

Full Transcript

Caitlin Bergmann (00:00):
(silence).

Caitlin Bergmann (00:36):
Hey, everybody, welcome. We're just welcoming everyone for a minute, giving everybody an opportunity to join the room, and then we'll get started. (silence).

Caitlin Bergmann (01:12):
Okay. Hey, everybody. While we're giving everyone another minute or two, because it's 3:45. We prompt show here at Tech Review. We really hope that you enjoyed our first room here on Clubhouse a few weeks ago. We were here with Intel's CEO, Pat Gelsinger. I know we had fun. So, we're back. I've brought Elizabeth, our CEO and publisher of Technology Review. She's back here with me again, hey Elizabeth, to continue these conversations we've been having on-

Elizabeth Bramson-Boudreau (02:14):
[crosstalk 00:02:14].

Caitlin Bergmann (02:14):
Emerging technology with our partners. So, Elizabeth, welcome back to Clubhouse. I feel like I need to have a little sound, like musical cue for you here or something.

Elizabeth Bramson-Boudreau (02:22):
Yeah, like a little da da da da da da da, here we are.

Caitlin Bergmann (02:23):
Yeah.

Elizabeth Bramson-Boudreau (02:25):
We are back.

Caitlin Bergmann (02:25):
We are back.

Elizabeth Bramson-Boudreau (02:27):
[crosstalk 00:02:27], Caitlin.

Caitlin Bergmann (02:28):
Yes.

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Elizabeth Bramson-Boudreau (02:28):

Great to be back on Clubhouse and to be continuing the Intel conversation.

Caitlin Bergmann (02:33):

Yes, and speaking, great segue, we're here with a new guest who I am personally delighted to introduce because when I learned that we share, dare I say, a very healthy obsession with Peloton, I was so excited to hear what she has to say today about topics like that and smart exercise equipment, and how they are just one of many real-world, digestible, relatable examples of what the future of data centers are going to be. So, I promise, I give you my girl scout honor. I will table my thoughts on Peloton and you know who, who kicked the bucket, for thoughts on another Clubhouse moment. So, just like that-

Rose Schooler (03:13):

[crosstalk 00:03:13] Caitlin. No, I... You have to say, that was a brilliant return of [inaudible 00:03:18] by their marketing department. I'm just-

Caitlin Bergmann (03:19):

It was.

Elizabeth Bramson-Boudreau (03:20):

It was.

Caitlin Bergmann (03:20):

It was.

Elizabeth Bramson-Boudreau (03:22):

It was exciting. I mean, we can have a whole conversation about that moment in marketing. [crosstalk 00:03:28]-

Caitlin Bergmann (03:27):

We totally could.

Elizabeth Bramson-Boudreau (03:28):

It was so beautifully played, and Peloton, bravo to them.

Caitlin Bergmann (03:34):

Yes.

Rose Schooler (03:34):

Bravo.

Caitlin Bergmann (03:34):

But it... And just like that, a big welcome, you see what I did there, to corporate VP-

Rose Schooler (03:38):

Lovely transition.

Caitlin Bergmann (03:40):

Of Global Data Center and AI sales at Intel, Rose Schooler. Welcome to club Clubhouse at Tech Review.

Rose Schooler (03:47):

I am just super excited to be here with you today, Caitlin and with Elizabeth, and we're going to talk about some really cool stuff that's going on in infrastructure and the cloud, and the data center, and the edge, and tons of trends, tons of opportunity, and even more data.

Elizabeth Bramson-Boudreau (04:04):

Fantastic. Yeah, and also Peloton, so if you thought that was all you were going to hear, we aren't going to talk about Mr. Big, but we will talk about Peloton. It is great to be with you, Rose. Thanks for joining us.

Rose Schooler (04:16):

Thank you.

Elizabeth Bramson-Boudreau (04:16):

We have a wonderful audience here. It's in a very exciting topic, and that topic is the big shift happening now in the world of data centers, and especially, how organizations are going to manage storage down the road, because there's a lot coming and a lot changing. So, first can we... Can you help sort of set it up for us, Rose? What's coming? Why does what's happening in data centers matter?

