

Service Providers, Vendors Create New Foundations for Multifamily Broadband, IoT

At the **BROADBAND COMMUNITIES** Virtual Summit 2020, participants shared stories about how they are driving broadband into multifamily properties to enable higher speeds and provide a host of IoT services for residents and building owners. Following are some highlights of conference sessions focused on the multifamily market.

A BBC Staff Report

The multifamily broadband market continues to evolve. Today's renters expect that broadband will not only be accessible in buildings but also available when they move into a new unit. Service providers are equipping multiple dwelling units (MDUs) with a mix of technologies that can satisfy brownfield and greenfield buildings: coax, fiber, wireless, and G.fast and G.hn, which can leverage a building's existing coax or copper cabling. As wireless operators roll out 5G, they look not only to penetrate MDUs but also to coexist with in-building Wi-Fi service to give users a consistent experience. Buildings equipped with broadband enable a host of internet of things (IoT) applications for residents and building owners, such as automated lighting, self-guided tours and water management. The advent of managed Wi-Fi and building automation solutions means more property owners have opted for bulk, or wholesale, agreements with internet service providers. These themes were discussed during the **BROADBAND COMMUNITIES** Virtual Summit 2020, our first-ever virtual event.

Buildings and Apartments Get Smart

Vendors, providers and owners are taking different approaches to implementing the IoT in multifamily housing, but all agree that the IoT is here to stay – and that it offers benefits to property owners.

When IoT devices first became available, property owners saw them as a way to attract tech-savvy residents. “They used to be able to charge premiums for automated lighting, shades and so forth, but now millennials expect these things. They won't pay a premium for them,” said Mitch Karren, chief product officer for

SmartRent. As a result, owners now look for – and achieve – return on investment in the form of asset protection and operational efficiency.

Vendors are hedging their bets on the best networking protocols for IoT devices. SmartRent is committed to using Z-Wave, a low-bandwidth, reliable standard, for IoT devices to talk to its network hubs, which then connect through Ethernet or Wi-Fi to buildingwide networks. However, SmartRent also offers a hubless system that uses Bluetooth for device connections. STRATIS IoT, on the



Smart buildings help property owners protect assets and increase operational efficiency, said IoT experts.

other hand, offers a choice of Z-Wave, Zigbee, LORA, Bluetooth, Wi-Fi and other protocols.

Property owners often program automated IoT scenarios for repeatable events, such as resident move ins and move outs, self-guided tours and emergency access for repair personnel. Such scenarios allow management to operate more efficiently and move toward a “touchless” model, which has become increasingly important since the beginning of the pandemic. (Self-guided tours, once a novelty, “went to must-have overnight,” Karren said.) When owners install IoT devices in amenity areas – which not all do – they usually forgo automated scenarios and operate the amenity-area devices manually, according to Karren.

IOT APPLICATIONS

One of the most popular IoT solutions involves integrated perimeter access control; Karren said SmartRent’s goal was to provide a “frictionless, seamless experience” for building management, rather than making staffers or residents log onto different systems in different

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A graphic of a smartphone displaying the website 'BroadbandBreakfast.com' and a stylized orange coronavirus icon with nodes.



Legal leaders weighed in on contractual issues surrounding the IoT, bulk services, and other topics.

parts of a building. As well as being frictionless, said Ryan Buchert, chief technology officer of STRATIS IoT, a perimeter access control system needs to be auditable.

Water management delivers great opportunities for savings. Buchert noted that IoT sensors attached to various points in the water distribution system could identify bad meters, leaks and abnormal water usage.

Energy management is another promising application: Smart thermostats can be tied into building automation and control systems to determine in real time whether devices work properly or which units consume unusually high amounts of energy. Buchert said STRATIS is also working on enabling advanced demand response (proactively shutting down air conditioning during peak periods to help lower utility peak demand). Even in small garden-style apartments without building management systems, Karren said, IoT systems could diagnose problems with smart thermostats by analyzing such data

as the time they take to get from one temperature to another.

