



For Cloud Professionals, part of the On Cloud Podcast

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Title: What's at the edge? The ability to solve real-world problems

Description: Although edge computing is growing, it lacks the maturity of cloud. That's changing. In this podcast, David Linthicum talks with Deloitte's Lisa Noon and Clarify360's Jo Peterson about how research organizations are bringing standards to the edge and how companies are building on that to apply edge computing to more and more real-world situations. The consensus? Edge is a wide-open space with lots of potential, and companies that leverage edge effectively will have a competitive advantage.

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Operator:

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David Linthicum:

Welcome back to the On Cloud podcast, your one place to find out how to make cloud computing work for your enterprise. This is an objective discussion with industry thought leaders who provide their own unique perspective around the pragmatic use of cloud-based technology. Today on the show, we are pleased to welcome Lisa Noon, my friend and colleague, and Jo Peterson to the show. Lisa Noon is a Managing Director here at Deloitte, and Jo Peterson is the VP of Cloud and Security Services at Clarify360. Lisa, Jo, welcome to the show.

Jo Peterson:

Thanks, Dave. Great to be here.

Lisa Noon:

Thank you, Dave.

David Linthicum:

I know Lisa's down in Florida. Where are you, Jo?

Jo Peterson:

I'm in Southern California.

David Linthicum:

Geez, you guys are always living in better places than I'm actually physically located. What the hell's going on? So, Jo, we've had Lisa on the podcast before, but, ultimately, what do you do for a living, and what do you do for fun?

Jo Peterson:

So—well, not much fun during COVID, but I'm glad we're all coming out of that, right. Time for more fun. But I spend my day working as the Vice President of Cloud and Security for Clarify, and we help clients with their cloud and security needs. I guess we tend to do a lot of work with private equity and their holdings, and so my day is never boring. It's always interesting and fun.

David Linthicum:

Yeah, you just don't hear about security these days that much, so I'm glad you're keeping it going.

Jo Peterson:

Ha-ha-ha-ha-ha. Right?

David Linthicum:

It's like everything I talk about. Anytime I get a call from a reporter, it's a security-related question, so it's like this is kind of what we need to figure out moving forward. So, Lisa, we've had you on the podcast before, but catch us up. What have you been doing lately?

Lisa Noon:

Sure, Dave. I'm a leader in the Google practice here, so I've been actually pretty super busy over the last year, the productivity gains from home are just kind of extraordinary, and COVID's kind of beefed up the work I'm doing. I've been doing a lot of work in healthcare with Google, with some really interesting things that maybe we'll talk about later in the podcast.

David Linthicum:

Yeah, I'm looking forward. Looking forward to the discussion too. It's an interesting set of topics, and let's get started. So, Jo, to you—what are the four distinct edge types that are out there today? What patterns are emerging, and what are the characteristics of those?

Jo Peterson:

So, there was a really interesting ForresterNow report that came out, and it was entitled, "The Four Edges of Edge Computing," and Forrester did a nice job of explaining the different types of edge and also talking about how there isn't a whole lot of division between them. And I thought that was kind of interesting. The Forrester report defines the edge as infrastructure and software that is physically separate from, but connected to, enterprise core IT assets and shared fiber or wireless networks. So, I thought that was a pretty fair explanation of things, but just like with the cloud, and, David, you know this, vendors tend to use different words to explain all things edge. So, as consultants, we get to translate vendor speak to clients. And I try not to think of edge as this strictly physical division of a network, but instead as broad categories of adjacent technologies that have things in common.

So, back to your question about the four edges. Forrester defines them as enterprise edge, operations edge, engagement edge, and provider edge. And as I think about it, I think about enterprise edge as more presence-based, so places like data centers, telco co-lo, towers that extend core networks. Operations edge, to me, is more device-based. So, I think about IOT networks, gateways. Here we're talking about process-ordination of some sort at a remote location, so think about a warehouse, storage facility, a retail store.

And then when I think about engagement edge, I think about how maybe a CDN [*content delivery network*] helps a gaming company get closer to the end user. So, to me, engagement edge is kind of like the 2.0 version of a CDN using geographically distributed hubs to connect customers to data faster. And then lastly, provider edge is where the telcos play. Telcos are using their networks to do network splicing, and offer 5G and, then layer technologies on top of that, into that splice. There's definitely this overlap, so a piece of code, for example, that can run on different edges, depending on the need, could be an overlap. Vendors also sell compute storage network and software that runs on many edges. That's what I think.

David Linthicum:

So, Lisa, out of these characteristics, which ones do you think are finding their way into some of the stuff you're working on more recently?

