Deloitte.

User Friendly: Season 2, episode 4
May 2018

Future of connectivity: 5G will change the playing field

Part of the User Friendly podcast series

Dave Couture, National TMT Managing Director
Jack Fritz, Future of Connectivity practice leader

Heidi: With 5G on the horizon, the most radical technology upgrade yet, the growing world of connected things and how users access digital information will take another leap. We've been hearing a lot about the future of connectivity and what this means from a consumer and use-case perspective. What about for the industry players and the ecosystem of people that support the enablement of our connectivity. What does this really mean in the near term, and what do we think we'll see in a few years? Today, I'm here with Dave Couture and Jack Fritz from Deloitte, who will help us separate the hype from the substance as we explore the future of connectivity. Gentlemen, welcome to the show.

Dave: We're really happy to be here on an important topic for not just our industry, but for the macroeconomy.

Jack: Thanks, Heidi, and thanks for having us.

Heidi: Dave, I want to dive right in to the terminology for our listeners, so what is meant by future of connectivity?

Dave: Let me start with a couple of framing elements. First we're moving to an always-connected world: as consumers, as businesses, and as society-at-large. If we just think about ourselves individually first, how many devices do we have today that are connected in some way to the Internet? We probably have at least three or four, our PDAs or cell phones and laptops or desktops, and then more of us will have some sort of connectivity in our vehicles, our appliances, and our houses, some of which now have remote control connectivity. We're just getting started. Think about that now from an enterprise

business perspective. They connect each individual employee, they connect each individual machine, they connect each individual function internally, and with every one of the customers and partners that they engage with as well. So it is pervasive in how we work, how we commute, how we live; it is evolving today and it'll be different because of the connectivity of the future. Connectivity is predicated on the assumption that the technology underneath it is in place to support it all. So when you hear things like 5G and spectrum and wireless and deep fiber and small cells, all these technologies are bringing us closer to what's possible with the future of connectivity.

Heidi: Jack, what's your perspective on the possibilities of the future of connectivity?

Jack: As we look at the networks of today, they're generally fiber light, so what that means is there's not a lot of actual physical fiber in the ground. There aren't maybe as many small cells and bigger macro cell towers out there in the surrounding area of your neighborhood, and really everything is overbuilt on one another so when you see someone digging up your street time and time again to put in more cables, that's what we mean by overbuilding. And this really, you know, has been leading to large swaths of the country with substandard or even nonexistent broadband, and that contributes to a lot of the discussion that we're seeing around digital divide. In the future the networks are really going to center around heterogeneous architectures, and we see that that really leverages the existing network and equipment, along with shared infrastructure. They're going to have a lot more fiber, there will be a lot more cell sites, especially small cells, and they're going to be defined by software with virtual functions. And as these assets and technologies are deployed, we're going to begin to see a lot of the massive speed gains and improved coverage, and these are the things that tend to catch more headlines. But really, all of that is built upon this kind of hidden infrastructure that a lot of the consumers, I don't think, totally see or realize.

Heidi: I do want to make sure we sort of simplify a little bit at least for me and for some of the listeners who may not know what exactly 5G is, and why it is different.

Dave: At the most basic level, 5G is simply the fifth generation of wireless technology with large-scale deployment and usage. There are lots and lots of trials and initial small sampling deployments going on, and there are lots of standards that are being aligned and integrated right now. It's the fifth generation; it provides a pretty significant leap in terms of faster speed, lower latency, and more capacity both in terms of the amount of data on the network and the number of connections the network can manage. It means that I'll be able to download a high-def movie in under a second, and it enables things like connected vehicles, things that can't tolerate even a few seconds of delay, to become reality. And what's really exciting is that when you think about a world with that much faster speeds and lower latency, you see the possibilities of what you could do as businesses, as enterprises, as services built on top of that capability.

Heidi: Jack, let me turn it over to you before we go deeper into some of these other areas. Help us understand what spectrum is and how you see it evolving.

Jack: Spectrum is really just the range of channels or frequencies that you can operate in. So as we think about it, spectrum is that last bit of connection between your wireless device and your router or a cell tower, or a small cell, et cetera, and it's absolutely critical to an operator's coverage and capacity. It has significant impacts on both their operating and capital costs, to say nothing of the different impacts to customer experiences. So if you're dropping phone calls in a building in an elevator, that's based on certain frequencies and certain coverage characteristics, versus having a slow experience downloading a movie or watching something streaming.