Rose Schooler (04:43):

Oh, absolutely. So, I think... You had a conversation with our CEO, Pat Gelsinger. I'm sure people online are reading some of the reports in the market, like if you look at what just last year, in September, Gartner was saying about the emergence of the data center, the criticality of not just the compute infrastructure, the real-time nature of the assets, the fact that they're flexible and scalable, but things like the emergence of things like workload placement. So, it's not just about where you're putting compute, it's what's going to run on it, right? So, if you look across the spectrum for us, we see trends at the edge, we see trends with connectivity, we see trends with AI and HPC, and then, obviously, just the ubiquitous nature of computing overall.

Elizabeth Bramson-Boudreau (05:40):

Yeah. So, let's talk about that. So, there is this report that I think has been circulating from Gartner. It said that by 2025, so that's only two, maybe three years from where we are now, roughly 85% of infrastructure strategies are going to integrate on-premises, co-location, cloud, and edge delivery options, compared against only 20% in 2020.

Elizabeth Bramson-Boudreau (06:11):

So, from 2020 to 2025, it goes from 20% of infrastructure strategies that integrate all that to 85%. I mean, that's a monumental change. So, how does all that connect to what's happening and what Pat Gelsinger

talked to us about last time, about the adoption of cloud and edge platform technologies? Can you connect that for us, Rose?

Rose Schooler (06:36):

Yeah, absolutely. So, and it goes back to a little bit about what I said. You think back to how we've operated in the past. You had all your massive amount of computing assets sat in the data center. It started initially on-prem on an enterprise, and then you saw flexible consumption models that were introduced by the hyperscalers, but now what you're seeing is it's not just about, like I said, the way you're computing. It's what you're computing.

Rose Schooler (07:05):

So, it's the workload that you're running. Where do you want to run that workload and what are you going to do with it? So, what outcome do I need? What's the workload that delivers that outcome? Then, where should I put the workload so I get the best performance with the best power efficiency? And we'll talk, I think, more about that later, with the emergence of sustainability as a critical need, and carbon footprint concerns. And how does that support the outcome for the customer, right?

Rose Schooler (07:39):

So, it's the where and the what, and then it's really driving companies to rethink their infrastructure strategies and how those impact their data centers. So, it could be... And let's make it real, right. We talk theoretical all the time, but when you're doing something like oil rig, where do you want to run some of your analytics, if you're out in the middle of the ocean. Do you want to run it all the way back into a data center, or do you want to use some local thing to do some of those analytics? So, that's just a real simple example. So, you may have the need to execute some of the application locally, which we call at the edge, right? And the rise of the edge. And you may have the need, if it requires higher performance computing to do that in the data center.

Rose Schooler (08:28):

And some of the reasons that may be behind that are things like latency, right? Do you have the time to take the data, move that across the network into a data center, and rely on the response of time and the increased latency of the transaction, or do you want to do it super quick, right at the edge? You may want to do that because of data integrity concerns, or sovereignty concerns.

Rose Schooler (08:55):

So, in some cases, you're going to put your compute as close to the data collection and analytics as possible. And I think a perfect example is that, we talk about AI, and we'll talk about it more, I'm sure, but... There's kind of two parts to AI, right? There's the inference in the training, and something like inference, where you want to act really quickly and infer a result, and you think of things like speech recognition, or a recommendation engine, or managing area-specific data, that would be better served at the edge. But if it's super compute-intensive, it then becomes like the ying to the inference yang. So, you have something like training, where you got to teach these models how to predict, and that may work better, reside better in the data center, where you have more scale, more performance.

Rose Schooler (09:44):

So, if you're processing incoming data at the edge, you have less information that needs to go back to the cloud, like we talked about. So, think about it this way. If you're at a popular burger restaurant that opens branches and you order a burger, you don't want to have to go 10 miles away for the burger to get delivered, right. It'll get cold and not very appealing. You want it quick, you want it hot, you want it like you want it. So, having that combination of edge and data center computing is a great approach to that problem, too.

Elizabeth Bramson-Boudreau (10:17):

But just to carry out that analogy, in determining, perhaps, what kind of... How the menu might need to change from restaurant to restaurant, that might be something that could get handled closer to the compute.