Lisa Noon:

Well, Dave I just—most of the work I've been doing is healthcare-related lately, so anything that pushes compute power outside of traditional provider networks and kind of assisted-care facilities is a huge plus for us. Edge is really empowering that migration. And, so, everything Jo just talked about. I mean, obviously very complex space technically, but it's a simple concept. It's just getting the compute power where we need it and being able to leverage it securely with the right ethical and privacy mechanisms in place, so yeah. I mean, I couldn't agree more on the need for it, and as Jo described, I mean, I think you've got a window in the complexity, so we've got an awful lot to do.

David Linthicum:

Yeah, we do, and I'll tell you what, it's the one question that I get a ton: tell me what edge computing is. And really, I can tell people what cloud computing is in about a paragraph and do so effectively, but edge computing I almost have to write a paper, just because the number of patterns that are out there. Yeah, that is edge. Yeah, that's edge too. You mean in the data center's edge? Yep. You know, starting to look with these micro-clouds, which is kind of a version of edge.

I guess it's the enterprise edge, and all these things that are out there and these emerging ways in which we're dealing with architecture. And architecture's changing. So, as I mentioned a bunch of times, Things are becoming more complex. They're going to become more complex, they're going to become more distributed as they become more effective and efficient with the utilization of technology, and that's kind of how edge computing emerged. But it is going to come up with different kinds of architectures that are out there that we have to learn how to define the patterns and we have to learn how to define the solutions, which is I think where the learning gap is right now, where we need to be versus where we are now. So, Jo, to you, how is edge cloud architecture taking shape, and what should be looking for important—what things should we find important right now?

Jo Peterson:

Yeah, well you make a really good point. There are patterns that are emerging, and I saw this interesting piece in Network World, and I think it's important to mention that edge computing is a broad architectural concept rather than a specific set of solutions. It's important to remember that. And it's also really easy to think of cloud and edge as centralized versus decentralized. But to your point about complexity, it isn't that easy, and it's not really how things are shaking out. So, from a purely business perspective, the hyperscalers have worked really hard at creating their businesses, and pardon the pun, but they're not going to let that revenue just float into the clouds. They're all working on their edge place.

I think that what customers are going to start to struggle with is management ease. So, they're going to look for a common horizontal unified platform, and that's I think where the hyperscalers can really win if they play their cards right, because customers want a consistent development and operational experience. But if you look at what an edge footprint looks like, it often looks really different than a cloud footprint, and therein lies some of the challenge that you mentioned. The edge is usually this small physical footprint in remote location and has limited connectivity. Traditional, full-featured OS's are often not a fit. So, if we think of infrastructure edge that sort of sits between your production cloud and the outermost edge of your environment, for example, you might be an oil company, and it could be an IOT sensor on an oil rig, for example. That infrastructure at the edge can process data, route traffic, or perform latency-sensitive tasks while sending the rest back to the cloud. So, in short, edge is doing very specialized workloads, and we are going to start to see that architecture continue to evolve to fit that need. Does that make sense?

David Linthicum:

Yeah, it does make sense. Lisa, I'd like your perspective because you come from a cloud architecture and building cloud solutions. We've been on the same team doing that in the past, and so how does the inclusion of edge kind of change that in how we consider how we're dealing with cloud architecture?

Lisa Noon:

Yeah, that's a great question, Dave. I was listening to Jo here, thinking about the use cases that I've seen in the last year, and the level of interest and the number of really interesting use cases has kind of exploded. But as I map those back to those architectural patterns, those four, those primary four, I don't see a strong fit from any of them. I guess, as you say, they'll continue to evolve and we'll end up with micro matter as we go, but with respect to things like COVID driving people out of hospital and into care homes, we do an awful lot of work with remote care recently. That—COVID combined with a severe doctor shortage and people just living longer and needing more care just continues to drive the level of care supported by smart devices further and further away from centralized facilities. You know, telemedicine itself, I mean, I think probably everybody on this call has had several experiences with telemedicine over the last year. I have myself.

That drive—that significant need to escalate the number of smart devices in homes so that doctors that are physically disconnected from patients can get alerts and monitor patients who are not co-located with them. We see examples in kind of critical care, in ambulances. Obviously, I think it's pretty obvious to all of us, the more you can do in an ambulance, the more data you can collect, the more kind of advanced medical devices you can leverage, the better the quality of care and the outcome for the patient at the site of the accident or in the hospital when they arrive. So, all these kinds of things are real life examples of kind of critical use cases for edge and, like I said, as I map them back to those simple—fairly simplistic design patterns, I don't see a strong fit.

