intelligence
by Inside Towers

Q3 2021

Wireless Infrastructure Industry: Market Analysis Report

Understanding the Fiber Business

Digital Bridge: A Prototype

Industry Expert Perspectives

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All editorials are written by John Celentano unless otherwise specified.

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In This Issue: Wires Make Wireless Work!

We like to say, "It takes a lot of wires to make wireless work!" After all, signals are only wireless between your mobile device and the nearest cell tower. From there, signals are carried over terrestrial networks increasingly via fiber optic cables, lots of them.

Fiber is used in wireless infrastructure at several x-haul levels: fronthaul, mid-haul and backhaul. At the same time, fiber companies operate millions of fiber route miles delivering wholesale long-haul transport and middle mile dark fiber and wavelengths to enterprises and other carriers. Telephone companies are selling fiber-based retail broadband services to tens of millions of residences and small businesses via fiber-to-the-home/fiber-to-the-premise architectures. Our lead article, "Understanding the Fiber Infrastructure Business" takes an in-depth look at the fiber network business and key players in the U.S. market.

Infrastructure companies that own and operate towers, fiber networks, and data centers are moving from leasing single-purpose assets to selectively adding multiple complementary offerings to serve their enterprise and wireless service providers' evolving needs. One company is setting a torrid pace in evolving its entire business to digital infrastructure investments and operations. Our article, "DigitalBridge Group: The Prototype Infrastructure Company" looks at what the company is doing as a precursor to what infrastructure companies could (and maybe should) become in the future. DigitalBridge is "rotating" its traditional real estate investment trust (REIT) operation to 100 percent digital infrastructure encompassing towers, fiber, data centers, small cells, and edge infrastructure in key markets around the world.

We have updated our proprietary Wireless Infrastructure Value Index that tracks the consolidated stock performance of 13 top tower companies, fiber providers, data center operators, and infrastructure companies as a benchmark of the overall health of the wireless infrastructure business.

Tower Transactions highlights recent deals in the global wireless infrastructure market.

This issue includes an interesting M&A Advisory commentary from guest contributor Max Drachman, CEO at Drachman M&A Co.

Scott Soden, Managing Principal & Co-Founder at Alpina Capital offers important considerations on valuing infrastructure in our Investor Perspective section.

In our D.C. Watch section, the NATE team of Todd Schlekeway, President & CEO, Jim Goldwater, Director of Legislative and Regulatory Affairs and Todd Washam, Director of Government Relations and Wireless Industry Network discuss how labor and equipment shortages are affecting wireless network construction.

Enjoy the read. As always, we welcome your feedback!

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Understanding the Fiber Infrastructure Business

There's an old adage: "It takes a lot of wires to make wireless work!" These days, those wires are fiber optic lines. Fiber increasingly has become the connectivity media of choice among wireline and wireless service providers alike, due to fiber's high capacity and low latency propagation properties.

Unlike copper wires, fiber is immune to electromagnetic interference and is a secure transmission medium. Moreover, fiber optic cables are physically smaller and more lightweight than copper cables, making them easier to handle, install and maintain.

Fiber Optic Basics

A fiber-optic cable, or fiber cable, is an assembly like an electrical cable, but containing one or more optical fibers or fiber strands that carry light signals. These strands are pure glass fibers no thicker than human hair and are individually coated with plastic layers. Multiple fibers then are enclosed and contained in a protective sheath suitable for the environment where the cable is used, whether in the air, underground or underwater.

Fiber cables can consist of a few pairs of fiber strands and up to several thousand strands in a single cable sheath for high density applications. One of the largest available fiber cables is the RocketRibbon™ made by Corning, Inc. of Corning, NY. RocketRibbon has up to 3,456 fibers comprising 12 individually protected sub-units, each with 288 closely packed fibers, in the same diameter as existing stranded loose tube cables.

Long-haul transport networks use lower count fiber cables for ease of handling and installation while adding high data transport capacity with dense wave division multiplexing (DWDM) optical equipment installed at each end of the cables. High fiber count cables are used in shorter distance metro rings and for inbuilding and data center applications that involve a large number of individual fiber connections.

