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Innovating with 5G and edge computing

Host: Hanish Patel, *User Friendly* host and digital transformation leader, Deloitte Consulting LLP

Guests: Rob Kasegrande, managing director in Deloitte Consulting LLP, leader of Deloitte's 5G and Edge Computing practice;

Jennifer Artley, senior vice president, 5G Acceleration, Verizon Business;

Robb Juliano, vice president of 5G Solution Sales, Verizon Business

Hanish Patel:

5G and edge computing solutions enable organizations to connect devices and services, accelerate digital transformation, and take advantage of ubiquitous real-time data. Many forward-looking organizations are exploring how these technologies can create more value for their business, yet with so many variables in play it can be hard to know where to start or which options are most likely to drive value. So how can enterprises innovate with 5G, and where should they start on their journey to enable a more connected future?

On today's episode we'll explore how 5G private networks open the door to use cases that can boost productivity, enhance operational efficiency, increase cost optimization, and create revenue opportunities. Joining me to discuss how companies can adopt and unleash the full potential of 5G are Jennifer Artley, senior vice president of 5G Acceleration at Verizon Business; Robb Juliano, vice president of 5G Solution Sales at Verizon Business; and Rob Kasegrande, managing

director in Deloitte Consulting and leader of Deloitte's 5G and Edge Computing practice.

Jennifer, Robb J., and Rob K., welcome to the show.

Jennifer Artley:

Thank you for having us.

Hanish:

Now, before we get started, and for the benefit of our dear listeners, you probably

heard me reference Robb Juliano as Robb J., and Rob Kasegrande as Rob K. They've kindly agreed for me to allow them to call them Robb J. and Rob K. during this episode so you know who's speaking. One more thing: Most of you, if not all of you, have already heard about 5G, so we're not going to get into the definitions or the comparisons of previous generations as we go through this episode.

So, with that, let's get into it. I'm going to turn to you, Rob K., to kick things off. When you look at the opportunity for 5G in the enterprise market, how do you see that market developing?

Rob Kasegrande:
We see a tremendous opportunity for enterprises in the market to adopt 5G services, coupled with edge computing, to really improve productivity and drive growth in their business. Now, let me just touch on why we talk about 5G and edge together; when you think about what businesses and enterprises are trying to accomplish around industry 4.0 and digital transformation, and take advantage of the data and the analytics that you talked about in your opening, you really need a combination of a high-performing network that connect devices, could connect sensors and equipment, as well as the ability to process that data in real time. It's important for 5G and edge to be talked about together because it's critical to the growth in that market.

What we've seen is growth in that, and in fact, over the last two years we've seen a real uptick in the adoption and growth of 5G—especially in the private cellular market—with many early adopters in the defense industry as well as advanced manufacturing and heavy industry. But now we're starting to see that open up more with broader interest in both the public and private sectors. Industries such as retail, manufacturing, supply chain (including warehousing and health care) see the value in bringing together 5G, private networks with 5G, and edge to improve their operations and their efficiency. They're actively looking at how 5G could help them drive productivity improvements and grow revenue within the business. Jennifer, I

would love to hear your thoughts on this as well.

Jennifer:
Thanks, Rob. Verizon sees huge opportunity for 5G in the enterprise market and we're actually underscoring our commitment to the market with huge investments to help build out the infrastructure but also to develop the offerings and the solutions that can help our enterprise customers use that high-performance connectivity to overcome the business challenges that they face, the operational bottlenecks, and quality assurance. There's lots of different use cases.

The bottom line is that 5G is really built for scale, which makes it perfect for enterprises. If you think about what you just said— endless bandwidth over the air and near-zero latency—it creates an opportunity for massive capacity where you have a lot of device density. And so, as enterprises are thinking about real-time use cases, how can they get that high performance with a more economical solution than maybe what they've had in the past? What could they do with the power of that bandwidth?

There are so many business challenges to solve for. We're encouraging our customers to think about the problems that are right in front of us right now. Think bigger than that, but get started with a specific project or initiative. And then part of how we answer that question does depend on the vertical that we're working with.

Hanish:
I want to stick with the train of responses that you both talked around in terms of the market developing and the opportunities. Robb J., I want to turn to you for this one. In that same vein around where we're seeing those opportunities, what benefits can these enterprises expect from 5G, and what can it do for them? I'd love to get your perspective on that front.