Smart elevators, touchless door controls and smart intercom systems are desirable because they improve residents' experiences, protect residents' safety, protect owners' assets and increase operational efficiency.

Finally, both vendors said they had begun paying more attention to indoor air quality because residents are spending more time in their units. Their systems can track airflow, temperature consistency, gas leaks, dust, volatile organic compounds and more. They are even working on being able to track coronavirus particles.

LEGAL TANGLES

Installing IoT systems may create contractual problems for building owners with their broadband service providers. Lauren Brown, assistant general counsel for Comcast Cable, pointed out that adding numerous IoT devices to a network that doesn't have the capacity to support them will impact users' experiences. "If

their network is slow, they'll blame Comcast," she said. Another issue is potential liability by owners and/or providers for any misuse of IoT devices or the information they collect. Finally, Comcast and many other providers have their own smart-building and smart-apartment products, and they want the opportunity to sell their solutions before owners contract with other vendors.

As owners and broadband providers negotiate or renegotiate contracts, said Dan Glivar, a partner in the law firm of Holland and Hart, they should explicitly consider the impact of any existing or planned IoT systems. "It is worth investing time and money to have lawyers involved upfront," he said. Attorney Art Hubacher of Hubacher Ames & Taylor agreed, saying that, given enough time during contract negotiations, the parties could work out solutions, such as putting IoT systems on separate local area networks or indemnifying broadband providers from privacy breaches.

Bulk Service Agreements Do's and Don'ts

In the last several years, more property owners have opted for bulk, or wholesale, agreements with internet service providers. This type of agreement, once confined mainly to student housing, senior housing and other niche markets, has become more common in market-rate housing, in part because of the popularity of managed Wi-Fi and building automation solutions.

“Bulk managed Wi-Fi delivers the best user experience,” said Lynn Dodson, vice president of sales for Spectrum Community Solutions. “It eliminates channel conflict, which means happy residents. One owner told us the increase in net operating income due to bulk services netted the company an additional \$1.1 million when it sold the property.”

“We’re seeing a ton of interest in bulk internet,” said Dave Spence, senior director of national accounts for XFINITY Communities. “A lot of owners are looking at bulk as a better baseline for the internet of things. There are better synergies for building management system integration. If you go to a virtual property with DocuSign and virtual tours, bulk is a better model.”

BULK VIDEO

Providers are bundling traditional video and streaming video packages with bulk internet. Josh Lunsford, director of strategy, multifamily and new build for Cox Communities, said, “We haven’t seen much impact on bulk video except maybe for student housing.” Senior housing communities often have a strong resident preference for bulk video.

However, bulk video can pose problems for providers because of the rapid increases in video programming costs, which aren’t under providers’ control. Sue Weiske, vice president and associate general counsel for Charter Communications, said Charter has been honoring prices so far, “but in the future we won’t be able to do this – we will have to renegotiate or look at a retail option.”



The large cable providers discussed the advantages and disadvantages of bulk service agreements.

Ian Davis, telecommunications attorney and founding partner at Davis Craig, agreed that this problem is hard to solve. “The only thing I can think of is [a contract clause saying] that if the price changes by X percent, either party should be able to walk away from video. The issue is that some providers want to walk away from internet as well.”

The shift to streaming video – some providers, such as CenturyLink and AT&T, are in the process of dropping traditional video services altogether – also causes contractual headaches. Hubacher asked, “How does [streaming video] impact the marketing agreement? Do we need to reopen the contract to allow streaming service? And what happens to the revenue share they used to get paid? What does the contract say, and is there a way to reach agreement on marketing and compensation?”

Lauren Brown pointed out that providers are constrained by their own agreements with video programmers that govern how they can deliver content, especially because streaming services are more difficult to restrict to the authorized party.

CHALLENGES IN TRANSITIONING TO BULK

Owners contemplating a transition from a retail to a bulk internet model must educate themselves about the challenges

involved and leave plenty of time for the transition. There are implications for both staff and residents. Bills must be converted from individual to bulk. Leases may need to be amended, and owners may want to offer residents incentives to accept this, especially if they are going to incur penalties for canceling individual service.