Fiber in the wireless has become important at several levels to support high-speed connectivity and transport applications. The term "X-haul" refers to different fronthaul, mid-haul and backhaul connections.

Fronthaul is the connection between the baseband unit (BBU) located in the hut or shelter at the base of a tower and remote radio units (RRUs, or radio units RUs in Open RAN parlance) up on the tower next to the antennas. A hybrid fiber-power cable provides signaling and power from the BBU to the RRUs/RUs. These hybrid cables typically are installed with sufficient fiber strands and copper pairs to serve the existing and planned RRUs/RUs in each radiation (RAD) center up on the tower.

Mid-haul has been introduced with Open RAN architecture where the BBU is split between the centralized unit (CU) and a distributed unit (DU). The CU is in a centralized location to serve multiple cell sites. The DU is situated at the tower or at some intermediate location between the CU and the tower. Mid-haul is the high-speed fiber connection between the CU and DUs. The DU connects to RUs via a fronthaul connection.

Backhaul is the high-capacity, high-speed transport connection from BBUs at cell sites to the network core or to data centers. In Open RAN, backhaul is the connection between the CU and the core.

Each x-haul segment uses different types and sizes of fiber cable and associated terminal electronics.

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DigitalBridge Group: The Prototype Infrastructure Company

DIGITALBRIDGE

Outlier or Precursor?

DigitalBridge Group (NYSE: DBRG), headquartered in Boca Raton, FL, and led by CEO Marc Ganzi, is a digital infrastructure REIT with a broad array of assets. Its portfolio includes towers, fiber, data centers, small cells, edge infrastructure and other real estate assets. The company's diversity of products and international geographic coverage makes it unique among all infrastructure companies worldwide.

Emerging phoenix-like from the former Colony Capital organization, Ganzi and his management team are focused on taking a share of the projected steep ramp of global mobile network and data center capital investment over the next five years.

The team realized that its classic REIT structure under Colony Capital, a leading global investment management firm, would not give them the latitude to play in these high growth markets without a top-to-bottom makeover of its business.

Certainly, the pandemic brought to light the critical role of the digital infrastructure sector in a global economy that increasingly relies on reliable high-speed broadband connectivity. That gave the management team the opening to make a bold move, utilizing Colony Capital's earlier acquisition of Digital Bridge Holdings' assets in 2019 as a catalyst for the new DigitalBridge Group to emerge.

In Q2 2020, DigitalBridge committed to accelerate its previously announced shift to a digitally focused strategy to better position the company for growth. That meant "rotating" out of the company's traditional non-digital assets into digital-focused investments.

Colony Capital was rebranded and relaunched as DigitalBridge Group in Q2 2021.

DigitalBridge has nearly completed its rotation from managing investments in a legacy real estate portfolio to a digital infrastructure investor and operator. Now the company is set to accelerate its growth with further investments in hig-growth digital infrastructure markets around the world. In just three years, DigitalBridge has become THE player in digital infrastructure.

The key question: Is DigitalBridge an outlier among infrastructure companies that tend to be siloed in one asset class such as towers, or tend to operate in a specific market? Or, is the company the prototype of a diversified, competitive infrastructure company of the future, one that enables comprehensive end-to-end infrastructure solutions for its Enterprise and carrier customers?

Infrastructure Companies

For the most part, infrastructure companies tend to stay in their lane. They are either in towers, small cells, fiber networks or data centers. And most operate in a specific geographic region. A few companies have diversified into another asset class that they consider complementary to their primary business.

This latter point is true among the Big 3 U.S.-based tower companies. Crown Castle (NYSE: CCI) operates fiber and small cells in conjunction with its tower business. Similarly, American Tower (NYSE: AMT) recently has made a big move to acquire CoreSite data centers that complement its tower business. SBA Communications (NASDAQ: SBAC) also has a small presence in data centers.

