Daniel Newman: Aaron, welcome to the 2022 Six Five Summit. So excited to have you as part of our Edge track, talking about the connected, intelligent Edge and Edge and IOT and all these things. Such a big topic. How you doing?

Aaron Chaisson: I'm doing great. Thanks for having me. I love this topic. It's tremendous stuff that's happening in the industry, so I'm looking forward to the conversation.

Daniel Newman: Yeah, it is a really huge topic. I keep hearing the exponential numbers of how much larger the Edge is than typical data center, but oftentimes the mystique and mysteriousness of the Edge creates confusion. So, that's where I want to start with you is, the Edge is sort of one of those technology terms that has gotten many definitions, many different descriptors, many different people call it something different.

Aaron Chaisson: Sure. Yeah.

Daniel Newman: Different [inaudible] keeps coming up. Sometimes it's described as the Edge can be all the way out to that final sensor. Sometimes it's a small regional type of data center's considered the Edge. It gets many different things. So, let's start there, because this is the part of the business you're leading at Dell. How do you define this? How is Dell thinking about it? How are you thinking about it? How are you kind of communicating this category to the market and to your customers?

Aaron Chaisson: Yeah, sure. So, I mean, first of all, there's so many different definitions of what the Edge is and to be clear, the Edge is not brand new, right? There's been Edges for a long time. It's the outer point where there's some compute going on. I mean, back in the day, there's remote offices and branch offices. There was a lot of examples of things that were happening outside of the data center where production was happening. But I think one of the main differences now versus then was, at the time there simply wasn't enough compute power that was happening in these remote environments to really be able to do anything in real time .to really be able to do anything actionable. There was productivity applications and there might have been applications running particular robots or features or capabilities, but there, it was not real time.

It was not adaptive. It wasn't acting in any kind of like reactive way to things are happening right now. So, I think what's really happened and changed in the last couple of years is quite honestly, the continual progression of Moore's Law, the advances in accelerator technologies. We can now bring enough compute power out to the Edge where data's being created to actually be able to do work on it right now. In the past, you had to move that data to the cloud or to a corporate data center where you might do post process analytics, get new insights, learn something new, and then maybe change what you're doing, but it was more reactive, and after the fact versus happening in real time. So, you look at what you can do today, where the average smart watch, my Apple watch has more compute power than the space shuttle had.

I'm pretty much a walking data center in what I might carry around with me. If you think about it, if I've got a watch and I've got a smartphone, maybe a tablet and a computer, I've got 14, 18 cores and terabytes of capacity. That's a data center, a mid-sized data center from 10 or 15 years

ago, and that can now put it into everything. So, the fact that you can put compute literally in every device, that's changing what's happening and what you can possibly do at the Edge. So, when we think of what the Edge is and how we really define it, recently, it was where does the physical meet the virtual? Where does the analog meet the digital? That's kind of technological in nature. We're really looking to focus on what are the things that different industries are trying to do?

So, we really define it as the Edge today as where data is acted on, near its point of creation, to really generate immediate and essential value. That's different per industry, right? So, for farming it's how do I make my field more productive to increase crop yield? For manufacturing, it's how do I modernize and advance my manufacturing facilities? For healthcare, it's going to be point of treatment, whether that's an emergency room, a radiology lab, even first responders in mobile units and being able to track them and give them the information they need or healthcare on devices that people are using with wearables. So, what we really think is that what's happening at the Edge is very industry-specific, and so it's being able to figure out how do we bring the right technology to where they need it to drive the innovation and the outcomes that the industries are trying to achieve and that's how we're really approaching the Edge today.

Daniel Newman: Yeah, I love how you kind of made that relation to how much compute power we carry with us every single day. It's pretty remarkable what we're able to do on our mobile device with a connected PC, even on a watch or an Alexa or these devices that have just massive amounts of compute, and they of course networking storage. I mean, of course, parts of the Edge are much more simplistic. You've got simple sensors and data that's providing information from a farm or from a factory that's, that tends to be a bit more binary, but that all the way up to the fact that kind of, we have an automotive track here, but like a vehicle is kind of like a rolling data center now. Right? You're seeing the evolution of the bomb in a vehicle. It's going to be 20% chips by 2030, and the amount of data, storage, networking and then of course, integration to the cloud that a, vehicle's going to have.

