



For Cloud Professionals, part of the On Cloud Podcast

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Title: Ready for cloud's future? It might be a quantum leap.

Description: What's the future of cloud? No one really knows, but it's the job of futurists to try to predict it. In this podcast, David Linthicum talks with Deloitte's Chief Futurist, Mike Bechtel, about where cloud may be headed. Mike's take is that, over the next five to ten years, decentralized cloud and quantum computing will make a huge impact on cloud and how companies use cloud as a force multiplier for innovation. The catch? Companies must be bold and take calculated risks to get there.

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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 joined by Mike Bechtel, and he's Chief Futurist for Deloitte Consulting LLP. I'm going to love to figure out what that is. Mike helps clients develop strategies

to thrive in the face of discontinuity and disruption. His novel and experimental technologies team, NEXT, N-E-X-T—I guess the X is silent—approach futurism as a practical and strategic discipline, helping leaders harness tailwinds, avoid headwinds, and arrive at their preferred tomorrow slightly ahead of schedule.

Okay, that was tough to read, but I'll tell you. It sounded very impressive. So, tell me about what does a futurist at Deloitte do? I know what a futurist is; I'd just love to hear what you do at Deloitte. And tell us more about your NEXT team. I'd love to hear about that, and especially if I can reach in and leverage it for a resource at some point in time.

Mike Bechtel:

Yeah. Well, thanks, Dave, and I acknowledge fully that, whenever you say futurist or futurism, you neatly divide your audience into the lean-in crowd, like, "Wow, that's cool," and then the lean-out crowd saying, "What's this guy all about?" But in short, we're in the business of helping our clients understand where the puck is headed. For 12 years, Deloitte has had a strong run with a publication I co-edit called, "Tech Trends," which chronicles what's new at organizations you've heard of, with crunchy case studies driving the narrative. Increasingly, we're finding that clients, they need newer than new. They're hungry to get a sense of what's next.

And, so, as ethereal as the work sounds, it's actually pretty straightforward. We maintain an inventory of a couple hundred new-to-us technologies that we hear about each year, we shake them down, we make heads or tails out of which ones look to have legs, which ones look like more hype than hope. And then importantly, we follow their trajectory to make heads or tails out of when it's time to act. There's this great quote I saw a couple weeks ago: "When you're dealing with exponentials, the best time to act is when it feels too early." And, so, what we're finding is a lot of our clients say, hey whether it's quantum or decentralized or ambient or any of these other not-ready-for-primetime terms, it's a good idea to get cooking just a little bit so that when they take off, they're not hopelessly behind.

David Linthicum:

Yeah, back in my role when I was CTO of different companies, things like that, you had to play a role of a futurist, but it wasn't, I think, to the extent and deep thinking that you guys are moving, moving into that direction, because, ultimately, you've got to predict where the market's going. You've got to predict what technology solutions are going to be attractive in the market and how to basically create technology out of these trends, and at the end of the day make some bets. The thing I used to tell my investors and my leaders and people who worked for me was, that if it's out there, it's too late. We have to think about what's next, because if we're able to invest in where the technology is going versus where it's heading currently, then we're going to be the first mover. But of course, the discipline, I guess is the way to put it, that people typically didn't like to move in directions that weren't proven in other markets. But if you do that, you're kind of missing the idea of being an innovative and creative resource. Is that kind of what you guys are looking at right now?

Mike Bechtel:

For sure. I mean, to apply best practices is a means of keeping up or at most leapfrogging for a little while, right? You get a momentary advantage if you play your cards right. But the most overused and potentially cheesiest quote in my line of work is, "The electric light didn't come from the continuous improvement of candles." And what you begin to recognize is, okay, if we want to get a quantum leap, not quantum computing; that's different. But the old idiom, you want to get a quantum leap, yeah, you've got to go against the grain. You've got to be a little bit bold. But you do it in a way that's risk managed. I mean, you said the word prediction earlier, Dave, and what we've learned as we've worked to continue to improve our craft here is that we'd prefer the word projection, because what you tend to find is the mark of a charlatan in futures work is they talk about a single future that will happen the whole Babe Ruth calling their shot thing. That quickly devolves into a game of gotcha.