Robb Juliano:
Thank you for that. Just to reiterate a little bit about what Jen and Rob K. also said: If you think about 5G, this is unique. It's different
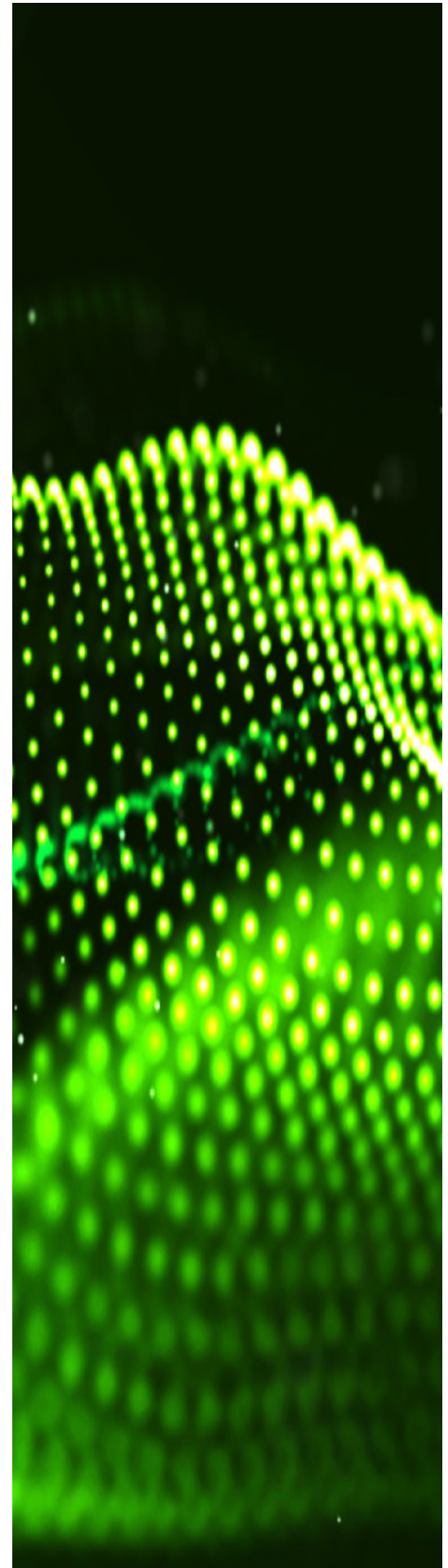
from what you traditionally would go and buy or procure; this is a design build type of scenario. So, when I say that, it's designed from the ground up to meet the demands of the customer, the client; to meet the demands of whatever the application is that you're really trying to solve for, be that high reliability, capacity, response times, or whatever it may be.

If you look at where things are coming together today, whether it's manufacturing, industrial capacities—think about things like factories, warehouses, assembly lines—downtime is an absolute killer. So these sights, these use cases, these customers, they house mission-critical, time-sensitive, and automated apps that definitely require, or would benefit from, technologies like computer vision, sensor analytics, AI—and Rob K. talked a little bit about that in his opening—that are there to help execute beyond what they do today. So, improvement and things like quality control, predictive maintenance, inventory management, also AGVs (autonomously guided vehicles).

Part of the warehousing logistics scenario, it's a huge amount of use cases that we're starting to see in the logistics landscape for basic connectivity where these are roaming big factories; they have blind spots. Private network provides a unique opportunity for us to help that, and that helps bolster some of the asset tracking solutions and use cases that we see in manufacturing.

Also, if you think about cashierless checkouts in retail, real-time supply chain sync, consumer-facing businesses like retail—all of these things can impact the customer experience, and so these are the types of things that we're starting to see. These are the types of enterprises and customers that can expect and uplift a new type of experience through the use of 5G.

I might also add, if you think about other industries that require a unique scenario for indoor and outdoor environments, places where cable can't reach, where Wi-Fi just doesn't work, it's not practical, work sites, temporary work sites, oil fields, pop-ups,

whether they be retail or medical, and that's where 5G, private 5G, and private cellular come into the mix as a unique solution that can solve, again, the design and build of those requirements that those apps and those types of environments require.

Jennifer:
If you step away from those B2B heavy-duty contexts, there's a ton of public-facing enterprise applications that also benefit from 5G. A couple of examples that might resonate with the listeners: Think about stadiums and venues. Obviously the Super Bowl just occurred, and the experience in-stadium needs to be amazing, but also at home it needs to be amazing. Like the one that we just saw, there could be more than 30 terabytes of data being used. Servicing that demand for data takes a serious onsite network, and Verizon has invested more than $100 million in network upgrades and enhancements in and around State Farm Stadium in the greater Phoenix area over the last few years to prepare for the Super Bowl and to support the community for years to come. That impacts not just the people attending the game, but all the residents of Phoenix, the tourists, the public safety agencies—the businesses throughout that area really benefit from our longer-term network investments.