Just an example of the proliferation of the Edge. Vehicles, mobile devices, computers, like I said, smart speakers, headsets, just everything, and of course XR, that's another one that's going to, the metaverse, right, is going to have a huge play as well.

Aaron Chaisson: Yep.

Daniel Newman: But you said something I want to lean into here. You said about data. Okay. So, all those things, I just described, all those things you described are putting off massive amounts of data. That brings complexity, because companies and CIOs are thinking about, of course, how do we get at that data? How do we make all that data available? There's cost considerations. There's data networking, fabric considerations to get that data to and fro. These are just a couple of the considerations, and of course all the integrations, multi clouds and things that you guys are talking about. So, as you're sort of out there talking to customers, how are you sort of, what are you hearing and how are you addressing those customer needs to be able to take advantage of what the data opportunity is, and that the Edge has created?

Aaron Chaisson: Yeah. I mean, to your points of sensors and all that. I mean, I think about 10 years ago, I think I was talking to a customer saying, I have 10 devices in my house that have IP addresses. I can probably within my arms reach, touch eight or nine that are now on my network and they're all generating data. So, that's just me in my home. The amount that's happening across [inaudible] industry is tremendous. I started at EMC 25 years ago, or so. We've been saying that data is exploding for decades. It just keeps going and going in orders of magnitude more. So, there's a tremendous amount of data, and increasingly, that is being generated at these Edge environments. So, managing, harnessing, identifying what data needs to be analyzed, where it's generated, what data needs to be moved back for longer term analytics, and for in the case of AI, do the inference thing at the Edge, but be able to capture and identify the data that needs to be moved into the cloud for model training and so forth to continue to improve those capabilities.

Customers need to figure out how to harness that, right? So, I mean, luckily Dell Technologies, we, more data on this planet runs on Dell infrastructure than anybody else. So, we look at ways to be able to not only be able to capture and analyze it at point of creation using gateway technologies, or we've got a streaming data platform product that allows you to capture and analyze in real time data, data streams, as they're coming in. Package that curate that and opportunistically move it to a data lake and a core data center in a cloud environment, if you choose to. So, we're looking to be able to get the technologies to not only, and to roll them out, to analyze them at creation, but to be able to curate them and manage them throughout their life cycle. Recent announcements that we've done is partnerships with Snowflake. We launched a project Alpine at Dell Tech World this year, to talk about being able to manage unstructured data, both on-prem and off-prem in any cloud.

So, we're developing technologies to be able to manage this life, this data throughout. Now, and why are we doing that? I mean, ultimately that comes down to something that, very simply, that Michael Dell likes to always say, which is, "Compute is really an engine and that engine needs to be fed." The engine is compute and fuel is really the data that gets fed into it to be able to analyze that. So, I think the exact quote is that, digital transformation that we're doing is like that machine and data's the fuel. 5g is the connectivity that pulls that together. So, there's more and more fuel being fed into the system, and we're developing the compute systems to be able to actually process that, analyze that and be able to drive value for our customers.

Daniel Newman: Well, it's never bad to get a little wisdom from Michael Dell, and he definitely is one of the people that clearly sees the future. He was our very first opening keynote for this Six Five Summit when we did it the first time. That, three years ago now. So it's [inaudible] Yeah. I mean, but you know, every time I speak to him, I always think this, someone gets it. There's a reason he's built $100 billion revenue organization. It really is, multi-cloud was sort of thematic of Dell Tech World this year when I was there. It's been a little bit thematic over the last few. Of course, it's all about the data. I can't tell you how many times I've heard Jeff Clark say that in some of his presentations as well. So, tie that together for me though. You've got all these new solutions. You mentioned some of the new solutions from a multi-cloud standpoint, and then a database standpoint. What are you focused on at the edge? What kind of solutions are you focused on the edge to make sure the customers are able to tap into all that data?