Rose Schooler (10:29):

Oh-

Elizabeth Bramson-Boudreau (10:29):

It's just what this one customer wants that we should be handling at the edge.

Rose Schooler (10:34):

Oh, yeah. That's... So, let's riff on that a little bit. Okay, so, you're a local burger restaurant. If they're collecting and analyzing data at the edge, they can do some of that initial analysis, but they may want to go back to the main cloud, if you will, the main data center and run more intense training algorithms or analytics. And then, what you may find is you can learn things like, at my local burger joint, we go through more tomatoes, more lettuce and more chicken. We actually sell more chicken sandwiches than we do burgers. So, you can tailor your infrastructure. You can tailor your supply chain. You can meet your customer's needs on a more real-time basis when you get that combination of edge and cloud computing.

Caitlin Bergmann (11:24):

And I think about-

Rose Schooler (11:25):

That make sense?

Caitlin Bergmann (11:25):

Yeah, and I think the example that you've done here to really ground it in something relatable, like improving and optimizing the customer experience, is why speaking to a subject matter expert like yourself is so critical to just give that, what does that mean in real terms? And I think we're about to discuss one of my favorite topics, and a pretty zeitgeisty one, this week.

Caitlin Bergmann (11:47):

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So, just a quick room reset before we go there. If you're just joining us now, welcome to our conversation with Intel's Rose Schooler. Not only is she awesome, but she is a corporate VP of Global Data Center and AI sales and she's with Intel, who's our sponsor for today's conversation. So, without further ado, I think it's time to discuss my favorite topic du jour of the week.

Rose Schooler (12:08):

Let's go there. Let's go there.

Elizabeth Bramson-Boudreau (12:10):

I feel very ill-equipped because I'm a CrossFit person.

Female (12:14):

You are.

Elizabeth Bramson-Boudreau (12:14):

Although, I do love me some Peloton, and Rose, I know you're way up on the leaderboard. So, the machines know a lot about all of us.

Rose Schooler (12:24):

[crosstalk 00:12:24]. Way too much credit, Elizabeth and Caitlin.

Elizabeth Bramson-Boudreau (12:28):

Well, nobody knows what you're really doing on Clubhouse, right? So, that's the benefit, right? These machines know a lot about all of us; our preferences, our exercise patterns, probably can tell us whether it's time to slow down and maybe take that mini aspirin, if we've got a heart issue, to just, again, point to the popular culture. So, but really, seriously, though-

Rose Schooler (12:54):

And just like that, we're back.

Elizabeth Bramson-Boudreau (12:56):

And just like that. Talk to me about the future data center and what it means in a common... I mean, we're playing, but a common scenario like that one.

Rose Schooler (13:05):

Yeah, I think that's a... It's a great example. Okay, for those of you that aren't Peloton addicts like Caitlin and I, obviously, you have a little bit of compute on your bike. You're not running a data center, and for those of you that understand our microprocessor portfolio, there is clearly not a Xeon-class processor in my Peloton. But what you do have is you have the bike, which is a little bit of computing at the edge, sits in your house. You can jump on one at a hotel, where you can login to your profile and your data's right there at your fingertips. And then, because I'm traveling a bit again now, it's really nice. You can run it on your phone. So, you've got a little bit of computing in your hand, which is the farthest edge device, or in your bike, that you can think about.

Rose Schooler (13:52):

And you know that there's this constant creation of data. I've gotten into the habit of wearing my heart rate monitor when I exercise, even with my app or on my bike. It gives me more analytics. It's collecting data from the bike during the ride. It's getting data like GPS information and elevation from my phone.

Rose Schooler (14:12):

And back in the day, number one, you didn't collect the data. Number two, every time there was any type of analytics, it had to go back to the data center. So, with that, you have bandwidth limitations, you got the latency issues again, you got network disruptions, all of which can impair the experience and can limit the amount of data analytics and throughput that you get.

