



GIGABIT TO THE MDU

Capturing Generation “Y”

MDUs AND MILLENNIALS

Multi-Dwelling Units (MDUs) consisting primarily of apartments, condos and mixed use multi-family housing, are experiencing occupancy rates at an all-time high. Providing premium broadband to the Multi-Dwelling Unit (MDU) market is a major opportunity for service providers, with over 80 million MDU households in the Americas, constituting over 35 percent of all homes in the United States. New multifamily housing starts grew by 10 percent exceeding 390,000 in 2015 (the most since 2000) and are expected to remain at high levels through end-2017.

At over 90 million strong and with an annual buying power exceeding \$600 billion, millennials represent a major target market for service providers, especially since many of them call MDUs home. Millennials comprise over one-half of all MDU residents. They are the first generation that is digital native and have grown up with the Internet for a major portion of their life. According to a Goldman Sachs report, they are always connected (80 percent have mobile phones), 75 percent are active on social media and a growing number consume audio/video content online (38 percent watch TV online; while over 44 percent download music/videos). This makes millennials a prime target for service providers with a focus on MDUs.

THE MILLENNIAL GENERATION

- **Largest demographic in the U.S. (92 million)**
- **Growing spending power (\$600 billion p.a.)**
- **Digital natives (80% smartphones; 75% social media)**
- **The renter generation (60% renters)**

Source: *US Census, Accenture, Goldman-Sachs 2016*

GIGABIT TO THE MDU



THE CASE FOR GIGABIT BROADBAND IN MDUs

FTTH COUNCIL SURVEY OF MDUs, 2016

Residents on Average:

- **Spend 5.1 hours online per day**
- **Have 5.5 connected devices (not including smart home devices)**
- **Get 61% of their video content online**

A recent report from the National Multi-Family Housing Council (NHMC) listed high-speed internet as one of the top two amenities desired among this population.

Positioning Gigabit services in the MDU market requires not only convincing the tenant that they need higher-speed service, but also the building owner. For MDU owners, their primary interest lies with the economics of a Gigabit deployment. They want to see a return for their investment such as increased property values (for condos) and/or increased rental rates, as well as, a positive effect on occupancy levels and decreased apartment turnover.

So how does Gigabit broadband translate to MDU economics? A recent study by the Fiber to the Home (FTTH) Council showed that Gigabit service results in an 8 percent growth in apartment rent and a 2.8 percent increase in condo value (owned). So there's a clear case for Gigabit in MDUs.

“ Fiber-optic, high-speed Internet connectivity results in 2.8% higher condo value and 8% higher apartment rent ”

Source: FTTH Council MDU Study, 2016

ONE SIZE DOES NOT FIT ALL

There are a number of considerations regarding the diversity of MDUs that must be understood in order to successfully deliver Gigabit broadband to MDUs. These include:

- **Household Density:** Roughly one-third of the over 32 million MDUs have 2-4 units, another one-third consist of 5-19 units, while the final one-third are over 20 units. The unit density helps to determine the type of technology required to deploy Gigabit services.
- **Building Age:** According to the NMHC, of the nearly 20 million apartments in the US today, over one-half were built prior to 1979 (over 35 years old), 30 percent were built between 1980 and 1999, leaving less than 20 percent that have been built since the year 2000. Older buildings often have wiring that

needs to be replaced or lack accurate conduit and duct drawings thus increasing cost and extending the time needed to deliver Gigabit services.

- **In-Building Wiring:** MDUs present a major challenge due to the variety of in-building wiring. Older MDUs have copper or coax wiring, while others may be retro-fitted with higher-grade CAT5 or CAT6 cabling. Newer MDUs are being pre-wired with fiber in each living unit. Service providers need a broadband toolkit approach to address the complexity of wiring options within MDUs.
- **Turnover and Cost:** Turnover is a big concern, with more than one third of apartment residents churning every year. This impacts the ROI of delivering broadband into the MDU. Service providers need to look at approaches to not only reduce cost of install, but also consider new approaches to broadband-enabling the building or living unit to overcome turnover.