Hanish:
Jennifer, I love stadiums; I live near one. Tell me a bit more about that.

Jennifer:
Actually, we just recently announced a five-year partnership deal with the NFL (the National Football League) to deliver a managed private wireless solution across each of the 30 NFL stadiums in the US.

The solution includes full support for coach-to-coach communications on the field, and of course, it provides the NFL with the speed, the security, and the reliability for that critical on-field coach-to-coach communication. We piloted this solution during all five international NFL games this season that were played across the UK, Germany, and Mexico. That included the deployment and management of the private wireless

technology, and the testing and coordination, and in-game operational support.

It's part of our broader Verizon Business connected venue approach, which is rooted in the huge investment we've made in, gosh, more than 70–75 large public venues in the US, including some of the most iconic sports and music venues.

Hanish:
And here's someone who's still learning the game because I didn't grow up playing the game, but I could definitely do with a coach-to-fan network where they're explaining the rules to me.

Jennifer:
That's one use case, but there's many aspects of that. One thing we're doing is cashierless checkout. If you think about that, cashierless checkout is an ease of use, it's an experience, it's appealing to the consumer, and you can do that in venues, you can do it in pop-up stores, you can do it when you have seasonality in your labor market.

Another good example is automotive. 5G automobiles are about to become the ultimate mobile device; it's a phone, it's a tablet, it's a car, it's all one, and it's a mobile asset. It's a different way of thinking about how to utilize a network. And on-premises networking of all kinds, whether it's a campus, an industrial site, indoor, outdoor, anywhere that needs reliable, secure, onsite connectivity in a varied environment, or as a replacement or supplement for cable and Wi-Fi—5G's an amazing technology to use.

As an example, you can bring a network with over 200 Wi-Fi access points down to about 10 cellular 5G nodes, which means it's a lot less to manage and worry about breaking. Robb Juliano, I don't know if you have anything you want to add?

Robb J.:
It's important to point out that every industry vertical can benefit from and has its own use cases, so more bandwidth, more density, as Jennifer just mentioned, with availability for sensors and real-time speeds. There's a ton of different flavors for custom

5G implementations. They can be very strict private networks where data never leaves the premises, they could be hybrid networks where the general public is interacting both onsite with the private network as well as the public network. Stadiums are actually a really good example of that, where anywhere there's a huge general public presence, you're interacting between the private network within the stadium as well as the macro network that's more general for the public.

I would also say, too, that—and Rob K. mentioned this in the opening—edge compute is a huge piece of the evolution here. It goes hand in hand with this, so bringing that low-latency, onsite compute stack to the network, enabling a much richer experience of creative solutions that we've been talking about. When you think about that—when you think about the applications that are going to be built, and they're designed to bring value within that environment—within all those use cases we just talked about, the combination between that 5G private network as well as the edge compute stack is really the critical infrastructure that drives home the value stack that customers are going to go looking for and the ROI models that are so important to getting wider adoption, if you will, within this space.

Hanish:
Firstly, thank you for some fantastic use cases. As you were going through those, I was listening and thinking about my experiences—my recent experience in a stadium or cashierless retail—and it just dawned upon me that so much more is getting hooked up through those networks, through 5G, that we may not even be thinking about as a general consumer, but so much of it is powered. Then the other element—and I heard it a couple of times around edge compute—I want to dig in a bit deeper into that concept of edge computing.

Rob K., I'll turn to you. It's a little bit of a two-part question, actually. One, for our listeners, in terms of those who are maybe not close to it, what is edge computing? Then that will be important. And then two, what are those considerations the

enterprises need to be thinking about when they consider edge computing?

Rob K.:
Let me touch on that. Historically, when enterprises have heard the term "network," they think infrastructure and they think IT, and when they hear the term "edge compute," they think some sort of computing power that sits in the cloud, but again, infrastructures. That dynamic is changing because with the advent of private 5G and private edge compute, enterprises can now invest, build, and operate their own network to provide that infrastructure, but more importantly, drive transformation and operational changes.