Rose Schooler (14:35):

So, now we get a little bit of that. I don't want to take this example too far, but you get a little bit of that computing in the bike. You get a little bit of the computing on your phone. And that's where you have to get something more specific like, hey, who else is out there on the leaderboard? I'm sure... I don't... I shouldn't say that. I'm not 100% sure, but I'm confident that that is done within their IT infrastructure in their data center, right, and their local, and their centralized compute, excuse me. So then you can know, hey, where am I on the leaderboard? Am I going to compete with Caitlin today or am I taking a little bit of a joy ride? And then, there's little things-

Caitlin Bergmann (15:15):

No, yeah, I think you're winning that one. I've seen your leader board [crosstalk 00:15:17].

Rose Schooler (15:19):

[inaudible 00:15:19]. I don't know about you, Caitlin, but I'm kind of digging the strive score, which is [crosstalk 00:15:24]-

Caitlin Bergmann (15:24):

I can't figure out if I'm killing it or if I'm dying with the strive score.

Rose Schooler (15:28):

[crosstalk 00:15:28].

Caitlin Bergmann (15:28):

I need to spend more time figuring, unpacking that one.

Elizabeth Bramson-Boudreau (15:30):

Okay. Okay, ladies. Okay, ladies.

Rose Schooler (15:31):

Okay, sorry, sorry, sorry. These Peloton examples are getting a little too deep. I got you, Elizabeth. So, but on that, I'm sure they're doing a little that locally, right, because you're really just competing against your previous score and your previous experience on a ride that's similar.

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Rose Schooler (15:47):

So, just a simple example and a fun one, because like we said, we're kind of addicted to our Pelotons, but it's the data generation, the ability to do some light things locally, the analytics that happen in the cloud. And then, you can extrapolate this example to your experience in a retail store, the data they collect on a factory floor, a smart city, but in my case, I like to use the Peloton example because yes, I am addicted.

Caitlin Bergmann (16:21):

The first step is admitting it, Rose.

Rose Schooler (16:23):

I know, I know, I know.

Elizabeth Bramson-Boudreau (16:27):

All right. So, let's talk... Let's sort of pull back. How important is it for tech leaders, folks who might be listening here, to be thinking about their own data center strategies and rethinking that along the lines of what you've sketched out here, Rose?

Rose Schooler (16:43):

Yeah, that's a great question, because if there's anything that's predictable in tech, is it's that it's constantly changing, right? So, back in the day, as you noted, everything used to be on-prem. When we look ahead, Gartner just predicted in March of this year that 75% of enterprise data will be created outside of the area of the centralized data center. And our work-from-home environment is probably a fantastic example of that.

Rose Schooler (17:17):

And as we think about how data, or technology, excuse me, gets more integrated into how we live, we just, I'm sure, greatly overuse that example. How we learn. We saw that during COVID as everybody's kids were home studying and taking online class. How we play, how we work. Data is really becoming that new currency, and again, it's not localized, created, and analyzed on-prem like it used to be.

Rose Schooler (17:46):

So, if you want to use that data and you want to learn about your customer, you need data. If [inaudible 00:17:52] improve your product or your service, you need data. If you want to get healthier, I'll plug it again, you need data.

Rose Schooler (17:59):

But collecting and synthesizing these massive amounts of data isn't going away. It's actually exponentially growing in importance. So, the ability to take action, gather insights, is really becoming a competitive advantage, and really, we've got to think about how we, again, go to the point of creation, do some analysis, and what we take back on-prem. And then, on top of those data trends, there's a ton of inflection points in the industry. Security is front and center. Sustainability may be one of the fastest trends I've seen emerge and take priority in my tech life, which is 32 years, very long. We have supply chain issues. And these are just a few where... In these examples that we can reshape how we solve these issues by leveraging the data, look at the bottlenecks, and put solutions in place.

Rose Schooler (19:02):

Cloud, the architecture, the consumption model are at the center of these trends, and whether it's a public cloud, whether it's your cloud on-prem, whether you're looking at a multi or hybrid cloud environment, it's the architecture that everybody has been and continues to embrace, but it's not just in the hyperscalers. You're seeing that architecture take hold in our comm service providers, in our enterprises, at the edge. So, it's really our pervasive architecture of choice.

Rose Schooler (19:33):

And then, think about the model. I keep talking about it as a consumption model, and it's really a pay-as-you-go model for server compute, for storage and networking. And a super simple example, I'm sure many of you have your smartphones and you've come to the point where, as you add more and more apps and you're at 40,000 photos, you get a little popup that asks you to pay for more storage. Perfect example as a consumption-driven business model and pay-as-you-go.