Owners must decide whether to install new customer-premises equipment or leave this task to residents. If an owner drops the former retail provider, it may have to buy out the contract. Dodson said, “It’s super important to have a lot of communication with the leasing manager and staff.”

Transitioning to bulk internet poses challenges for providers as well. Dan Glivar said, “Installation is more complicated for managed Wi-Fi. Do we need new wiring? Where does it go? Where do you put the wireless access points? How can you put them in the common areas, and which common areas need them? How can you install them during a pandemic? Who maintains the access points and wiring? Do you need to upgrade equipment during the contract period? And the most difficult issue is how to define and measure service levels. No one has a silver bullet for metrics.”

How Owners Can Support Provider Infrastructure

Broadband providers today are proposing and installing a wide variety of networks for multifamily housing. What can owners do to prepare their new buildings – or retrofit their old ones – for the best, most future-proof networks?

CenturyLink is “all in on fiber to the unit (FTTU),” said Jeff Johnson, the company’s director of consumer sales. Fiber to the unit is the standard for greenfield developments; in brownfield buildings, if FTTU is not feasible, CenturyLink will install fiber to the floor and G.fast to the unit. Johnson noted that CenturyLink is expanding to serve MDUs outside its traditional service territory; in these markets, it is experimenting with several other types of infrastructure, including wireless-only and G.hn.

“We’re not asking developers to do a lot,” Johnson said. Fiber to the property already exists in most cases. The company asks developers to put in conduit or riser space as a path for fiber, including for wireless access points in the hallways. Structured media panels in the units also are on CenturyLink’s wish list. For brownfield buildings upgrading to G.fast or G.hn, no major disruptions are required.

AT&T is also committed to FTTU as the “best and most future-proof solution, which has shown its worth in

the work-at-home environment,” said Eric Small, vice president for AT&T Fiber Build. AT&T has installed fiber in more than 3 million MDU units; though most are GPON networks, recent installations use the XGS-PON architecture, which supports multigig service. In brownfield properties, particularly if they are occupied, AT&T considers G.fast more practical. A third alternative, only for bulk internet properties, is all-wireless.

For an FTTU installation, AT&T brings fiber to the property and uses existing pathways or finds new ones. It terminates the fiber with a fiber jack wallplate in each unit. In non-fiber installations, the owner must supply horizontal and vertical pathways from the property edge to each unit. “In garden-style properties, the lack of conduit can be a showstopper for fiber down the road,” Small said.

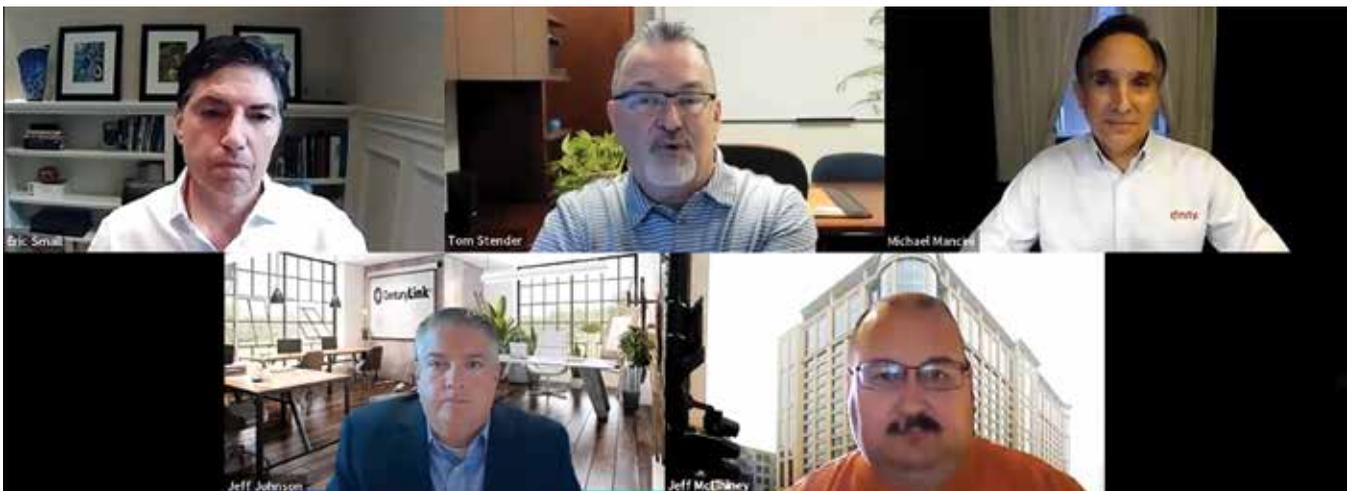
Comcast also uses a variety of infrastructure approaches. Most common is fiber to the building with distribution over coax within the building. But Comcast also has an FTTU option, using either EPON or RFoG technologies. Recently it added a third option: fiber to the floor with Cat 6 wiring to the unit. (Previously, Comcast used this option only in student housing.)