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GIGABIT ARCHITECTURES FOR MDUs

The unique nature of MDUs drives the need for a toolkit approach to delivering Gigabit broadband. Fiber connectivity is key, but service providers need to consider multiple Fiber-to-the-“x” (FTTx) architectures and technologies to deliver on the Gigabit promise. These include:

- **Fiber-to-the-Living Unit (FTTLU) –A:** This architecture involves extending fiber directly to each living unit in the MDU, where it is then terminated by a single ONT or residential gateway. This is a complete future-proofed solution allowing upgrades to multi-gigabit speeds. However, this is a high-cost solution, requiring re-cabling with fiber and causes tenant disruption.
- **FTTLU–B:** For low-density garden-style apartments, an alternate option involves deploying nested GPON ONTs (up to 16-ports) in a common area and pulling CAT5 cabling into each living unit. The resident simply plugs their wireless router into a wall-jack to activate service. Initial tenant disruption is offset by benefits such as instant activation for the next resident with no truck-rolls, elimination of vandalism (no equipment in the living unit), and increased ROI from each ONT.

- **Fiber-to-the-Floor (FTTF):** In this architecture, fiber is extended to each floor, and living units are connected over copper (CAT3 or CAT5) or coax cabling, using a medium-density ONT (eight to 16 ports). This is a medium-cost solution and reduces tenant disruption.
- **Fiber-to-the-Building (FTTB):** FTTB extends fiber to the basement or interior wall of building. Using a high-port count (24 to 48 ports) ONT or DPU, service providers can connect multiple living units cost effectively over existing copper riser-bundles or coax.

	Access Equipment Costs	Cabling/Labor Costs	CPE Costs
FTTLU-A	\$	\$\$\$	\$
FTTLU-B	\$\$	\$\$\$	Nil
FTTF	\$\$\$	\$	\$
FTTB	\$\$\$\$	Nil	\$

In addition, there are a number of different technologies that can be used to deliver Gigabit services in the MDU market. The following matrix shows a comparison of these technologies and the FTTx architecture best suited for each technology:

Technologies to Deliver Gigabit Services in the MDU Market

	GPON	NG-PON2	G.fast	G.hn	10G EPON	DOCSIS 3.1
Deployment Model	FTTLU	FTTLU	FTTB/F	FTTB/F	FTTLU	Fiber Deep
Physical Medium	Fiber	Fiber	Copper, Coax	Copper, Coax, Powerline	Coax/Fiber	Coax
Downstream Rates	2.5 Gbps	40 Gbps	Up to 1 Gbps*	1 Gbps	10 Gbps	10 Gbps
FTTB	1.25 Gbps	40 Gbps	Up to 1 Gbps*	1 Gbps	10 Gbps	2 Gbps

* Throughput rates assume DTA and coax medium

“Focus area for FTTP will be on what we term multi-dwelling units...”

– Clive Selley - CEO - BT Technology, Service & Operations & Group CIO

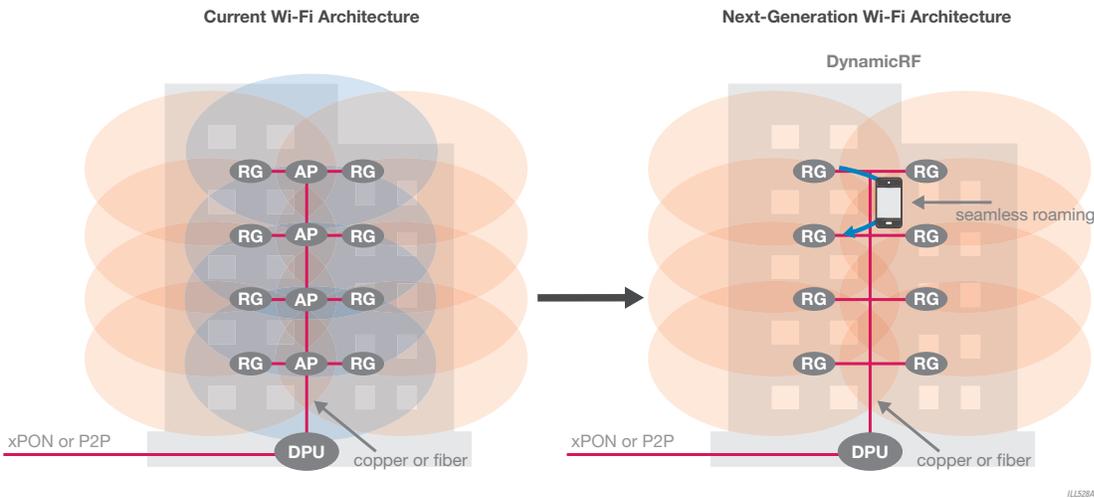
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Wi-Fi – EVERYWHERE

For millennials, Wi-Fi is the primary means of accessing the Internet with their smartphones, tablets, laptops and other Wi-Fi enabled devices. However, Wi-Fi in MDUs presents a major challenge for service providers. Signal bleed from Wi-Fi routers or residential gateways (RGs) in neighboring living units can cause interference and slow Internet connections. The situation is compounded by Wi-Fi access points (APs) in lobbies and common areas, designed to increase coverage. However, they also add to wireless interference resulting in poor signal quality, slow network speeds and a poor customer experience. A next-generation wireless architecture is required for MDUs.