In the past, where edge, cloud, and network seemed so much like an IT story, this is really about the intersection of IT and OT in bringing that together, and that comes together in a couple different ways. From a 5G standpoint, it's a new way to deliver connectivity, which is a private network; you could start small, you could scale as you go, and what it allows you to do is you could set the network for your exact needs. We talked about latency, we talked about bandwidth, we talked about network slicing—all of these capabilities that allow you to customize a network to your needs. As your business grows and your infrastructure needs grow, you, too, can scale that network.

Now you bring edge with that. Edge then allows you to offer highly customized solutions that sit on top of the network, that are taking advantage of the low latency, that are taking advantage of the high throughput. All of the data that you're collecting on your sensors and your devices and your cameras—you're able to process it in real time, and not just one or two sensors, you're talking thousands.

Think of a manufacturing facility that could be hundreds of thousands of square feet with hundreds of thousands of sensors. Past connectivity solutions struggled with scale, but 5G removes that, so now you have all these connection points. And now you add edge to that, and you have the ability to capture that data, act on that data, and

drive things like real-time operations and analytics—all the things that are going to drive greater efficiency in your enterprise, greater performance, and ultimately lead to greater growth.

Robb J.:
If I could add to that, Rob K., you hit it on the difference, and there's a transition here at this intersection between OT and IT, and this conversation is not about network; it is about operational change, operational transformation, and how these things can help enterprises achieve—like I mentioned—additional ROI that maybe they haven't been able to get through or get to in the past. Part of our 5G story includes, as Rob mentioned, edge computing, private networks, network as a service, network slicing—all these things align to create a solution or a story for these customers that allows them to approach this in one way or another. Edge compute—obviously you just heard Rob K. talk about the benefits of that. I fully agree that's a critical component to how we actually transform and build the apps that drive the workloads on the private network to get to the outcome.

When you think about hybrid, too, this is not an "or" conversation. There's plenty of environments where we can work together in a hybrid environment, where we deploy a private network that sits in an environment that coexists with the Wi-Fi network as well to provide a balanced approach to connectivity for whatever the use case may require. But at the end of the day, the combination between private network and edge compute really does deliver a very differentiated approach to a secure, high-availability architecture that allows these applications to deliver the ROI that they're designed to go to.

Rob K.:
Robb, if I could just add one more thing: The value of that platform and that integrated stack when it comes to scale, we talk about all these use cases. This is not about a point solution to solve just one of those; the value in this is you can build use case after use case after use case, and the power of the network and the power of the compute that comes with it and

the ability to own it, manage it, and scale it as you need is unprecedented, and that really is where you get so much more ROI because you just continue to build, innovate, and deploy more use cases to impact the business.

Robb J.:
One more thing I want to add to that, because I do think there is a natural evolution that we're seeing in the marketplace where certain use cases in certain industries are finding the value of private networks today and now for what they provide today, which is, as we talked about, pervasive connectivity in a private environment. At the same time as we continue to evolve and extract that value from those use cases, we are finding that customers want more, and so that's where the work with Deloitte and Verizon comes together, where we go and look at applications that, again, will sit on that edge infrastructure to drive new value for those companies.

So, it is an evolution, and we're seeing—to Rob's case point, we may start at a certain point around private network, but that quickly evolves into a much wider conversation around bigger return, bigger use cases, and bigger impact to the business.

Hanish :
Let's stick with that train of coming together and working together. How specifically are Deloitte and Verizon working together to really help these enterprises solve their businesses when it comes to 5G? Jennifer, I'd love to turn to you for that one.

Jennifer:
Thank you. I heard a couple of things; I heard Rob K. say that the value is additive, and it absolutely is additive to be able to drive to scale. I also heard Robb Juliano say this is about operational transformation and operational differentiation, which means that when we're looking to solve complex business challenges that our customers have; we can't go at it alone. The importance of the ecosystem and collaboration across an ecosystem when it comes to driving enterprise 5G is absolutely critical, bringing together the right combination of capabilities and technologies to deliver on the outcomes that our customers are looking for.

So, very specifically, to answer your question, Verizon and Deloitte are collaborating with an ecosystem of about 20 leading global companies, with a bunch of complementary technologies at the Wichita Smart Factory, which is a fully operational production line and experiential lab for creating and researching smart factory technology and strategy. Our collective objective, of course, is to help manufacturing firms, in this instance, experiment with new approaches to utilize data and connectivity to improve that real-time coordination between people and assets.