Elizabeth Bramson-Boudreau (20:07):

So, what are the-

Rose Schooler (20:09):

[crosstalk 00:20:09].

Elizabeth Bramson-Boudreau (20:09):

What are the big trends in cloud and what do those of us listening here, who may be CTOs, developers, or engineers, other kinds of tech decision makers of one sort or another, what are these big trends important... What are the important things for us to know?

Rose Schooler (20:27):

Yeah, so, and it actually aligns. We built our corporate four pillars against these, what we think are the biggest trends. And we've been kind of touching different parts of this elephant in the conversation. And I would point to, really, four things; ubiquitous computing, and I think we hit that one hard, but I'll hit it a little bit again, HPC, high-performance computing, and AI, pervasive connectivity, and edge-to-cloud approaches.

Rose Schooler (20:58):

So, let me unpack each of those a little bit. Okay, ubiquitous computing. Really, what is it? It is connected devices that when we... No matter what we say, we do, we see, we touch, we hear, we're creating data all the time. I can point to the heart rate monitor. I can point to the information that we're typing into our phones. I can point to the intelligent things that we're now putting in our houses, even appliances.

Rose Schooler (21:31):

And it's really creating this explosion of data, and the data explosion and the need for some computing capability on that data, they're inextricably tied. So, that's what we mean by kind of ubiquitous computing. You're... Every human is creating lots and lots of data, and where you create it, you need to compute it. And our goal is really to simplify the environment, provide greater access, reduce costs, and I think we've seen that.

Rose Schooler (22:04):

I mean, let's just poke on reduce costs for a little bit. We probably have more computing power in our hand today than we did 10 years ago in our PC, easily.

Female (22:16):

Oh, god, yeah.

Caitlin Bergmann (22:18):

For sure.

Rose Schooler (22:19):

For sure, right. And so, we want to make it efficient and we want to make it real-time. And just, if you can envision, compute technology, is an example, right? So, it understands your behaviors, and the technology can help you wake up in the morning because it knows on your calendar, you have an appointment, so it sets your alarm clock. It might know where, because the address is in the calendar, appointment that you got to drive there and it's at 8:00 AM. So, it gives you a route on your nav system or application to avoid traffic.

Rose Schooler (22:57):

So, you just start to see maybe the... What have been kind of siloed applications, starting to integrate and learn from each other and really simplify our lives. And cloud architectures, at the edge, into the data center are really enabling some of these use cases. So, that's one, okay.

Rose Schooler (23:19):

The next thing I noted was really high-performance computing and AI, and they're kind of different, but they're also kind of the same. So, for those of you that don't spend lot of time around high-performance computing, it's really kind of a bunch of servers that are jammed together into something called a cluster. Okay, and no jokes on the term cluster. [inaudible 00:23:42]. And it's connected by a really fast interconnect, so you can move data in between them really quickly.

Rose Schooler (23:49):

So, then you have AI, which is the programs and the learning that resides on top of those high-computing functions that help us make better decisions. And you can see the com the combination of this really high-performance computing with this really smart software creating endless possibilities for us, whether it's things like understanding fraud patterns. How many of us are getting notifications on our phone now where it's like, "Hey, I've never seen you at this bank before. I've seen you... I have a suspicious activity. You might want to look into it." Diagnosis, commerce businesses, the list goes on and on.

Rose Schooler (24:31):

And then, I think the pandemic really [inaudible 00:24:34] examples here, where you had situations, where... We worked with folks like Zoom, and their noise reduction capability to help background from remote collaboration. That was HPC. We've worked on... With the University of Chicago, for things like COVID models. HPC and AI. So, and all of this is now being done in the cloud, right. So, there's the tie

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back to cloud as an architecture. So, that's two. We talked about ubiquitous computing, and we talked about HPC and AI. Do you want to hit on anything else before I go to the next two?

Elizabeth Bramson-Boudreau (25:11):

No, you're good.

Rose Schooler (25:12):

Okay. [crosstalk 00:25:13].

Elizabeth Bramson-Boudreau (25:13):

I'm with you.