David Linthicum:

Yeah, those are great points. And I think that one of the things that we're learning as we meld edge and cloud computing is that as things move out to the edge, that there has to be a symbiotic relationship between the two, and you said something very profound, Lisa, and I see the same. I just don't see really kind of cool emerging patterns that are consistent among various projects that are out there and how we're leveraging edge computing, because I do see a lot of the processing, a lot of the data storage to the point where we may have more data storage residing outside of centralized locations, on the platform of these edge-based systems, than we do have with the centralized systems. They have to be managed, they have to be secured, and there has to be a way to manage it from a centralized system, whether it's a hyperscaler or not. There has to be a way in which we can manage metadata, we can manage distributed data, we can manage the tiering systems within edge computing. Just a lot of that stuff doesn't seem to be taking shape as quick as it should be. Am I being too pessimistic, Jo?

Jo Peterson:

Well I think that we've all been doing this for a long time. I started working with cloud in 2009, and my guess is you guys were pretty right around that same time if not sooner. And it was Wild-West, right, and so the edge is sort of Wild-West right now. And I think what we're seeing is vertical-specific solutions come out. You know, Lisa mentioned some of the ones that are happening in the medical field, in healthcare, but they look super different from what's happening over in oil and gas. And eventually we'll get to a point where we see templates, but look how long it took us to see templates in cloud.

David Linthicum:

Yeah, that's true. I mean, we're still defining what cloud architecture is, and it's evolving fairly quickly. How we deal with data, how we deal with security, how we deal with governance. In many instances, we're just solidifying those things right now, and cloud's been quite a deal for ten years. That's a long time for technology to be out there as it's evolving, so I think edge is probably going to take a similar amount of time, if not more, just because it's more complex and there's so many different patterns there, more different patterns than you find within cloud. But to Lisa's point, it's absolutely an imperative we get the

technology right because of all the good it's going to be able to bring us moving forward. So, Jo, back to you. What are the business drivers of edge computing right now?

Jo Peterson:

Well, I went and looked this up because there's just like when you ask—when you Google what is cloud, you Google the same thing with edge, and you get 15 or 20 different answers. So, there's five drivers to the edge. Cost of bandwidth and centralized infrastructure, continuous operation if network access is interrupted, security and data protection related to a negative impact on operations and applications, determine the latency and distance limitations. And then compliance, I thought this last one was interesting. Compliance with sovereign entities and industrial regulations.

David Linthicum:

Yeah, data sovereignty's a huge issue right now.

Jo Peterson:

Yeah, so I thought that was kind of—I hadn't thought about that as it related to edge architecture.

David Linthicum:

Well, you think about it, I mean, it's—Lisa kind of brought up the reason for getting into it, kind of as a business, because it's able to do things in a much more better way in terms of a faster way, in terms of deliver things that are going to be lifesaving technology and business-saving technology. So, a proper application of edge computing could enhance the delivery service business for sure, but it's also able to enhance the ability for doctors and the medical profession to do a much more effective job because of the amount of information you're able to take off an edge-based system that's sitting in an ambulance, or the ability to save your life because the edge-based system is in your vehicle and it's able to detect things that could be going wrong you may not detect, even personal things that are occurring to you—higher blood pressure, frustration level, things that could be leading up to a heart attack.

All these sorts of things are possible now that we have this technology, and they couldn't occur in a centralized environment because it was just too bandwidth—and it's still going to be too bandwidth latency-y, so to speak, to send these requests to a centralized system and a cloud-based system and get a response back. And, so, we have to have these edge-based systems that are connected to a larger system to do some backend processing to do this processing. Am I off base, Jo?

Jo Peterson:

I think you're spot on, and I think it's—what's interesting to me is to see the emerging use cases, because they really are, to your point, David, they can be not only business differentiators, technology differentiators, but they can make a real impact on someone's life with Lisa's example of the ambulance. That just really makes a difference.

David Linthicum:

So, Lisa, I bet you have some business drivers as well around healthcare moving forward in terms of the business advantage of leveraging edge technology. And I guess in healthcare it would be multiple dimensions. It would be operational efficiency but also—and this is coming from a selfish perspective—the ability to save lives, diagnose issues, and solve problems.

Lisa Noon:

Absolutely, Dave. You know, the practical applications, I mean, Deloitte's been working pretty closely with Google on a few missions. That's one of the things I love about being at Deloitte is you can kind of marry your passion with your experience, accelerating the pace of discovery for the cures of untreatable diseases, and here we had COVID. You know, those kinds of missions here clearly driving the advances in clinical and biomedical research, driving edge. COVID driving edge. Patient centricity driving edge. I mean I hate to keep focused here on the healthcare profession, but I could probably list a thousand drivers for edge. It's wild, wild west, we all agree, but moving really quickly. And if we could just, I think, start to standardize and consolidate, maybe clean up, as you say, the meta model for edge, come up with common dialog, common patterns, we could all be a lot more efficient and a lot more effective and really leverage this technology to solve some real-world problems.

