better target the network solution to the problem. Just 10 years ago, every solution included either a full base station, or a repeater. The choices in the middle – femto cell, pico cell, small cell, eRan – have developed as a middle ground to allow a more scalable solution. The heterogeneous network, which is a wireless network comprised of different types of base stations and wireless technologies, allows for flexibility; for example, a full base station goes into a stadium, and a pico cell in an office lobby. With DAS, the signal source can be scaled to meet the capacity requirements, reducing costs for carriers. The tradeoff for covering more locations at a more reasonable price is increased network complexity. The unexpected consequence is that selecting the right solution adds another step to the deployment, which can slow down the time to on-air.

## “The Dynamic Collaboration”

So here's the opportunity – carriers and enterprises collaborate to meet the shared need. Having coverage in a facility is mutually beneficial. Employers want their users' phones to work at their office, and carriers want their customers to connect without stress. In-building coverage offloads voice and data from the macro network, and increases the satisfaction of users who expect ubiquitous calling and texting. Both parties benefit from having coverage in the building, so it must be done in a way that meets both their needs.

The focus for the carrier should be quality coverage. Without that focus, the problem repeats itself in two years as spectrum positions mature and capacity requirements increase. Flexible, multi-band, fiber-to-the-edge solutions that have the ability to adapt as the macro evolves are the best way for the carrier to get a long-term value out of their in-building investment. However, by partnering with enterprise, the carrier can get the right solution for the venue at a budget-friendly cost, instead of installing a partial solution and crossing fingers for the future.

On the enterprise side power, water, and HVAC have long been considered minimum requirements for occupancy. Now, access to applications is equally important. Broadband data and cellular connectivity have become essential, so it's not surprising that telecom infrastructure to support them has become the fourth utility for business.

Connectivity requirements change constantly, and in the always-connected mindset, there's always a need for more bandwidth and more capacity. That applies to both carriers for their wireless networks, as well as to enterprises for their LAN and WAN needs. Telecommunication solutions that grow with the demand, with an easy upgrade and augments and minimum downtimes, are the key to a long lasting network. When the enterprise treats the communications network as a central utility across all applications including cellular, Wi-Fi, PON or active Ethernet, IPTV, security, building management systems, and others, it leads to a reduction in the total cost of installation, operation, and management.

Converging independently operated building networks over a common infrastructure also simplifies the tasks of security and monitoring, allowing enterprise IT to focus on core business needs. This integrated network creates new opportunities, lowers operating costs, and increases agility.

Fiber-to-the-edge can make the converged network a reality. With a long life span and virtually unlimited bandwidth, an all-optical infrastructure is designed to bring a flexible, high-performance, future-ready network to organizations. It allows for today's connectivity while simultaneously solving the issues of tomorrow such as mobility, remote powering, and an ever- growing population of connected devices.

The following converged use case illustrates a new commercial mixed-use building constructed to suit a new headquarters for 400 employees, as well as some retail and banking.

Broadband data and cellular connectivity have become essential, so it's not surprising that telecom infrastructure to support them has become the fourth utility for business.

## Commercial Building

The building owner had one main objective – create an untethered workspace, which meant no fixed LAN ports, where the entire workforce would operate off of WLAN in a virtualized environment. Specific requirements included an LEED-certified structure and smart connected building, Wi-Fi and cellular coverage to support devices in an untethered work environment, and a streamlined infrastructure that could deliver superior network performance for today's requirements as well as future applications and solutions.

The solution provided is limited, essential infrastructure.

The main IT server room, or main distribution frame (MDF), includes the IP network interfaces on the bottom and the DAS system for the cellular service and fiber and power management at the top. Leaving the MDF is a single cable which runs to various zone boxes above the ceiling throughout the office; there are no telecom closets. These zone boxes house the fiber and power termination, the DAS remotes, and the networking equipment to deliver the IP backhaul for the WLAN serving the enterprise, as well as

security cameras, access controls, and some digital signage in the lobby.

This solution delivers office-wide WLAN connectivity and provides in-building mobility for various devices. Additionally, the composite fiber/copper cabling provides connectivity and remote powering for the edge components -- the DAS remotes as well as the IP appliances that deliver POE and data backhaul to the wireless access points. Collapsing the IP backhaul and DAS on the same fiber cable allows for a significant reduction in the number of cables pulled throughout the venue.

Another benefit of this solution is the significant amount of spare fibers at every node location for future applications. The demand for applications and services will continue growing, requiring more speed, more bandwidth, and more capacity. An all-fiber infrastructure is the answer, as it provides a stable foundation and is an ideal one-time investment for those long term needs.

Notes:



Corning Optical Communications LLC • PO Box 489 • Hickory, NC 28603-0489 USA  
800-743-2675 • FAX: 828-325-5060 • International: +1-828-901-5000 • [www.corning.com/opcomm](http://www.corning.com/opcomm)

Corning Optical Communications reserves the right to improve, enhance, and modify the features and specifications of Corning Optical Communications products without prior notification. A complete listing of the trademarks of Corning Optical Communications is available at [www.corning.com/opcomm/](http://www.corning.com/opcomm/) trademarks. All other trademarks are the properties of their respective owners. Corning Optical Communications is ISO 9001 certified.  
© 2017 Corning Optical Communications. All rights reserved. CMA-576-AEN / June 2017