Aaron Chaisson: Yeah. So, we've, first of all, we've been at this for a while. So, there's been over 20 years where our teams have been working primarily through our OEM division to work with OT vendors to develop industry-specific solutions, to help go drive those outcomes. So, historically when you've had much of a separation between sort of the operational side of the house, that really executed at these Edge environments and the core, IT that was really primarily responsible for the data, the core data center pieces. We really worked very closely with OT to develop solutions across many different industries. Think oil and gas, so energy, healthcare, education, governments, manufacturing, retail, you name it. So. We've been doing this for many, many years, but what we've been doing recently in our Edge business unit is, as more and more of that data needs to be processed at the Edge, we're seeing that the OT teams and the IT technologists start to come together.

So, what we've been doing is identifying some of the industries that we think are starting to make that transformation more immediate. So, industries like manufacturing and retail are the ones that come to mind, and we're starting to build solutions in partnership with ISVs that focus on those industries and verticals to be able to develop today, develop validated designs and solutions that can target specific outcomes. So, for example, last year we announced two different manufacturing solutions, one with PTC, and one with Litmus. These are obviously industry-leading software platforms for the manufacturing industry, and we've worked closely with them to build software and hardware stacks that deliver specific outcomes for them. Give them a platform to run applications that help them with things like quality control and inventory control, environmental control for the manufacturing facilities, being able to handle a shipping and transportation.

So, these are areas that we're developing solutions, specifically targeting that industry. Recently, we branched out into retail. So, we announced a retail solution just last month, at Dell Technologies World. In partnership with Deep North, to really go after a lot of the use cases that in the retail space that we're looking at are more computer vision oriented. So, things like self-checkout, things like being able to understand how the customers are navigating and moving through stores to be able to optimize product placement, customer experiences, and to be able to make sure that they're delivering more and more value at these retail outlets. So, today we're working on those. We're going to continue to roll out more solutions. We're looking to expand into new spaces, and then ultimately, how do we start simplifying that at scale over time? That's kind of where we're going to be going in the next phase.

Daniel Newman: Yeah. You mentioned industry solutions, which I think are going to become increasingly important. Of course, I always say, and this probably is a little broken record, but not everybody's heard me say this before, so I'll say it again. Industry solutions that have some depth behind them, meaning like when it comes to the Edge in industries and building solutions that are truly hardened to support specific industry cases. Because we've seen a lot of architecture over the last few years with industries and by the way, not just in infrastructure. We've seen it in software.

Everyone wants to attach, this is the retail case, and it, so building some depth behind those sounds like a big opportunity. You quickly gloss, but one thing before we sort of wrap up, I want,

I'm going to ask you about the future, so start thinking. But security, the Edge creates a ton of security implications as well. How much time are you spending talking about that? How much are you thinking about, how much are customers thinking about that?

Aaron Chaisson: Yeah, absolutely. Security is the number one concern. Maybe if you think about it, when you start putting increased amount of technology in a variety of Edge locations, you've effectively taken that out of the hardened, secure barriered, secure entry data center that's exist in the past, and you're putting these out into environments that aren't necessarily physically as secure, but you're also increasing your attack footprint, and your attack surface. So, there's absolutely concerns about the data that's being generated, the security of that data, the security of the systems. You combine that with the fact that many companies don't have enough IT technicians in these remote locations to really be able to deploy, manage, secure, harden these environments. We need to make that intrinsic. We need to put that into the actual platforms themselves. So, it's a good point of kind of where are we going next with this stuff?

So, we see kind of some of the, some key challenges is to date, to date we've been seeing a lot of customers as they increase the number of applications they're running at the Edge. They work with their technology providers to create bespoke solutions for each of those technology stacks. But as the Edge expands, that means that operational complexity is going to be really, really challenging. So, what we're looking is how do we simplify that by creating a horizontally scalable technology that allow you to run multiple workloads and increase in scale without increasing operational complexity? But as we look at that, there's a couple of constraints that are involved, that we need to plan for. Number one is the one you mentioned, security, right? So, we've got to be able to make sure that whatever we're building meets zero trust, the emerging zero trust environments.