There's really kind of two ways in which it comes to market: one is the more unlicensed traditional way that I think a lot of consumers are more familiar with in the sense that these are frequencies that anyone can use or things like Wi-Fi in your house. It's what baby monitors use or garage doors, or a fan remote control, and then there's also licensed. These are licenses that were originally brought to the market by the government and were originally sold for specific uses so things like radio stations, public safety communications, and, of course, now we see today the networks that our smartphones use, and really there's now a third kind of bucket emerging here, which is more of a hybrid of the two, where there's a licensing structure where you might have some of the spectrum licensed, but then if it's not being used, you know, there's a secondary tier, which is more unlicensed or shared where you kind of get first to use it if the license holder isn't using it, then you can access it to try to improve the overall utilization of that. And I think what a lot of people don't realize about spectrum is its value when you put spectrum, the asset itself, in the context of financials. It has traditionally been recorded as book value. It's a static asset; the carriers don't really adjust for changes in value based on the secondary market where the values almost always go up, but there's almost a quarter trillion dollars of this asset on the book of communication service providers today. And with 5G's data explosion and the ever-increasing need for more and higher

speeds, and the cost to acquire and deploy spectrum, it seems unlikely to let up at any time in the near future.

Heidi: As 5G and spectrum evolve, what major players are going to shape the future of connectivity?

Dave: So, recognize it is global in nature, there will be every, I would say, local domain, whether that's a federal government as we call it or state or city, that will certainly have an input into how they define to regulate or manage it, and again almost every country has their own tailored approach to that, and so regulators will play a role. But from a business perspective, it'll be many of the traditional players. It'll be the telecommunication carriers that we know of today, the infrastructure providers, we talked about the cells and towers, but there's also a lot of equipment that is embedded within that, for sure, and they're going to continue to have a key role; they are the incumbents in the ecosystem. They have to find where we are today, and they're certainly going to play a critical role in shaping where we go in the future as well. But there's a bunch of nontraditional players that we think will be actively involved. This group will be increasingly important since the amount of infrastructure build that is required will likely exceed the financial capacity of any individual player, certainly in the core telecom industry in and of itself, and because of the compressed and desirous time frame. So we would expect application providers, solution development, and you can expect the world of cloud and collaboration, those players out there that are driving the pervasive use of cloud technology and/or of social collaboration, where eyeballs and access are really, really important to their businesses, I think they're going to play a role as well.

Heidi: Jack, the amount of infrastructure to build out this fiber is massive, and the capital required can't really just sit on the shoulders of two main players. So this idea is going to become more and more critical. Is that a fair assessment?

Jack: I mean, we did some research last year really talking about $130 to $150 billion needed just to build out the fiber infrastructure for all this and that doesn't actually cover the small cells, the macro cells to fill in the networks, all the additional kinds of locations and real estate, the equipment, et cetera, but just for the fiber itself was $130 to $150 billion dollars. These are just staggering numbers, and that doesn't go away either. Then you have to maintain it and continue to expand on it, so there's a lot of capital that's going to be required to realize this.

Heidi: What new participants do you see emerging in the connectivity ecosystem?

Jack: I can think of a few groups here and one of them that really jumps to mind is financial players. So whether you think of spectrum or small cells or fiber, all of these are critical to 5G, and they're starting to get a lot of increased interest from financial sponsors who are viewing these assets as more and more similar to more traditional real estate investments, and the more they understand the space, the more I think they're going to be entering and becoming more active participants. And there's obviously some others as well, and as Dave mentioned, there are governments and they're participating in new ways as we think of public-private partnerships, and they're looking to monetize a lot of their own assets, whether physical assets like their light poles, which are good candidates to put small cells, and then they also have things like rights-of-way and permitting, and other ways to monetize their assets when we think about utilities or infrastructure players. There's an inherent interest in communicating with the sensors or the text in the field and their distributed networks, and then we also have content distributors, so obviously 4K quality video is expanding and the number and size of screens is continuing to grow, and then on top of that we have new and emerging technologies with digital reality, AR/VR, and as that becomes more widespread and more interactive, and we think about things not just like total amount of data, but also the latency

5G, spectrum, wireless, deep fiber and small cells: all these technologies are bringing us closer to what's possible with the future of connectivity.

to get that kind of real-life effect where the latency in the 5G network is actually faster, so it seems as real in real time to the brain, and so that's going to be critical as well for those types of applications.

