

TECHTalks | EPISODE 10 | Ubiquitous Cloud Computing*With [David Linthicum](#), former US Chief Cloud Strategy Officer, Deloitte Consulting LLP*

Raquel Buscaino: Welcome to Deloitte TECHTalks. I'm your host, Rachel Buscaino and I lead the Deloitte US Novel and exponential technologies team where we sense and make sense of emerging tech. On today's episode, we're going to dive into the exciting world of ubiquitous cloud computing. We'll discuss cloud brokering, why the cloud sector is ripe for business model disruption and how ubiquitous cloud computing might impact consumers and customers alike.

I have the pleasure of welcoming Dave Linthicum, former US Chief Cloud Strategy Officer at Deloitte Consulting LLP to the podcast to help us explore what the future of cloud entails.

Dave, welcome to the podcast, it's really so great to have you.

David Linthicum: It's great to be here. This is exciting.

Raquel Buscaino: So Dave, as a leader in the space, where do you see the future of cloud heading?

David Linthicum: I think it's going to be around heterogeneity and differences in platforms. So, companies kind of centralized on cloud computing, public cloud computing specifically, as the way of doing computing. Now it seems like lately, it's the ability to move processes out to different heterogeneous environments, edge computing, mobile computing, even traditional computing, legacy systems, things that are on our desktops, you know all these different kinds of platforms that we're finally taking advantage of, and the core driver there is the ability to manage those environments and the ability to broker these resources.

So, within cloud computing, we've had this notion of cloud brokering for a long time, ever since we had more than one cloud around, we're able to allocate and leverage resources and do so through a brokering arrangement. So it's in other words: "I need compute. I need storage. Okay, broker! Where do I find that?"

And instead of just brokering cloud services - by the cloud providers typically - we are brokering all kinds of services, you know, things that exist in our mobile computing, things that exist in our mainframe, data center, managed service providers, co-location providers, anywhere we can process stuff that we can connect to via a network that'll provide us with the least cost and the most optimized way to do it. And, by the way, the greenest way to do it, the ability to use the least amount of resource and least amount of power to get at the storage and compute that we need.

Raquel Buscaino: So David it sounds like, instead of just having a single source for your cloud computing, it's a multitude of sources, and it's almost like a marketplace of matching supply and demand if that's a good way to say it.

David Linthicum: Yeah, it's going to be the future of computing. Look at it, you wearing your wristwatch: that can be a brokered resource. You are operating a desktop system: that can be a brokered resource.

So the idea here is that where companies used to try to move to a single platform, become very homogeneous, move to a single cloud provider, that doesn't seem to be the most optimized way to do it. And so people are deploying AI, they're deploying, you know, different heavy duty storage and process intensive applications. And what cloud brokering is about is moving those applications on

platforms where they're going to be most optimized. In some cases, that may be a public cloud provider. Other cases that may be a mobile cloud provider that's closest to the point of data origin, and other cases is going to be edge based computing. So the idea is that we're opening up, within cloud computing, the concept or the fact that it doesn't matter where a platform exists: if accessible, we can broker it, we can manage and monitor it, we can deal with the complexity of it, we can really get to the point where we're finding the best lease cost, greenest routing capabilities, or platform capabilities for whatever we need to do.

So that seems to be a journey that we're on right now. It'll be interesting to see where everything heads.

Raquel Buscaino: Yeah, and you said that this has been in the works for quite some time, but what makes now a good time for cloud brokering to take place and what are those driving forces that maybe weren't present in past years?

David Linthicum: Oh, that's a great question. It's really kind of the connectivity has come about. So in the olden days, you know, we used ISDN (Integrated Services Digital Network), and you know, even dial-up computing and slow broadband things, we couldn't reach all systems, and so the rise of cloud, you know, kind of made it to that we could have broadband connectivity with a single public cloud provider.

Now we have broadband everywhere, 5G, ubiquitous Wi-Fi, networking, so we can reach all these platforms at any time for any reason. And, by the way, they're fairly reliable, we're able to manage them as platforms, and we're able to abstract or aggregate these platforms, so they basically look like a single pile of compute systems, a single pile of data storage systems, any number of ways to do it.

So what shifted was, we've always had this brokering technology around, and the idea that we could leverage highly distributed computing - distributed computing is an old concept around since the 70's - but didn't have the network bandwidth to make it happen. So that was a primary drawback of moving. Now we have the bandwidth. Now we have the ubiquitous networking that goes along which allows and enables ubiquitous computing.

Raquel Buscaino: Sounds like it's not just the visibility into what resources you have available, but actually being able to utilize them too.

David Linthicum: Yeah, that's it in a nutshell. In other words, it's not as much to see the resource but I need the profile of the resource. I need to be able to access and leverage the resource either as a storage system, a compute system, or perhaps a GPU (Graphics Processing Unit), TPU (Tensor Processing Unit) to support AI-based systems. And by the way, it's able to secure access to the resource, so I can have utilization of those resources without compromising security.

Obviously, people are going to be a little concerned, if I'm distributing their data everywhere and distributing the processing everywhere. "What about my proprietary data? What about regulations and security issues?" The rally is this brokering management systems can layer those things. If you think about it? It's leveraging very distributed, very complex, very heterogeneous assets, but doing so through a single infrastructure that's able to leverage abstraction to make accessing those resources extremely easy.

So, for instance, if I'm a developer, I'm just seeing storage, and I'm seeing storage configured in any number of ways that I want to. I can see one virtual object storage system that may be spread across

different physical devices that are maybe all over the world in some cases, if that is the most optimized way to do it, and those resources are the best and the greenest way to make that happen.