Jeff McElhiney, student housing technology manager for property management company Peak Campus Companies, also uses diverse infrastructure approaches. The majority of Peak Campus properties have fiber to the closet with either coax or Ethernet wiring to the unit; a smaller number, mainly in cottage or townhome-style properties, have FTTU networks. In new buildings, Peak Campus is no longer installing coax for video because students have their own streaming accounts. “It’s better to put money into robust broadband,” McElhiney said.

PREPARING FOR THE FUTURE

These panelists offered this advice for developers that want to build their new properties for the broadband networks of the future:

- Don’t fall in love with wireless-only networks. Allow space for equipment and pathways for wired networks.
- If a building will not have fiber to the unit at the outset, install microduct or, preferably, 1-inch electrical nonmetallic tubing, as a pathway for fiber in the future.
- Be aware that multi-gigabit service will become standard in a few years, and use wiring that will support this.
- Use building materials that allow



Property owners need to future-proof their buildings for broadband, experts agreed.

- good Wi-Fi propagation. Avoid metal and plaster where possible.
- Wiring panels in each unit must be large enough (30 inches for a

single provider, 42 inches for two providers) and deep enough (3 inches) to accommodate customer-premises equipment.

- Don't skimp on property management integration software. Make it simple for the owner to onboard and offboard customers.

Competitive Carriers Bank on Agility, Customer Experience to Serve MDU Broadband

Competitive carriers offer something that incumbent cable operators and telcos can't: the ability to act quickly and adapt to rapidly changing needs within a given market. This is true when providers target the multiple-dwelling-unit (MDU) market.

During the Telecom Provider Update No. 3 on Disruption in Telecom & COVID-19's Role panel at the **BROADBAND COMMUNITIES** Virtual Summit 2020, panelists talked about this opportunity and how their companies are responding with new options.

For instance, Wave G, a competitive cable operator, offers gigabit connectivity into residential buildings in West Coast cities from California to Canada, including Portland and San Francisco.

"As an industrywide experience, having your smaller ISPs deliver that second or third option helps drive innovation," said Erik Spring, senior director of multifamily for Wave G. "The innovation we have seen in the last six years with gigabit, instant on and a lot of other delivery methods come from the eyes of the smaller ISPs."

A FLEXIBLE PERSPECTIVE

Though new innovations are key, emerging providers can adapt to any changing needs that an MDU owner needs for its residents. For example, a service provider can help owners and residents deal with emerging issues, such as COVID-19.

Starry, a wireless ISP currently present in five large U.S. cities, works with more than 500 major residential owners and operators of properties. It also is creating incentive programs with its property owner partners to build broadband access, which helps with resident retention.

"I think the advantage that all competitive providers bring is the ability to be flexible and agile to respond to the needs of property owners," said Virginia Lam Abrams, senior vice president of external affairs and strategic advancement for Starry. "This is not something that all the big incumbents can claim."