Heidi: Dave, what are each of these players thinking as they prepare for the future of connectivity.

Dave: For the communication service providers, we think that there's both an offensive and defensive perspective; from a defensive perspective they have massive customer bases and assets, a few of which Jack highlighted, but preserving, protecting, and enhancing those customer bases is really important and so they want to be on the forefront in bringing to those customers the advancements and the technology and what 5G can yield. On the offensive side, they also have a chance to explore a plethora of new business models and develop new solutions that drive more top-line growth for their business and adjacent businesses. To think about the types of services that can be developed on top of these real-time speeds is a new market opportunity; for any like utilities, they're on a fixed rate of return models, and they need to make sure that they're driving cost savings in each of the businesses, which means they have limited funding for investment, so everything they will have to do will have a much sharper focus on the specific applications and use cases that they're going to try to drive as we work toward a world of 5G. And in the funding for rebuilding cities, for example, take what happened with this year's hurricane. Telecommunications and networking is getting some of the funding as it's increasingly recognized as a critical part of the infrastructure in the vibrancy of cities. So for infrastructure providers, this is their chance to reposition to be the ones who own the customer relationship and the connected transportation and very tight relationships with the cities and municipalities from which we assist and businesses engage. You think about the connected car ecosystem. It's not too far out there either. They will similarly be looking for ways to own and control the development of the connectivity infrastructure to enable a world of autonomous driving not just for individuals, but for large aspects of the population, public and private transportation. And so they all have a niche and specific use cases they're trying to leverage relative of their current base and to some value-added markets that they can move into.

Heidi: It does sound like from what you and Dave have shared that there's a tremendous amount of opportunity for everybody, but what challenges do you see that may prevent connectivity progress?

Jack: Well, one of the huge challenges that we see really is the lack of sufficient infrastructure, and we eluded to this a few times as we think about supporting 5G and kind of realizing that future vision. Unlocking the potential really rests on the assumption that there's going to be enough fiber extended to the end customer to provide more dense coverage of the networks. And we talked about the $130 to $150 billion for that fiber infrastructure, and that's just over the next five to seven years, but then there's the additional cost beyond that as well, and then as we think about the responsibility and who pays for all this. I think that's a question that a lot of people asked, and it really isn't all on the wireless service providers. It involves the carriers, US policymakers, and ultimately investors who may not be traditional players, but they're starting to look at these types of areas whether it's fiber or small cells, et cetera, as an investment, and talking about it more like a real estate type of opportunity versus a telecom or technology type of investment. I think there are a lot of different participants in the ecosystem. I think it's going to vary by different parts of the country because of the current starting point, and what's there will change as well. And so we see a lot of opportunity here, but it's going to take everyone kind of working together to be able to realize this vision.

Heidi: If we can overcome this fiber challenge, Dave, what are the new business models that we may begin to see evolving?

Dave: If you just think about 10 or 15 years ago and the amount of new services and capabilities and things that we all currently do as businesses and as consumers that we couldn't in the past, but within the specific aspect of 5G, there are a couple of framing dimensions. It's the next advancement of connected everything. The Internet of things and the at-real-time speeds with no latency. You can think of whole new markets that could enable, from connected health and remote health, as if you're there in person, the ability to diagnose and deliver a whole range of health care–related services. You can think about real-time entertainment and connectivity as if you're at the live event. And being called to do that on any device anywhere, and so there's that. And then if you could think about a really high-velocity manufacturing-type environment that from floor-to-ceiling of one end to the other has speeds that really allow analytics and processing and super-compute paces throughout the entire manufacturing line from one area to another. So there's a whole bunch of advancements in that arena. That's one. The second is an additional advancement to help close the digital divide. To provide more and more access to these two areas of population and society in rural domains that haven't had access or haven't had a chance before. They'll be able to choose to be part of the connected economy, and hopefully at price points that they can afford.

Heidi: Jack, for those who live and breathe telecom, what should they be thinking about for the next six months or the next year.