Adopting wireless RGs and APs with built-in radio resource management (RRF) is key to delivering Wi-Fi in MDUs. RRF is an enterprise-grade self-optimizing network (SON) technology that automatically selects the right Wi-Fi channel setting and transmit power of each RG or AP, to maximize coverage across the MDU, while eliminating interference from neighboring APs.

Seamless roaming is another requirement, as residents expect connectivity whether in the living units, hallways, or common areas and not have to login multiple times to access the network. Instead of deploying additional APs for coverage, utilizing the existing RGs and enabling an additional public SSID and L2 roaming between the RGs can be an effective solution. Seamless roaming can be provided for all residents, significantly reducing CAPEX.



“ Our investment in our network helps enhance our competitive position in broadband while staying ahead of rapid growth and bandwidth consumption by our customers. ”

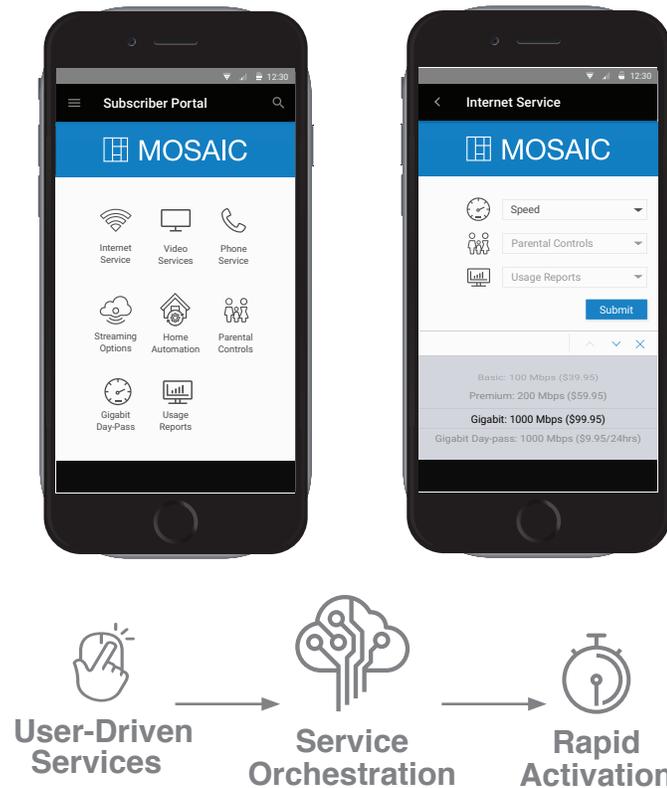
– Mike Cavanagh, Comcast Corp, Senior EVP & CFO

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APP-DRIVEN SERVICES DELIVERY

Turnover is a key challenge that service providers must address with respect to broadband services in MDUs. The average apartment lease is between 12-14 months, while the average payback period per subscriber is between 18-24 months, making serving an MDU subscriber a costly proposition. Service providers need to transition their business model from turning up individual subscribers, to Gigabit-enabling the living unit and focus on self-service activation.

Millennials, who comprise majority of the residents in MDUs, have grown up in an instant, on-demand economy where everything is an “app”. They want to be in control of their experience and they want the ability to choose the services they value. To succeed in capturing Generation “Y”, service providers must deploy highly programmable Software Defined Access (SD-Access) networks, which enable network automation and service orchestration, and support extending self-service capabilities via a mobile app. For millennials, a self-service app allows them to select and activate services on-demand, eliminating truck rolls and delivering a user-driven customer experience.



Millennials have grown up in an on-demand economy where everything is an app.

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SUMMARY

The MDU market presents a major opportunity for service providers equipped to offer Gigabit services, allowing them to gain a competitive advantage. It is important to remember that MDU owners and property managers see Gigabit broadband as a means to higher rent and higher occupancy and increased property values. Service providers must translate the benefits of Gigabit broadband into how it can improve business for the owner/management company. To succeed, service providers need to adopt a broadband toolkit approach to address the variety of MDU types, stock (age of building), wiring and resident demographics. In addition, by adopting a next-generation SDN network architecture service providers can offer increased service flexibility and service innovations, which are key to capturing millennials.



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