Renters today expect internet to be ready to turn on, much like electricity and gas service is. Another element of being flexible is a provider's ability to immediately respond proactively to customer needs by pre-installing internet service.

Consolidated Smart Systems is doing this through its InstantON program, which provides immediate online service as soon as residents move into a property. This program offers free internet service to new residents for 30 days.

"The ability to get internet 24/7 and you don't have to talk to an agent or schedule a service call is a huge benefit," said Dan Terheggen, CEO of Consolidated Smart Systems.

Taking it a step further, Consolidated Smart Systems plans to offer a new managed artificial intelligence-based Wi-Fi service. "Residents will be able to manage Wi-Fi in their units from their phones," Terheggen said.

BRAND REMAINS IMPORTANT

Emerging competitors may not have the same brand recognition as large incumbents, but they seek to make a name for themselves by being exceptionally responsive. This helps lure new customers and MDU owners.

Starry's Lam Abrams said that consumers have very basic expectations



Competitive carriers touted their agility and willingness to meet owners' needs.

MULTIFAMILY BROADBAND

when it comes to broadband: They want it to work consistently, and they want the overall interaction with the provider to be easy.

“When a consumer makes a decision on a broadband provider, they tend to gravitate toward brands that not only deliver good connection but also a great experience. That level of service is reflected in our brand and working with smaller providers. For property owners, having that diversity of offerings with small providers has a halo effect for the property, so brand is as critical today as it has ever been.”

Spring agreed, adding that property managers and owners want partners that provide uninterrupted services. “Developers, owners and managers are looking for good-quality ISPs, not good marketing,” he said. “Providers need to deliver on what they say they are going to do.”

“COVID-19 has exposed a lot of the weaknesses for the big brands,” Terheggen said. “In today’s environment, a property owner needs creative solutions and can’t wait three months to go through a bunch of red tape to get a decision made.” Another

issue that has been raised during the COVID-19 pandemic is network flexibility. Like other providers, Wave G saw its internet traffic rise, but it was able to respond to customers’ needs because it had already deployed a large amount of capacity in its network.

“COVID-19 exposed the need for a good-quality network topology that’s not oversubscribed,” Spring said. “A lot of incumbent networks are oversubscribed, so during peak times people were having a hard time connecting.”

5G Wireless Operators Seek Consistency, IoT Support in MDUs

Wireless operators deploying 5G find that they have plenty of opportunities to deploy 5G wireless in major metro areas to serve the diverse needs of multifamily property owners. The advent of 5G offers not only higher speeds, but also the ability to support a host of new applications for residents and building owners.

Verizon Wireless, for one, now offers its mobile 5G service in 35 cities and is delivering its fixed home wireless broadband services in 11 markets. Depending on the implementation, Verizon Wireless uses various flavors: millimeter wave wireless spectrum, low-band spectrum and mid-band spectrum.

As it targets multifamily properties,

Verizon sees 5G as a vehicle to deliver higher speeds and provide access to new broadband capabilities. “5G wireless service will bring alternative broadband into multifamily communities,” said Mike Weston, executive director of Verizon Enhanced Communities. “It will enable not only additional speeds, but also IoT capabilities.”

The 5G network also will enable a host of new applications, such as multicamera views. Consumers could view multiple camera angles of players during the Super Bowl, for example.

Because these networks are true wireless, users can install devices themselves that can be connected to the Wi-Fi network. Verizon also is

developing repeaters that can get 5G signals inside MDUs.

“Devices are self-setup by the user,” Weston said. “The user picks up the wireless signal and attaches a device to the in-home wireless service or uses indoor repeaters that allow 5G to be consumed in the apartment.”

Likewise, multifamily building owners won’t have to deal with their properties being disrupted because the 5G service does not require new wires to be installed in the living units. “MDU owners can keep down the loads of visitors in their buildings, so they don’t have as many technicians doing installs at a time when maybe that’s not such a good thing,” Weston said.



5G wireless will support new applications for MDU residents and owners, carriers said.