So, what we like to say is, "We don't predict, we project." You say, "Hey, like a flashlight beam, here's a whole range of plausible futures, plausible outcomes. Let's work together to figure out the ones that look compelling, right?" Call those preferable. And then we back-cast, which sounds like voodoo, right? But back-cast is just the opposite of forecasting. You say, "Okay, you want to get emotionally intelligent AI in your call center so that you can handle tier one inbound calls? Great. Well, let's move backwards along the tech tree to see what needs to happen. Pretty soon you say, "Okay, well, I'm definitely going to need that data lake and I might want to move it up to a cloud data provider," because both of those moves are going to be table stakes for that emotional AI future.

So, in short it's figure out where you'd like to be, and then work backwards to figure out the no-regrets bets you make today to get there.

David Linthicum:

Yeah, I think that's wise words. And moving forward in my career, I used to think of something as something that's going to be a viable solution based on the patterns we're seeing in the market. Back in the '90s I was a development leader at a large oil company. I saw the fact that we were spending all our time in coding interfaces between source and target systems to the point of 60, 70 percent of the budget was basically doing that, and creating this spaghetti code in between these various things and various platforms.

Mike Bechtel:

[Laughter] Sure.

David Linthicum:

And, so, you're thinking, "What if there's a discipline or an approach in the way to do it enterprise application integration, and then what if there's technology to back up those approaches?" And this one worked out, so we created EAI, I wrote the book, left the oil company, became CTO of different technology companies, and moved in this direction created a many billion-dollar industry, things like that—not just me. The organization, the tech team—people lined up behind it. I find there's no people who invent things.

In other words, maybe I invented the TLA, but I didn't invent the technology behind it. Smart people lined up behind me to figure things out and get to the tactics of it and actually how to make it work. But doing something like that is tough to do, because you have to not only have faith that you're moving in the right direction based on the patterns that you're seeing, but you have to put the prework, in this case writing a book that maybe no one may be buying if this particular technology stack doesn't come up. And, by the way, you end up doing that many times in your career. Most of the time it doesn't work out,

or it doesn't work out as best it should. Sometimes this is knocked out of the park. It's ultimately having the courage to go out there and be innovative and creative, in other words creating net new concepts and technology where they don't currently exist. Does that kind of resonate with you?

Mike Bechtel:

Oh, yeah. I mean Dave, I worked as a venture capitalist for eight years before joining Deloitte.

David Linthicum:

The way futures monetize their knowledge, venture capitalists, because that's what it is, isn't it? It's basically placing bets and taking risks and—

Mike Bechtel:

Well, that's it. That's it. It's walking the talk and having the stomach to line up behind your projection. And I'll tell you, some of the patterns that we picked up on—one, you spoke to it, I think really well, when you talked about inventors. One of the things I learned in VC was that entrepreneurs, yeah, they're looking to bring something innovative to market, new and improved, like a laundry detergent jingle: "New *and* improved!" But the standard for novelty, it doesn't need to be as high as I think a lot of the lab-coat crowd thinks, right? More often than not, the real money, the real opportunities, the real business impacts happen when you have a new assembly of known winners, right?

And, so, to your point, your work stood on the shoulder of a lot of giants. And it's not that their work didn't matter; it's just that you as an entrepreneur saw that you could assemble a bunch of their great insights and turn it into something that moved somebody's needle.

David Linthicum:

Yeah, ultimately it's the ability to use other people's ideas in creative ways and build new ideas on top of those. I think we do stand on the shoulders of giants. If you move into technology, you realize very quickly that if you go this alone, you don't depend on other people's research, knowledge, innovations, things like that, it rarely works out, especially at the speed that everybody's moving.

So, let's get into the topics. I'd like to talk to you about decentralized cloud, and it's interesting. When we put in the show notes, you put decentralized cloud, "None of us is as trustworthy as all of us." And, so, I kind of had visions of peer-to-peer security validation, blockchain, things like that. But how is this different than grid computing? Here we go again with the decentralized cloud things. We've been talking about that since kind of cloud came around, and other massively parallel systems of the past the ability to have tight-coupling or processes. I remember when there was a stack of 100 servers all running Windows NT that was massively distributed, say, back in the early '90s. So, where are we now in terms of distributed cloud?