Jack: Sure, so spectrum is one of those things that definitely jumps to the forefront. Spectrum, as we talked about, is really the buying of spectrum, and clearing it. So a lot of it currently has other users in there, whether it's the Department of Defense or other

government agencies, and then it has to get into the networking equipment, so all the switches that are put on the towers and in the network itself and then having to also put it in all of our devices and people upgrade their devices every 24 to 36 months so it takes a while to get those devices out into the market. But a lot of that planning starts today. And then as we talk about fiber, and we mentioned this a few times, it's going to be critical both for the back hall from the small cells and from the macrocell towers, but it's also going to be important as we secure it for a long haul transport as well. As we think about small cells and the densification, getting a lot of the permits and locations in place and starting to really think about what the strategy is, how we are going to approach small cell and network densification, because that's going to be critical for both the coverage in these areas (a lot of the spectrum we're talking about doesn't travel very far, maybe a couple hundred meters) and the capacity, so as we get a lot more devices in a small area, that's going to take up a lot of the capacity from towers, which means we need more towers or cell sites. And really what a lot of this comes down to is more spectrum, more fiber, more towers, and more cell sites. And that means at the end of the day, more money for operations. So I think those are two critical things for telecom operators to be thinking about, which they obviously are thinking about all the time anyway, but this is really an area where, as they transform kind of the network architecture infrastructure, they need to be thinking about what their cost structure of the future looks like. So as you go from 50 to 70,000 towers, to a few hundred thousand cell site locations, what type of cost structure are you looking to have in the future and how do you maintain that from your business model with customers, as well as thinking of other ways to potentially fund and cover all of those obligations going forward. So I think those are really the key areas. And then lastly we would say learning from each other, learning from a lot of the trials in the market. We see carriers are taking different approaches with what they're going to bring to market from their different starting points, but I think ultimately whether it's fixed or it's mobile, there's a lot of opportunity with 5G around the connected world, and really over the next six to 12 months there's going to be a lot of trials, there's going to be a lot of announcements in the press, and I think just learning from one another, from the equipment vendors, and seeing what works and just kind of staying abreast of all that is going on will be absolutely critical as well.

Heidi: Dave, what should other industries be considering in terms of where their opportunity may be outside of telecom?

Dave: I would encourage all industries to be thinking about how they can best capitalize and take advantage of the opportunities that these higher speeds and increased access are going to enable, both in terms of improvements of things they do today and whole new arenas. I think you can go across every industry, since we do live in and have such dependency right now on connectivity. Think about it at a multiplying compounding degree of speed and accessibility and what you could then do with it. So I think the opportunity is endless.

Heidi: This is a very exciting area. Before I let you go, we are going to play a quick thirty-second debate on this topic.

In the past, we've always considered consumers to be the winner, in the connectivity ecosystem. Jack, we're going to start with you. In your opinion, who will be the winner in the future? You have thirty seconds.

Jack: Can I say everyone? I mean, joking aside, I really do think that we're reaching a turning point where connectivity is in everything that we do, whether we're talking about a connected car, or tactile Internet for remote surgery, there's so many possibilities. And in all of these areas, the solution providers both new and old are vying to differentiate in new

Unlocking the potential really rests on the assumption that there's going to be enough fiber extended to the end customer. That will cost $130 to $150 billion just to build out the fiber infrastructure.

and innovative ways, which means new infrastructure, so equipment networking software. And the ultimate beneficiaries, I think, are those who participate in the new connected world, and those who choose to kind of batten down the hatches are the ones who risk being left behind

Heidi: Excellent. Dave, over to you. Clock starts now.

Dave: Consumers are without a doubt going to benefit from it. They are going to get more, and oftentimes we're getting more for less, and I think that will be the same with consumers. But I think from a business perspective, it will be those that think in advance to use this to create competitive advantage for the current customer base, and then create new profit opportunities for them with value-added services they can embed.

Heidi: Excellent. Very nice, good timing! Thank you for engaging in our quick thirty-second debate on this topic. It sounds like there's a lot of uncertainty in the connectivity ecosystem. Major players are continuing to transform the way the world connects, but new players and technology, as well as new industries, are beginning to rewrite the rules. A lot is uncertain, but we know a few things, there will be massive device and traffic growth, both of which will drive significant change in the underlying infrastructure supporting connectivity, such as 5G and spectrum. And all of these changes will continue to evolve connectivity and transform our lives.

I want to thank our guests, Dave Couture and Jack Fritz, for joining me on User-Friendly. Thank you so much, gentlemen.

Dave and Jack: Thank you. Thank you.

Visit the User Friendly library

www.deloitte.com/us/userfriendly