Rose Schooler (25:14):

Okay, let's keep going. I think connectivity, we talked about how important it is. It is in the HPC example, right? You need to be able to move lots of data quickly between these nodes. But another area that I'm sure we see a lot of is cellular. It was LTE, it was 4G, it was 5G, but 5G is really kind of designed from ground up to deliver services targeted first at enterprises, versus the consumer, which is... Predecessors have been really focused on what can we get on our cell phone most quickly, and it's new revenue stream opportunities and it's different use cases, and...

Rose Schooler (25:53):

And while these seem... While you think about cloud computing and you think they're kind of disparate on the surface, it's the high-bandwidth activity that allows for the deployment of some of these edge technologies, with low-latency and high-bandwidth and 5Gs at the center of that.

Rose Schooler (26:13):

And you can imagine, in a time during COVID, if you're a healthcare provider and you're doing something remotely, you don't want your connection to go down.

Female (26:25):

Nope.

Rose Schooler (26:26):

You want a fast response, right? You want to be able to run those analytics and get that data across that connectivity really quickly. So, 5G is going to help us save money, improve experiences. And we talked a little about, a lot about the edge as the fourth kind of big trend, so I'm not going to hit that one again, and it's truly like a location, and keep it close and keep it fast kind of methodology, but what's the coolest is that it doesn't matter whether it's the ubiquitous computing, doesn't matter if it's AI and HPC, or connectivity, or edge, it's really riding on this fabric of cloud-based architectures. It's so cool.

Caitlin Bergmann (27:09):

You've just given me a crash course in things, no matter how many times I listen to them, I think I know them, but when you just put it so plainly and you put it in relatable ways, it tracks so much more for what it really means to my day-to-day life. So, that's why we're so glad-

Rose Schooler (27:23):

Oh, I love that.

Caitlin Bergmann (27:23):

That you're here for us, Rose Schooler-

Rose Schooler (27:25):

I love that.

Caitlin Bergmann (27:25):

Corporate VP of Global Data Centers and AI sales, which just rolls off the tongue. But kidding aside, we are here exploring with Rose, cloud, intelligent edge. We just went through some trends. We're going to keep digging into that, and specifically, what the future holds for data storage, and that's, of course, all sponsored by Intel today. And just a quick programming note, we are using Clubhouse's replay feature. If you haven't used it yet, it's fabulous. You can go back and listen to Pat's conversation that we had a couple weeks ago. I'm speaking so informally of Pat, like we're best friends, but that's Pat Gelsinger, the CEO of Intel. And if you missed anything from Rose's conversation at the beginning, just visit the MIT Technology Review club, give that a click, and you could listen in the chat from the top.

Caitlin Bergmann (28:10):

But Elizabeth, I got to tell you, we've been discussing things like public and private cloud ,and security, and how it relates to hybrid cloud. They're such timely topics right now, and I think safe to say the center of a lot of critical conversations for clients and their customers. So, I think now might be a really good time to go a couple more clicks into those concerns for the room today with Rose.

Elizabeth Bramson-Boudreau (28:34):

Yes. Yeah, I think that's right. Thank you, Caitlin. So, Rose, we've had a lot of conversations at MIT Technology Review about the importance of security.

Rose Schooler (28:45):

Oh, yeah.

Elizabeth Bramson-Boudreau (28:47):

And we know that a lot of organizations want the control of a private cloud infrastructure in order to ensure the security. We just had our annual cyber secure conference last month here at MIT Technology Review, and we heard this again and again from those in the cybersecurity field. So, talk to us about that, the security aspect to this.

Rose Schooler (29:08):

Yeah, and I think it gets back to the where and the what, like we talked about, right? So, and when we talk about the where for a little bit here, I think people, companies, enterprises, governments will continue to use private cloud. And again, let's remember that cloud isn't a set of customers. It's really an architectural approach, and I think that private cloud approach will remain in place for things like data that they think is critical, confidential for their business, for things like data sovereignty or national security.

Rose Schooler (29:48):

We see a lot in places like Europe, where if you're a telecommunications provider, you're a perfect person or company to provide that cloud computing capability, because a lot of the companies are distributed, situated, aligned by country, so you get to keep your data in country. And some companies are concerned about that. They want to keep their data on-prem and they have concerns about information outside of the organization control provides risk through a cloud provider.