Hanish:
Looking at that objective in terms of helping to experiment new approaches, how they utilize that data and connectivity, what are some of the use cases that are coming out of the [Wichita] Smart Factory to leverage 5G to the maximum?

Rob K.:
I could touch on this. This is Rob K.

A few things: First and foremost, showing what a 5G network could do—you've heard the term "fixed wireless access," which is about bringing high connectivity in the form of a private cellular network. Many manufacturing facilities and warehouse facilities have always struggled with wireless connectivity because of some of the challenges that come from it with interference because of equipment or what's being produced on the floor. 5G changes that.

Use case number one is showing you are able to use a fully wireless network, connect all your devices, connect all your sensors—not have the same challenges with connectivity and performance—be able to scale and put more agility into your manufacturing line because if you wanted to change things, or change your process line, move equipment around, you're not hardwired in.

That's just to start, but then on top of it, what are those applications on the edge, on top of the network, that we're able to demonstrate and that we've talked about? Quality assurance and defect analysis are

always top ones that come up; this is the ability to use things like camera vision to detect potential defects that come across a line so they can be pulled out and addressed before they even reach the customers.

Things like material handling—so using things like AGVs and AMR fleets that can do automated movement of material in and around the facility, as well as in and out of the facility. Advanced tracking that you can do with 5G, you're able to see where are my raw materials coming into my plant, or where is the sub-assembly that's coming from another factory into my plant? Then I could not just understand what it is, but also drive better performance in terms of scheduling and resources on the floor.

We also use that same platform with things like workplace safety. You could use computer vision, you could use where folks are located on the floor to reduce human error, reduce mistakes, minimize injury or productivity loss. You could use things like AR/VR that sit on top of that to do real-time training or help with maintenance, so there's a ton of different use cases that we're able to demonstrate and show in the factory that are leveraging 5G and edge computing.

Hanish:
I know I could geek out on this and keep plugging the three of you for use cases and where it's at, because I've seen so much of this and so much of the importance of it, but I know I've got to at some point bring this to an end.

I want to close out, and this one's to all of you: If we're looking at those companies who are just starting out on their 5G journey, where would they start, or where should they start? And what should they begin to implement around private networks? I want to open it up to the three of you to give a taster to our listeners, and particularly our executives, who are listening who are thinking of moving in this space and may not be fully on the journey yet.

Rob K.:
Sure, I'll start. I would say start by first defining what is the problem, or what are

the challenges that you're facing from an operational standpoint? Are they performance issues? Are they efficiency issues? Then think about—do some introspection and say, "OK, I know that I have these problems. I need to embark on some operational digital transformation effort. How do I get there? How could data help me? How could technology help me?" When you start to think about it, it's that stack of bringing the connectivity, the edge, the devices together that could solve that and solve so many other things. Start with the problem, and then start to develop the solution that could support solving that.

Robb J.:
I'd add into this as well. I agree with Rob K. If you think about it, there's a lot of enterprises that are going through this right now where they may not know exactly where to start, but every company understands what strategies they need to embark on to overcome some challenges or business problems that they have within their firms. And I think that's really part of the question

here, is you're going to have to test, you're going to have to learn, you're going to have to experiment a little bit, but it's important that you have somewhat of a strategy on where you want to get to, and at the same time, commit to the resources that are required to make this happen.

This requires investment from not only Verizon and Deloitte, but also with our clients to help them within the journey, and on the journey, to get the outcome that they're looking for. I would say experiment, invest, think big—but I think, as Jennifer will say, start small.

Jennifer:
That's right, because the value is additive; that's a really important concept to grasp. When you get started—maybe it's just one corner of the business, maybe it's just a test or a proof of concept—get yourself comfortable with the technology, and then grow with it from there because there is plenty of value to be added on top. Again, 5G is built for enterprises because it's built for

scale, so it's easy to get started to address a pain point, and then scale up from there. scale, so it's easy to get started to address a pain point, and then scale up from there.

Hanish:
That was a fantastic summation. Taking everything into consideration, as we look to the future, there's clearly an opportunity for enterprises that adopt private 5G networks to improve productivity or drive growth. And clearly you, as Verizon, are bringing solutions that use high-performance connectivity to overcome some of those business challenges. You've given us some compelling examples today that indicate every industry vertical can benefit from 5G's flexible and innovative platform.

So, I want to say, with that, I do want to thank you, my dear guests, Jennifer Artley, Robb Juliano, and Rob Kasegrande, for joining me today. And until next time, happy listening.

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