Mike Bechtel:

Yeah, so I'll tell you, the quote that you opened with that I hit you with, "None of us is as trustworthy as all of us," that's a riff on an old Japanese proverb that used to say—well, I suppose still does, too, that none of us is as smart as all of us. And I would see that proverb battered around 2005, 2006 when crowdsourcing started to take off, this idea that, like, hey, you don't need a Siskel and Ebert, or a traditional movie reviewer, when you can get 6,000 people to participate on a movie review aggregator, like a Metacritic or a Rotten Tomatoes, et cetera.

Well, when blockchain dropped circa 2013, it had such an image problem, right? First of all, it was conflated with bitcoin, which was in turn conflated with malevolent actors on the dark web seeking dangerous products illegally, and the whole thing just felt like a fraught mess. Well, what we've seen through the long lens, Dave, is as cryptocurrency separates from the platform, from the stack that is blockchain, and then blockchain further separates from the parent concept of distributed ledger tech, or DLT, we're starting to recognize that there's a heck of a lot more to this than just digital gold. And this isn't going to—rest assured, faithful audience—this is not going to be the part where I start yakking about NFTs and digital videogame cards and all the rest of it.

Rather, it's the recognition that things like storage, right, hard disk, DNS, compute—that these assets can be tokenized, priced, and exchanged through a DLT network in the same way that you can move bitcoin or trading cards around today. We're projecting that three years, five years, ten years from now, rather than going to a single counterparty, a single cloud-hosting provider, you could say, "Well, maybe none of them are as trustworthy as all of us. I'll stripe my enterprise data among 600 hard drives in cryptographically secure bytes." And, some of those people might be enterprise server rooms with a little extra storage, make a couple bucks. Some of them might be some teenager in Iowa who's got a detached hard drive and he's looking to make a couple bucks himself. It seems crazy, but the future usually does.

David Linthicum:

Yeah, and I think we've been kind of discussing that for a long period of time. And the thing is, if you think about it, one of the reasons, which is the main reason that I moved into cloud computing years ago, is the fact of the matter is, we can utilize resources more evenly and more efficiently across organizations that need to consume them. And, so, the idea is that if I needed a hard—or I needed a server—I went into a datacenter and I bought a certain amount of time within the datacenter, and I bought my own hardware and software and bolted it into the wall. And then for the first ten years of its life, it was at three percent utilization.

Well, cloud computing provides a centralization of those things where you can leverage resources and allocate resources, the same physical resources such as a server, among many tenants that are looking for these things. But I guess it is the next step. The fact of the matter is that we can use these things in peer-to-peer relationships. We're able to find the resources we need and do so in a secure way and, therefore, avoid building datacenters and buying more hardware and software that eat up a lot of power and warm the planet, and all these things we can just not necessarily move in ways that are going to be less optimized, but into ways it's going to be less efficient, less costly, and therefore provide a core advantage to the businesses who leverage them. If I'm going to leverage the same compute resources and storage resources at a fraction of the cost that I do now moving into this model, I'm going to leverage that. Am I wrong somehow?

Mike Bechtel:

No. Dave, I mean, I think you hit nail on the head. As a suburban—happily married, suburban father of three, I think of my—I call this the power washer problem, right, where there are times, roughly twice a year, where I think to myself, "Man, I could really use a power washer." But I don't want to pay for a power washer, and more to the point, I don't want that thing taking up space in my garage. And, so, the real answer is not to buy one, B, not necessarily to rent one, but rather, C, let's see if anybody in my neighborhood has one I can borrow. Now the problem with borrowing, of course, is there's depreciation

and somebody's going to lose the nozzle and all the rest. Where I think DLT, or this blockchain tech comes in handy, and where it changes the game a little from the old peer-to-peer story, is we now have the pricing and value system baked in, where my fair use of my neighbor's power washer is charged at a market rate appropriately, et cetera. And, so, if you apply that metaphor then to hard disk, compute, et cetera, yeah, it's P2P, yeah, it's grid, but the economics are baked in in a way that makes it fair for everybody.