Rose Schooler (30:28):

And when your on-prem businesses use software and hardware solutions for their private cloud services, while ensuring their information is intact and it's in a corporate controlled situation. And wherever the infrastructure for public cloud is required, it's utilized.

Rose Schooler (30:48):

So, many companies, clients don't care about the location where their services come from, but for organizations, data centers will be the ones held responsible for facilitating the delivery of those private cloud services. Yet, and I'm sure we'll talk about multi-cloud in a second here, but they'll also embrace a multi-cloud approach for things that aren't business critical, where they're not worried about sovereignty security. And so, they'll put the workload where it is best served for the use case and the condition that that service requires.

Rose Schooler (31:31):

I don't think anybody is hugely concerned about where their public website resides, as an example, right.

Female (31:41):

Right.

Rose Schooler (31:42):

So, kind of building on that, the multi-cloud trends. So, and IDC, in 2021, noted that 85% of enterprises were starting to use multiple cloud services, right. So, there's that... We started with security. Sometimes they'll use on-prem, sometimes they'll use multi-cloud, and when they go multi-cloud, they're looking for agility, accessibility, maybe more services, yet also, the consideration of those security attributes, right.

Rose Schooler (32:17):

And we're seeing the cloud service providers, on a very regular basis, continuing to look at things like confidential computing as a core asset. So, the bar keeps getting raised on each side. If you're on-prem, security is continuing to be a job one. If you want to look at an off-prem set of options and considerations,

the hyperscalers are focused on increasing, improving, and continuing to roll out security services as well, which really enable that multi-cloud environment.

Rose Schooler (32:55):

So, you may see a situation where you have a couple public infrastructure-as-a-service providers. You may have a public platform as a service. You may have on-demand management and security systems from public clouds. You might have some of that in a private cloud infrastructure as a service, for your systems of record and your critical data. You may have private container as a service, either in a public or private cloud. So, you're really going to see security as a requirement continuing to increase, improve, and evolve both on and off-prem.

Elizabeth Bramson-Boudreau (33:35):

Right. Okay, fantastic. So, I want to switch before we run out of time. I don't want us to finish this conversation without going back to what you raised, which is sustainability.

Caitlin Bergmann (33:47):

Yeah.

Rose Schooler (33:48):

[crosstalk 00:33:48].

Elizabeth Bramson-Boudreau (33:48):

We know that computing is going to offer us huge advantages. We can do this real-time decision support, but it's also a really big drain on the power grid. So, can we... Can you talk to us about sustainability and how that fits in with this change in the data center and the dynamics you've been discussing?

Rose Schooler (34:09):

Yeah, absolutely. So, you had Pat on here, and one of the things he... One of his claims to fame internally is he has us working at a torrid pace, and he'll use that term all the time, and let me tell you, we're working at a torrid pace.

Rose Schooler (34:24):

But I will use that same statement to talk about sustainability, because this is a trend that is really moving at a torrid, torrid pace. So, we talked about this computing everywhere, and the... Really, this exponential burst in computing is really driving a greater need and increased power consumption and cooling needs, which as you noted, are really tough on the environment. And we're all aware of this.

Rose Schooler (34:57):

And it's interesting, because we did... Just a quick little story. So, we do a strategic planning process every year and I hosted it this year for our CEO and our executives, and we had a bunch of CIOs and chief security officers come in. And when you host these kind of forums, you often probably can forecast 75% of the things you think you're going to hear.

Rose Schooler (35:22):

There were two things that came forward in this year's session that were a bit of a surprise to me. One was green IT, sustainability, and the other one, which we will leave for another Clubhouse conversation, is IT for good.

Female (35:39):

Oh, [crosstalk 00:35:41].

Rose Schooler (35:41):

So, I'd love to talk about that at some time, but it came up and we're like, "My gosh, we have to start paying a bit more attention to that." In literally, weeks, we had a hyperscaler say, "We need to know the embedded carbon you use in producing your CPUs, so we know how much to offset."

Female (36:02):

Wow.