David Linthicum:

Yeah, I think if everybody would just listen to me and follow my advice, everything would be okay as far as I'm concerned. So, Jo, I wear a Fitbit. This thing knows how much I weigh, it knows about my heart rate, it knows when I sleep, how well I sleep. Should I be concerned about privacy issues with edge devices moving forward, and what kind of security standards and technology enablement are going to be in place to make sure that my data's not necessarily going to be given away?

Jo Peterson:

Okay, so first of all, my weight does not go into my Fitbit. I'm going to be really clear here. It's not happening. Maybe that's a female thing, David, I don't know that you're brave to put your weight in there.

David Linthicum:

Well, the scale does. I step on a scale that's connected to my Fitbit, so I have no control over it. I guess you can enter it in manually though. That's kind of cool.

Jo Peterson:

You can. You can. But you bring up a really good point. Look, here's the short answer. It's getting better. It's getting better because the public is forcing the issue. That's what I see. The public is much more aware of their personal data and personal security, thanks to everything that's shown up in the news more than they used to be, and so the folks that are producing wearables and anything—let's not just pick on the wearable guys—anything that's IOT-enabled are doing a better job of baking in security at the front end. That wasn't the case when products were released a few years back, if you were an early adopter, but it's getting better. And I think that's just public savvy that's happening. Are you going to get anything ubiquitous to happen? No, but it's driving in the right direction.

David Linthicum:

Yeah, I hope so because I think it's going to be a limitation of leveraging edge devices. I mean, Lisa just brought a great point. You know, even a better point, the ability for physicians to do diagnostics between long-term monitoring of attributes of someone's health—weight, blood pressure, respiration, all these sorts of things that can be monitored via a watch. Not necessarily a Fitbit, but we have watches around—or devices around that are able to do that. It can tell a lot. It can tell people that are leading up to a heart attack these are patterns, and we can look back at these big databases that show patterns and that lead to outcomes, and how likely you are to match up to that outcome based on the pattern.

And those sorts of things are going to be important, not necessarily because they're going to save lives, which is really important, but our ability to kind of take control of our own health, versus getting to the doctor every once in a while and having them do a diagnostic in an hour's time, where that's only an hour of your life, versus something that's monitoring ongoing. Well, edge computing has the capability of doing that because we have the power to gather information and process information that exists, and we're going to be able to take healthcare to the next level, not necessarily because medical science unto itself has evolved in a very aggressive way, but technology to enable medical science to do something that they haven't done in the past. I think that's the most exciting thing. So, Jo, I'm going to go to you, the last question. What breakthroughs are we going to see in edge, in cloud next year?

Jo Peterson:

I think we're going to see a couple. I've got four of them. This was a thinker question, so I think we're going to—let me just roll through the four. We're going to see an increased use of edge specifically by certain verticals with a focus on better customer engagement and targeting customer behavior. I think that we're going to see a continued investment in containers and serverless technologies. I think we're going to see more tech on demand, and I think we're going to see more and more happen within ecosystems. So, back to the first one if that's okay here. According to IDC, by 2023, over 50 percent of new enterprise and IT infrastructure deployed will be at the edge rather than in corporate data centers¹. And that's up from 10 percent today. So, by 2024, the number of apps that are sitting at the edge will increase 800 percent.

Those are crazy numbers. As it relates to the engagement aspect of things, I think we're really talking about low-hanging fruit. Looks what's happening on our smartphone. We're going to see the use of that data level go up, but in the next 12 months, we're going to hear more people talk about and see the use of the Internet of Behavior. And that's essentially using technology to track people's activities. Like you were mentioning, Dave, it's already happening on our wearables. But you're going to think about ways that marketers, they're going to be able to predict behaviors like payment methods, purchase decisions, item preferences. If your phone is owned by your employer, maybe things like adherences to codes of behavior. All that's going to come out of your smart device. And companies that will jump ahead of their competitors are going to take that data and make it actionable. So, imagine for a minute if you could help somebody improve their golf swing through the use of a wearable device and an app, for example. I know Lisa would be in favor of bettering her golf swing. I know she would. Of course.

Lisa Noon:

Got a fix for that?