David Linthicum:

Yeah. If you would've told me that Airbnb would've been as popular as it is right now, or even the car-rental services where you rent people's private cars, which are going like gangbusters, I would've told you, "The market will never really kind of accept that." And this sharing culture is truly bleeding into our culture, and so there's no reason why it can't get into how we deal with computer systems and really doing things much more effectively and efficiently. It may be scary at first, and most new innovations are and most things that are worthwhile are, but moving in this direction is going to benefit everybody. And I think this is something we have to kind of keep in the back of our mind and be a little bit more open-minded as we move forward to kind of the next generation in the cloud.

So, industry clouds—this was part of "Tech Trends," Deloitte's, and I saw this as well. This is something that we've been talking about since cloud computing first started. And there was the idea, if you remember the initial NIST definition of cloud computing, we had the concept of community cloud. That's kind of fallen away, but you still have these organizations that are able to create these specialized cloud services where the processes, the way they do storage, the metadata that's stored within the databases are purpose-built for a particular industry.

And I always thought that that was a good idea, because everybody's reinventing the wheel in creating these industry-based applications, and they're leveraging some what I call OPC, other people's code, and other people's metadata, things like that. But for the purposes—if you have these core things where it's able to do these specialized things around particular industries, you have some real advantages. We see some growth in this area, certainly the HIPAA in healthcare and some of the credit card processing system on the retail side, things like that. But as far as deep process, the ability to understand and deploy and share business best practices that other people have created, that'll be a huge advantage, especially for the small upstarts. What do you think?

Mike Bechtel:

I couldn't agree more with the framing around the advantage to the upstarts. There's this trope—and I'm sure you've lived it and you've been part of the creation of this movement, Dave, where, "You know, in my day, a startup would need a \$20 million server center just to get moving, and now it's an API call." Well, sure, infrastructure as a service, thanks to the cloud, is a gamechanger, because it lowers the friction that it takes to get from zero to one. Great. Well, over the last couple years as we've seen the abstraction of virtualization move up the stack, right, from infrastructure to platform to OS and containers and et cetera, it's still largely been in the sphere of a CIO or CTO's influence of control, right? Like, "Hey, I got this thing out of my basement and into somebody else's basement. Now I'm going to get more of this code out of my joint, into somebody's else's."

What we're seeing and projecting with this industry cloud notion is we're at the point of abstraction where it's different strokes for different folks, namely the affordances that like a healthcare player would need around data privacy, right, and transaction integrity, are different than, say, what a media and entertainment company would need, where it's all uptime and analytics, baby. And, so, the thought is it's no longer enough to move up to the cloud. Now there's this incentive to pick the "right digital neighborhood." And, so, do I want to move in, it's not even about which hyperscaler do I lie with. It's which set of APIs are going to speed up my life once I move there.

I had a great discussion with our friend Mike Kavis that I know you talk to, on a show a couple shows ago. He said, "Listen"—he's had two year-long pieces of work that have been abstracted and put together as an API call on AWS. And what used to be a herculean, roll-your-own effort is now just a function call away. And, so, the question that we see before a lot of our clients, Dave, is, "Okay, so you're telling me there's a whole mess of stuff that I can use—as you said, other people's code—for. Which stuff do I dare do that with?" And what we're seeing is that it's a matter of choosing what's core to your business and what's context, because for those areas where you win, you probably want to keep that differentiated and to yourself, right? Trade secrets, like Kentucky Fried Chicken, those 11 herbs and spices—super secret *[laughter]*. But for those areas that are just cost of doing business, best practices is sufficient, better, faster, cheaper, stronger, by all means there's probably an industry cloud neighborhood that would be happy to provide you those as a utility payment and get that out of your hair forever.

David Linthicum:

Yeah, there was a service that I started to track maybe around 2003 timeframe called the programmable web, and—yeah, and ultimately they had thousands of API calls. I knew the founder and we used to collaborate on a bunch of things and getting into service-oriented architecture and kind of the rise of cloud computing and the on-demand stuff on the early 2000s. That was really kind of cool and certainly well ahead of its time –

Mike Bechtel:

So, cool.