So, we need to be able to deploy hardware and software that validates and authenticates from point of install and throughout that life cycle, so that you don't, so you can really secure these environments. So, we're focusing on zero trust as a design foundation and a requirement for our solutions. We need to be able to handle zero [inaudible] environments. So, there might be nobody on prem that has a technology background. So, it's got to be super simple to literally plug in and self authenticate and self configure. We need to be able to manage it remotely, regardless of connectivity, because some of these remote environments either are remote by default. Maybe you've actually got it offline for reasons of cyber security concerns or issues, or maybe it's a location that doesn't have great connectivity, or maybe just flaky connectivity that cannot be, go up and down.

So, it needs to be manageable, deployable and life cycle controllable, even in different types of connectivity environments. Then of course, we need to be able to start really, really small but scale as they need it. So, we have solutions today, for instance, VxRail that meets a lot of these requirements, but at price points that are not necessarily at the low enough end for some of these environments. So, we need to be able to deploy optiPlexes or single-server configurations at a lower price point that get them to deploy what they need, but then be able to scale that up as their compute requirements and application loads increase. Of course, whatever we do needs

to be multi-cloud in nature, which as you said in Dell Tech World, that was one of our key themes.

That's even more true at the Edge, where many of the applications deployed at the Edge require cloud-based controllers or management systems. So, while you need to have ways of deploying those and managing those applications in all of these Edge environments, you also need to be able to very simply and easily deploy portions of those applications potentially in AWS or Google or Microsoft, and be able to control that all as a single unified sort of Edge estate. These are the things that we're looking to design towards, and be able to build solutions for our customers going forward.

Daniel Newman: So, we only have about a minute left, minute, maybe two. So, I'm going to put you in the hot seat to end this, but where does it go from here, Aaron? What are some of the areas that you guys are really investing in? I heard a little bit of you alluding to a little bit of that in your last answer. Yeah. What's the future look like from Dell and for the Edge?

Aaron Chaisson: Yeah, I think, I mean, the one key piece is how do we help customers capitalize on this Edge opportunity and the amount of data they're generating? That means again, to the, what I was just talking before, secure, simple to manage, simple to deploy, simple to lifecycle control at massive scale. Hardened systems that are infrastructure that we're traditionally known for being able to be built with the right temperature, vibration, hardened, rugged capabilities in different form factors for different use cases and sizes. We need to solve the data challenge, and so we are absolutely actively developing technologies to be able to support a data landscape that spans point of generation all the way into whatever public or private cloud that you need to leverage. So, having that single storage or data landscape is something that we're looking to manage.

Then finally, wherever that is, security is going to be critical, and at the end of the day, all of this has to exist in a multi-cloud world, because customers are going to be deploying many different applications, and as a good, great executive here at Dell always says to me, "Applications are like water. They find their home." So, we need to be able to support everywhere where those applications may end up landing, based on price, based on location, based on data gravity, and we want to be able to support our customers across that entire Edge to core, to cloud landscape throughout that life cycle. So, these are all areas that we're focusing on, but I would focus on the compute and the data as core management areas that we're looking to solve.

Daniel Newman: Absolutely. I think that's a great way to wrap up. No question the Edge is going to continue to proliferate. It's going to continue to grow. The implication it's going to have on business is going to be, for lack of better words, exponential. I believe that 100%, it's going to be, there's such a massive estate of data that's going to be used. Those that are able to use it most effectively, like it's always been, Aaron, will win, because that data is what, is going to tell us a lot of what we need to know and shape a lot of decisions, a lot of businesses, a lot of product services and so much more. Aaron, thanks so much for joining me here at the Six Five Summit, 2022. Can't wait to have you back. See you later.

Aaron Chaisson: Great. Thank you so much.


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