Jo Peterson:

I have an awful golf swing, so I've got nothing. I've got nothing at all here. So, containers, we talked about that's going to go. Tech on demand, look, I think we're going to move—we're moving toward a time where we're focusing—where we're seeing more use of machine learning and AI, and the hyperscalers are—GCP's got auto ML, right. Azure's got machine learning experimental UI. That gives the ability for, instead of having a team of data scientists, you can sort of learn to actualize and use those tools to make better business decisions. And then the last one is ecosystem. Jay McBain, who's a favorite of mine, talks about ecosystem and the use of more and more companies jumping into that ecosystem frame and using all aspects of ecosystem. And I think it's kind of a brilliant vehicle, and we're seeing it more as it relates to cloud and edge because of specialization. So, those are my four. I bet Lisa's got some good ones, and you do too, David.

David Linthicum:

Lisa, what do you think?

¹ IDC FutureScape: Worldwide IT Industry 2020 Predictions, Doc # US45599219, Oct 2019.

Lisa Noon:

Well if I just look where—for those of us that are out there trying to implement these solutions, I kind of hope for some advancements where they seem to break down. I mean, I can just give you a couple of examples. In order to really expand the use of edge devices and really kind of blow them out in the market, they've just got to be more manageable. The metadata about—I'm kind of in the old school asset management camp at this point, Dave. So, Jo, maybe you have some ideas, but just knowing where these devices are. Just make them findable. It came up over and over with COVID with things like ventilators. Where are they? We can't find them. They were in this room, now they're in that room. How many do I have? Really, kind of simple use cases that are surprisingly difficult to implement. We've been working with a few vendors who shall be nameless under NDA that have some solutions there, so I would predict some advancement. But if you see anything along those lines, we could put it to use right away.

David Linthicum:

Yeah, I agree. I think the biggest problem to solve is going to be asset management because the ability for dealing with edge devices, if we have 10,000 devices out there, and that's—some people—and some companies do have that, how do you manage them in such a way where you're not necessarily going to update the firmware manually, you're able to do it remotely, and the ability to assess the device and figure out and diagnose issues so people don't have to go out and visit them. That's where the expense occurs. The other thing I think is going to be the ability to kind of get into tiering of edge devices, so it's not always going to be a centralized computer paired with an edge device. Sometimes it's going to be a centralized computer paired with a middle edge device which is paired with a remote edge device. It could be something as simple as a very small sensor IOT-based system moving forward.

And maybe there's some data processing that occurs at the sensor level, and the second tier is able to deal with more complex data processing, but therefore it is able to use that in a decentralized remote way where it's not sending everything back to the mother ship for processing and then a centralized processing together and cull through the information and the ability for these things to play and work all together.

And finally, you guys mentioned it, the ability to get to standards on how we do all this stuff, how we deal with security, how we deal with architecture, how we deal with asset management, all these sorts of things. Lots of things are out there and being proposed, but it's still the wild west in terms of how we do them. And, so, your ability to pick a solution is really going to be dependent on the bias of the person who's picking the solution, not necessarily what truly are the best practices out there because I think the best practices haven't emerged.

You guys are both in this group called Cloud Girls. Can you tell us more about that and how people can join or support you?

Lisa Noon:

Go ahead, Jo. Yeah, Jo invited me. I've been a proud member of Cloud Girls for a while. It's a great group of women out there trying to network and help each other expand the number of women in tech, which I think we've all been about for a number of years, but this group seems to be really making a difference. Jo, I really appreciate the invitation. You've been a member a lot longer than I have. You probably give a much, much better overview of the organization.

Jo Peterson:

Oh, thank you. You did a nice job, and it's so nice to have you with us. So, David, we started Cloud Girls back around 2009, and we were trying to just educate ourselves on cloud. And since then, we morphed into this group that does a lot of work philanthropically-beyond education, and then we do a lot of mentoring of younger women that are coming into the cloud. And, so, we're unfortunately a closed group, but—so we're not necessarily looking for more members, but we do support a number of philanthropic organizations, and so if someone is interested, please hit me up on LinkedIn and love to tell you a little bit more. And thank you for allowing us to share that, David.

David Linthicum:

No, it's my pleasure. I think it's a great organization, and you guys have been in it for a long time, and it's great to find places where you can network and figure out your way through this career. So, always happy to promote that.

So, if you enjoyed this podcast, make sure to like and subscribe on iTunes or wherever you get your podcasts, and don't forget to rate us. Also check out our past podcasts including the On Cloud podcast hosted by my good friend, Mike Kavis, and his show "Architecting the Cloud." If you'd like to learn more about Deloitte's cloud capabilities, check out deloittecloudpodcast.com. If you'd like to contact me directly, you can reach me at dlinthicum@deloitte.com. So, until next time, best of luck with your cloud projects. We'll talk again real soon. You guys take good care and be safe. Bye-bye.

Operator:

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