Verizon and other large wireless operators, such as Sprint and AT&T, are grabbing the 5G headlines, but competitive providers are being no less aggressive.

Take Spot On Networks, a provider that focuses on providing wireless services to multifamily properties exclusively. The service provider said in-building wireless is an amenity renters expect. According to Cisco Visual Networking Index (VNI), more than 80 percent of all mobile traffic originates in buildings. “Without robust capabilities, the prospective resident will go to a building that has those capabilities,” said Dick Sherwin, CEO of Spot On Networks.

DRIVING INDOOR, OUTDOOR CONSISTENCY

As wireless operators and their partners roll out 5G in MDUs, there is a movement to ensure users will get a consistent experience whether they are inside or outside living units.

Service providers ensure the consistency of connectivity by deploying some form of managed Wi-Fi in their buildings. Users inside an apartment complex can get connectivity if they are in living units and other adjacent parts of the property, such as a gym or dog park.

In the case of 5G, users will be able to roam from a wireless 5G macro network and into a Wi-Fi network. Wi-Fi network capabilities will improve with the advent of Wi-Fi 6, which offers speeds of 9.6 Gbps – theoretically 250 percent faster than current Wi-Fi 5 devices.

“5G will create a seamless opportunity for the mobile-to-home experience in the building,” Weston said. “As you move between the Wi-Fi network in the home to the Wi-Fi network in the building and then to the macro 5G network, there will be an opportunity for more seamlessness in the user experience.”

Cable operators such as Cox Communications also have a hand in ensuring consistent wireless connectivity in multifamily properties. Through its Cox Business unit, the cable MSO provides turnkey small-

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cell managed services, including pole and strand mount co-location, power services, installation and ongoing equipment management.

“We’re doing a lot of small-cell rollouts on behalf of wireless operators,” said Lewis Roberts, executive director of product strategy and architecture for Cox Communications. “We have been able to use our strand assets to roll out small cells, which has enhanced our understanding of what it takes to build out small-cell networks.”

In addition, Cox delivers managed Wi-Fi services as part of its broadband agreements with multifamily property owners. Like other players, Cox views managed Wi-Fi and 5G as multiuse platforms that can provide various services, including traditional broadband internet access and building owner IoT applications.

“Whether it is connected door locks or connected lamps, we’re seeing a lot around IoT,” Roberts said. “There are a lot of different things that people want to onboard to their network. We’re doing a lot of things to drive the implementation of IoT in multifamily unit environments that will allow customers to connect various types of devices.”

Sherwin agreed and added that Spot On is seeing greater demand to support wireless services inside MDUs since the pandemic hit. “This pandemic has amplified and created significant challenges for the building owner and manager. We’re seeing increased smartphone use and IoT applications inside the building that all need to be accommodated.”

FIBER-RICH OPPORTUNITIES

As wireless operators move forward with their 5G wireless plans, they recognize that 5G will require a large amount of fiber to support it.

To this end, Verizon has been deploying fiber across its footprint. The telco said during its fourth-quarter 2019 earnings call that its capex spending guidance would be \$17–18 billion. In addition to beefing up its 5G, the investment will pay for further densification of the long-term evolution (LTE) network and the continued deployment of fiber.

“5G does require a heavy investment in fiber,” Weston said. “Putting small cells out in the public domain on light poles, the rights of way, or on buildings still requires a lot of fiber to get to those sites to do the backhaul.” He added, “It’s a very fiber-intensive business, and we continue to deploy millions of miles of fiber.”

As Verizon has set grand plans for its 5G network, other wireline players can fill that need. Cable operators and wireline providers enhance their wireline networks to satisfy wireless operators’ fiber needs where they can’t currently make a case to build their own fiber.

Since the early 1990s, Cox Communications has been serving wireless operators with fiber-based services. The cable MSO continues to drive out fiber deeper across its footprint to serve its own internal needs as well as those of wireless operators. This allows Cox to deal with the increased demands on its network and to have various options in its last-mile network.

“You have to have a robust wireline network to support wireless,” Roberts said.