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Wireless Infrastructure Ecosystem

Infrastructure Elements

The primary purpose of physical infrastructure is to support and enable wireless communications. The scope of our wireless infrastructure coverage encompasses:

- tower sites and small cells for locating radios and antennas close to mobile devices and user equipment,
- distributed antenna systems (DAS) for distributing RF signals both inside buildings and around campus environments,
- fiber optic cables for connecting remote radio units (RRUs) and baseband units (BBUs), the RAN to the Core including radio unit (RU) with distributing units (DU) and centralized units (CU) in Open RAN architecture, and for interconnecting data centers,
- data centers and multi-access edge computing that support the internet with cloud computing and data storage, and
- land that supports all types of physical structures.

Ancillary infrastructure elements include site DC power and batteries, backup power systems (diesel generators, solar, wind, uninterruptible power systems), equipment huts and shelters, and site security systems.

The table highlights the mix of infrastructure assets that these 13 companies own and operate. These companies primarily make their money by offering their infrastructure assets on a shared, leased basis to wireless service providers and mobile network operators along with a host of commercial, industrial, and government tenants.

Wireless Infrastructure Ecosystem At-A-Glance

Company	Towers	Fiber	Small Cells	DAS	Data Centers	Land	Other
American Tower	×			×	×	×	
Brookfield Infrastructure Partners	×	×			×		
CoreSite Realty					×		
Crown Castle	×	×	×	×	×	×	
Cyrus One					×		
DigitalBridge Group	×	×	×	×	×	×	×
Digital Realty Trust					×		
Equinix					×		
Iron Mountain					×		
Lumen Technologies		×			×		
SBA Communications	×		×	×	×	×	
Switch Inc.					×		
Uniti Group	×	×				×	

List Update: This list is not static. It will be updated quarterly as mergers and acquisitions are enacted, and as asset purchases or divestments take place. There were no changes to the list in Q3.

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Wireless Infrastructure Transactions

Wireless infrastructure deals and transactions are ongoing. While it is difficult to track all of them, many of which are private, we highlight notable transactions announced since the beginning of Q3 2021 to date.

Notable Transactions Q3 2021 to Date

Source: Company and Industry Reports

DATE	BUYER	SELLER	INFRASTRUCTURE PLAY	DEAL VALUE	DEAL STRUCTURE
July 9	Cellnex	Cyfrowy Polsat Group - Polkomtel Infrastruktura	7,000 towers & sites, 37,000 base stations, 11,300 fiber-route km	~US$2.5 B initial, and expansion	Cash
July 26	Stonepeak	Lumen Technologies	Fiber and undersea cable assets; 18 data	$2.7 B	Cash
July 26	DigitalBridge	PCCW	9 Data centers (7 Hong Kong, 1 mainland China, 1 Malaysia)	$750 M	Cash
Aug 3	Apollo Global Management	Lumen Technologies	ILEC operations in 20	$7.5 M	Cash
Oct 1	AustralianSuper	Singtel Optus	2,312 towers & rooftops plus 565 BTS sites	$1.4 B for 70% of Aus Tower Network	Cash
Oct 1	DigitalBridge	Vantage SDC	24MW hyperscale Data center	$539 M	Debt & Cash
Oct 7	American Tower	DataSite	2 data centers: Atlanta, GA and Orlando, FL	~$201 M	Cash
Oct 18	DigitalBridge	Superloop	Strategic partnership with APAC regional infrastructure operator	~$104 M	Cash
Nov 15	KKR & Global Infrastructure Partners	Cyrus One	50 data centers worldwide	$15 B, including debt	Cash
Nov 15	American Tower	Core Site Realty	25 data centers, 21 cloud on-ramps, 32,000+ interconnects in 8 major U.S. markets	$7.5 B, incl $1.4 B of debt	Cash

Transaction Details

BARCELONA, SPAIN July 9, 2021 - Cellnex closed the transaction with Cyfrowy Polsat Group to acquire 99.99 percent of its telecom infrastructure, Polkomtel Infrastruktura (PI). PI operates the Group's passive infrastructure of about 7,000 telecommunication towers and sites and active infrastructure comprising roughly 37,000 radio carriers covering all the bands used by 2G, 3G, 4G and 5G, approximately 11,300 km of fiber backbone and fiber-to-the-tower (FTTT) backhaul, and a national microwave radio network. Cellnex is making an initial cash investment of about $1.8 billion plus a further $675 million over the next nine years for up to 1,500 sites, and active equipment, mostly for 5G.