David Linthicum:

Your ability to get at industry-particular functions, not just code, because we're not dealing with code typically. It's going to be behavior and abstracting that behavior into different applications and different technologies. The pushback at the time was, and probably some of the technology limitations, was bandwidth and also IP and the concerns about security, all those sorts of things. But the applications that I did see pop up around healthcare and retail and manufacturing, leveraging some of those APIs, whether it's doing logistics planning around weather patterns—in other words, if it's going to be a bad part of weather in the Midwest, you understand that the shipments and the trucks are going to be a bit delayed and how that kind of fits into your larger supply chain, really getting into sophisticated stuff which was industry specific, and doing so with somebody else's servers.

And by the way, in many instances they would just let you use the servers; in some instances, you had to pay a fee. It was really kind of ahead of its time. And we're still focused on that today, but largely we're seeing these API systems leveraged in a walled garden. They're not necessarily reaching out and touching any number of these various processes. Do you think that's going to change?

Mike Bechtel:

Well, I do. Through the long lens—and again another trope in my line of work is that we futurist types are closet historians. And two ways to study history: one is to read a book and the other one is to live it. I'm equal parts geek and geezer at this point, so I've lived through some of it. And I remember in 1999, HP had an initiative called E-speak, which was in some ways a precursor to the programmable web stuff you just talked about, Dave, where "Imagine a world where every answer you ever needed to every question you ever have is but a function call away on the information superhighway."

Well, as we saw consolidation, right, as we saw sort of the disappearance of middleware vendors and then the reappearance of middleware vendors, where it's headed today and where we think it's projected tomorrow is that opensource software, new look middleware players, and this API economy are creating this sort of table-stakes thing where any software worth its salt has to play nicely with others. And the cloud is the big story behind it, right, because if this is the terra firm, the lingua franca, the place where everybody connects, then for sure things that used to be industry-specific sauce become other people's code. And things that used to be individual companies' secret sauce, if they can find a way to monetize it, will become other people's code. It's really just, as we see it, a matter of a lot of these function calls getting ever more atomic, breaking down, and critically a discoverable library where you can find, like where is the Google Search or the Alta Vista for all these available APIs? I think that's the missing component right now.

David Linthicum:

Yeah, and I think that's coming. It's been around conceptually for a long period of time—programmable web the latest instance of it. But these directory services are going to have to monetize themselves some way and find the ability to have a searchable term, and also the ability to be accepted by developers in the organizations that are actually going to leverage outside things that they didn't make, which is a bit of a cultural change. People have a not-invented-here attitude when it comes to lots of these things, and ultimately we're just getting into areas that are so complex and so deep in value that we can't have a not-invented-here attitude. We have to leverage other people's technology to make it work.

So, finally, quantum cloud and, ultimately—and I get a lot of people who want to talk about this. But I find out a couple of things—quantum computing and the quantum cloud is something that people think they know but they don't know. So, in other words, when you get there—and you don't want to ask them how to define it, so you really kind of start out having to explain it and why it's different than traditional computing. Can you explain what quantum cloud is and where we're going in those areas right now and where it's going to be applicable and pragmatic?

Mike Bechtel:

I tell you, Dave, having trafficked in all things newfangled for 25 years, it doesn't get any stickier to explain and describe than quantum. I just read an article this morning from Scott Aaronson titled, "What Makes Quantum Computing So, Hard to Explain?" And the short version is everybody who tries to popularize this concept makes this early left turn at Albuquerque where they start using these ham-handed metaphors about Schrödinger's Cat, and it's alive and it's dead, and zeros and ones, and the eyes glaze over, and it all feels hopeless.

What I would tell you, rather than trying and failing to explain quantum mechanics—Richard Feynman, the Nobel Prize winner, said, "Even physicists barely understand quantum mechanics." What I would tell you is there are a small but important set of problems that lend themselves to a completely different kind of problem solving, specifically that lend themselves to being solved through physical approaches rather than mathematics. You and I, right, Muggles, not Wizards, we Muggles simply need to know the classes of problems that quantum lends itself to are typically optimization problems and modeling and simulation problems. Anytime you've got to choose between a hundred or a thousand or a gajillion potential ways of doing something, aka an optimization problem, that smells like a quantum problem or a quantum opportunity.