Rose Schooler (36:02):

We had a C-suite executive say, "Sustainability is now a top-three issue for our compute decisions." We had another hyperscaler ask us to design a sustainable CPU. So, literally the need for zero-carbon footprint, the sustainability asks, are coming in daily. So, we're getting very front-footed from that regard.

Rose Schooler (36:27):

And then, as a company, we publicly disclosed our RISE 2030 commits to solving some of the planet's toughest challenges, and one of those is our march towards carbon neutrality. And there's a bunch of initiatives underway, from that regard. And I want to go back for a second, and if you think about the AI examples that I gave you, you are pumping through a lot of compute, and when you do that, you're consuming a lot of power and a lot of energy, so that's a place that we're absolutely focused.

Rose Schooler (37:02):

So, when you look at some of the things we're focused on, carbon aware computing. How are we shifting data center workloads, like I talked about earlier, to places where you can reduce the compute, be more efficient, have lower latency, make them more green. We're working on immersion cooling and heat and energy reclamation processes. We're looking at things like modular data centers and micro data centers that are deployed through our partners at the edge for those time-sensitive, ultra low latency, AI-enabled decision making. We're looking at clean and renewable energy sources, providing green resilient energy to data centers, aligning our compute with green energy investments, so we can reduce the impact of those AI workloads. And for future data centers, we need to work with our customers and our partners to continue making computing more efficient, denser, more power-efficient, and greener. So, it's front and center for us, our customers, the supply chain, you name it.

Elizabeth Bramson-Boudreau (38:15):

That's great. Thank you so much, Rose. Caitlin, I'm going to throw it to you.

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Caitlin Bergmann (38:19):

Yeah, so, you've been so gracious with your time today, Rose. The women in STEM energy is strong with you, so I hope you'll join us again very soon, because this was-

Rose Schooler (38:28):

Would love it.

Caitlin Bergmann (38:28):

Such a great way to wrap up the year and talk about our favorite topics, that include working out on bikes. But I want to give a one more thank you again to our CEO, Elizabeth Bramson-Boudreau, who's here with us again, and to our sponsor, Intel, for not just one, but two great conversations for us, with Pat, and here with Rose on Clubhouse.

Caitlin Bergmann (38:50):

And I just want to let you know that if you're looking for more content with Intel, if you check out this link that I'm sharing right now in the room, wish granted. We encourage you to check out this new podcast that we have coming up. It's live this week, perhaps while you're wrapping those holiday gifts. Our business lab podcast is phenomenal. It's hosted by my dear friend, Laurel Ruma, who is our director of insights, which if you're not familiar, is the custom publishing division of MIT Technology Review. And I guess the best way I could explain it, it's a podcast to help business leaders make sense of new technologies coming into the lab and what it means into the marketplace. So, Intel, Sandra Rivera, and Nick McKeown are guests this week. So, Sandra's link is here for you if you want to click that directly, but you can give those episodes a listen wherever you get your podcasts. So-

Rose Schooler (39:39):

And Caitlin, if I may-

Caitlin Bergmann (39:42):

Yeah, of course.

Rose Schooler (39:42):

Nick is just absolutely brilliant. Former Stanford professor, inventor, startup guy. He's fantastic. And then, Sandra, you've got to listen to her. Brilliant. My sister from another mister. We've worked together for decades, and I just want to give a huge, go listen to that podcast. Two amazing people.

Elizabeth Bramson-Boudreau (40:10):

Yep. Yep, agree.

Caitlin Bergmann (40:12):

Clubhouse, you have your instructions, so do it. Do what Rose says. But for more from us at Tech Review, you can visit technologyreview.com. I'm Caitlin Bergmann. I'm the executive director of Integrated Marketing. So, happy holidays from all of us at MIT Technology Review. Thank you, Intel. Thank you, Rose. And to all a good night, good morning, a good afternoon, depending on what time zone you're joining us today. So, thanks, and goodbye, everybody.

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Elizabeth Bramson-Boudreau (40:37):

Thank you all. Thank you, Rose.

Rose Schooler (40:39):

Thank you everyone. Thank you, Caitlin. Thank you, Elizabeth.

Female (40:42):

[crosstalk 00:40:42].

Female (40:42):

Bye.