DENVER, CO and NEW YORK, NY July 26, 2021 - Lumen Technologies (NYSE: LUMN) and Stonepeak, a leading alternative investment firm, signed a definitive agreement for LUMN to sell its Latin American business to Stonepeak for $2.7 billion. LUMN's LatAm business will operate as Stonepeak portfolio company (New LATAM Company) with the current LatAm leadership team and organization remaining in place. LUMN will retain a strategic relationship with the New LATAM Company and continue to serve joint customers in the region.

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M&A Advisory

Follow the Smart Money

By Max Drachman, CEO, Drachman M&A Co.

I suspect that most of those reading this article did not grow up wanting to be in the tower business. When going through the usual list of astronaut, firefighter, or my son's current dream of being a high-rise crane operator, the digital infrastructure industry does not typically make the cut. So, why is it that towers happen to be one of the most desirable asset classes in the world? To me, it comes down to two unique dynamics of the business, and the momentum of human capital.

Security and growth are the two baseline factors that many investors explore prior to deploying capital. Most good businesses have one or the other, and very few have both. When we launched Drachman M&A Co., we elected to target Outdoor and Tower assets because both fit the profile of highly desirable assets with many buyers. In terms of the domestic market, regulations have rendered a formidable moat (meaning, barriers to entry) for existing towers, with ever increasing demand from consumers providing the growth.

When comparing those two simple factors against other traditional media or real estate investments, it is a starkly different picture. I started in mergers and acquisitions on January 1, 2009, which is the equivalent of becoming a stockbroker on black Monday. It was quiet for a while. I attended many types of TMT (Telecommunications, Media, and Technology) conferences to get a better feel for the landscape, and noticed most companies sent the same people year after year, telling the same story about why their industry was experiencing headwinds. I left largely uninspired.

However, every Tower and Outdoor conference I attended were unlike the rest. Year after year, there were more attendees and a constant influx of new blood, new banks, investors, and vendors. What attracted these new entrants to the space? It could be the exponential growth of the major public operators. It could be the moat I mentioned earlier, or the obvious increasing demand for digital infrastructure. In my opinion, it is for a much simpler reason – the industry is growing because people are following the smart money.

There is no shortage of bright minds in the Tower space. Astute investors are deploying capital, developers are finding new and innovative ways to grow, and consolidators are taking advantage of scale and low interest rates to build value. We are even seeing private equity attempt to roll up service providers, in a ripple effect that is rarely seen in less desirable businesses. Spotting the "good old days" is easy in hindsight, but it is a bit more difficult when you are right in the middle of it, which is precisely where we are today.

As recently as 20 years ago, Towers were considered equipment for broadcast stations. Revenue growth was slow, relying mostly on escalators from tenants to boost revenue. Then, and somewhat parallel to Apple's conversion from a computer business to a cell phone company, the demand for cellular skyrocketed. A limited revenue sector for towers became the anchor tenants, and growth has been up and to the right ever since. The trend will continue into the future.

The first step was getting cell phones out of their permanently mounted placements in vehicles and into adults' pockets. As the chart shows, 62 percent of adults owned a cell phone in 2002. Today the rate is 97 percent. Smartphone growth has been exponential since 2012, climbing from 35 percent in 2011 up to 85 percent as of February 2021.

There is no shortage of bright minds in the Tower space. Astute investors are deploying capital, developers are finding new and innovative ways to grow, and consolidators are taking advantage of scale and low interest rates to build value.

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Intelligence Briefing – early mid February 2022

- A subscriber-exclusive, 1-hour interactive briefing call by John Celentano, highlighting new developments and updating key market metrics since the Q3 2021 issue release
- An opportunity for direct dialogue and to ask your most pressing questions.
- Check your email for the scheduled briefing date announcement.

Q4 2021 Issue – mid March 2022

- New, in-depth analysis of the fiber business and its critical role in wireless applications, not available from any other source.
- Insights from contributing Industry Experts.
- Updated Wireless Infrastructure Index data and recent transactions.
- Subscribers will receive email announcements for the Q4 2021 report release date.

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