Here's the rub. These machines are gonzo expensive, crazy error-prone, and there's only about 30 of them on the planet, or maybe 300. It's growing, but it's still tiny. And, so, here's the cloud bit. Quantum cloud is interesting because ain't nobody going to have their own quantum computers in their own basements going forward, right? The cloud revolution notwithstanding, we don't want these room-sized, herculean like 1947 ENIAC room-sized jobs in our own buildings. And, so, recognizing that just getting cloud native is table stakes to connect to these likely remote cloud-based quantum machines, that's going to be where it's at. Because when you've got to solve, say, the traveling salesman problem or a chemical chemistry modeling problem or any route-planning optimization, A, that's going to be on somebody else's premises, and B, they're not likely going to want to open up an EDI channel to your local on-prem server. They're going to presume that you're cloud native.

So, the story is really less, ooh, quantum computing is coming. You can hear that anywhere. It's rather, hip to the future of quantum? Well, better get your house in order in the cloud today, because that's how you're going to interface with it.

David Linthicum:

Yeah, I couldn't agree more, and I think ultimately if, we just talked about the power of APIs, your ability to abstract very powerful things behind these APIs, and that's the way quantum computing is going to sell. And your ability to kind of bring these things into practical, realistic applications where people can see the value of it right away—we get into these things that are kind of very scientific in nature, and certainly quantum computing and quantum physics and all these sorts of things kind of lead us to believe that PhDs are the ones who are going to have to create these applications. That can never be the case. The people who create these applications are the innovative and creative types who know how to leverage computing and leverage it as a force multiplier for different businesses.

So, where do you go to find your knowledge, your futurist knowledge on the web, and do you have anything out there that the readers should read?

Mike Bechtel:

Yeah, thanks, Dave, for the opportunity to sing off our own song sheet. We're a young team and we're growing, and a lot of our work shows up in publications today. So, we were fortunate to partner with the "World Economic Forum Building a Technology Futures 2021 Report" just two months back. You can find that at either Deloitte.com or at the World Economic Forum's website. But what's fun in there is it's a real tour of what's now, what's new, what's next, not through a dark mirror media lens, right? There's this old trope in Hollywood and in journalism, "If it bleeds, it leads," and that's why we see so many negative views of the future, right, malevolent robots coming to get us. Nor is this a Pollyanna future. It's a set of plausible projects around the future of education, work, locality, et cetera. And a neat thing in there is we actually added in some fiction stories as a way to not just think about what this all means but feel it. Like, what does this mean for our kids as they're trying to lead and navigate in the year 2030-something?

Another thing you could check out—we've recently published a, "Future of AI Report," that tries to wrestle with this recognition that AI is not new, right? People have been yakking about AI since 1955. AI is whatever computers can't do yet, and it only ever will be whatever computers can't do yet. So, in 1995, that was chess. In 2017, it was the Asian game of Go. But soon it'll be emotion, right, charisma, creativity, spirituality—you name it. And we'll doubt it on the way there, and then we'll brush it off as no big deal on the way out. But I'd start with those two. Else find us at Deloitte.com.

David Linthicum:

Yeah, check them out. I mean, they do some great work in terms of understanding where things are going, and the thing is, that's all about being a technologist and leveraging technology correctly. It's not only understanding where things are currently but where things will likely move, because at the end of the day, you have to make investments in the future. We're building something that's going to be a mechanism that takes us into the future, and Mike's on top of that and you guys should make sure you follow his work. Check him out, and love to have him back on the podcast at some time. So, if you enjoyed this podcast, make sure to like and subscribe on iTunes or wherever you get your podcasts. Also don't forget to rate us. Also check out our past episodes including the On Cloud Podcast hosted by my good friend and his book by the same name, Architecting the Cloud. That's Mike Kavis. If you'd like to learn more about Deloitte's cloud capabilities, check out DeloitteCloudPodcast.com, all one word. If you'd like to contact me directly you can reach me at DLinthicum@Deloitte.com, L-I-N-T-H-I-C-U-M is how you spell my last name. So, until next time, best of luck with your cloud projects. We'll talk again real soon and you guys stay real safe. Take care.

Operator:

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