So the idea is that it's not just providing access to very complex and heterogeneous systems, if you did that without management, it wouldn't help, it would make things worse, because people would have to, figure out how to code the various systems and native on these different providers.

But the ability to have these brokering and management resources and leveraging these backend systems that allows us to allocate, monitor, gain access to the most effective and efficient resources, but also leverage those resources in any number of ways so we can see massive amounts of physical computing systems that could be abstracted into a single computing system instance. So it looks like one virtual machine that we're dealing with, which may be mapped to dozens of different processors sitting in different locations.

Same thing with storage, and by the way, now that we're in the world of Generative AI, same thing with GPUs and CPUs (Compute Processing Units) and LLMs (Large Language Models) and all these things that can be scattered across these various systems. Remember, in moving into Generative AI, you are moving into very resource intensive storage systems, data is going to be needed in a high degree, massive amounts of processing needed. And if you're going at it with just a single source of resources, there's no optimization that's occurring. This provides optimization to scale to those resource needs, without necessarily hindering your ability to become more optimized and efficient. And, you know, don't warm up the planet while you're doing it. And, by the way, don't spend a lot of money while you're doing it.

Raquel Buscaino: Yeah. And so it sounds like when you say that, that green element, that sustainability side of everything, if we can more effectively manage our resources, how could that not be better off for the planet, for our environment and this fight against climate change?

David Linthicum: The idea of cloud computing was to be more green as well as more efficient. And of course, efficiency comes along with being green. Great thing about sustainability and money savings is they're bound, they're tightly coupled.

So the more money and resources we're able to save, the greener that we're able to leverage these resources. And this is just basically taking it to the next level, because what we're saying is not only are the cloud computing resources going to be in bounds for us to allocate these resources in very optimized and efficient ways to be more green. But all resources, ubiquity of computing, the ability to have anything that stores a process, or anything that stores data to a logical limit, obviously, you can take it to a ridiculous level, but the ability to abstract and leverage those things as we need them, so we're, in essence not wasting resources, we're not running systems that are only at [3% utilization](#) which we're doing right now in data centers. In essence, we're leveraging resources we already paid for, they're already burning Watts. They are already providing a certain amount of CO2 emissions, but doing so in a more optimized way. And so that really would be the ultimate in sustainability, resource utilization and the ability to get more economy and more value that can be returned to the business through the use of this technology.

Raquel Buscaino: And you mentioned for the businesses, what about for consumers? Could I, as an end-user, as a customer, right, do I have agency to potentially receive some value from the processing power that might be left over on my devices, on my smartwatch, is that a future we see?

David Linthicum: I hope so. So companies, you know, they buy millions of dollars of processors and storage every year. The ability to leverage whatever you need and the thing is, if we're owners of those systems, we're able to configure them to be leveraged through these environments. And so it is an opt-in thing. Most of them are going to be known environments, we know where they are, and what they do, things like that, we could have a future world where people are able to rent out their processing, basically by making it available to a broker that's able to in essence resell the system to someone who don't know. And it becomes kind of a resource that's shareable, very much like a car share service and there's a certain amount of value that comes from that as well as long as you can't turn that into some sort of a malicious threat.

But most of this, I think initially, is going to be people who opt in. It's going to be more traditional computers that we have sitting around a data center, even sitting around our homes.

Raquel Buscaino: It sounds like cloud brokering is at its core a business model shift, and that for all the reasons you mentioned previously, drives value to consumers and customers. So if cloud brokering does come to fruition, what else can we expect to see as by-products of this business model shift?

David Linthicum: You got to have security and governance as part of this, and the good news is, we're pretty good at doing distributed computing security but the bad news is, there's fewer people are walking the planet who really can execute on this. So it's a matter of also increasing the Talent pool, becoming more security aware, and the reality is that security has to be built in every aspect of this. Security can't be an afterthought, it has to be systemic to these environments. Brokering systems have to be secure and governed.

Raquel Buscaino: As we shift to a world of ubiquitous computing, what does that mean for legacy computing? Is it an all or nothing game? Is it a transformation from one to the next? Is it coexistence of both? Can you speak to whether or not this is a revolution or an evolution?

David Linthicum: Yeah, I think it's a matter of just not shutting things down just for shutting things down. I mean, 10 years ago, everybody was making the declaration that they are cloud first, and they're going to shut down their data centers, that's not going to happen. Those things have a role, probably have less processing and less storage on them, but they become utilized really as kind of part of the mix, and so, and certain processing, and certain patterns of application developments, certain things, will run well on these legacy systems that we can reach. So they become part of the ubiquitous pool. They have a profile, they have a participation, they have a certain pattern of application, certain storage system that they can leverage, and the idea is that we're going to have these big brains in front of these systems. They're going to work with developers and work with people who need to utilize these resources to find the resources that they need, and in many instances those are going to be legacy systems.

You got to remember for the last year, year-and-a-half, we've seen a tremendous amount of repatriation where people have moved from clouds back to some of these on premise systems because the cost of hardware and software has dropped significantly in the last 5 years and they realize they're going to get a huge business benefit from running on premise on this hardware that we own and the software that we own, you know, versus on the public cloud providers which we didn't own, but cost a lot of money.

So it's basically automating that process, but doing so in a dynamic way. In other words, you have a process or an application that you release out into ubiquitous network of computing and basically picks the platforms that are optimized for those systems. And many instances it's going to figure out that the

on premise environment is going to be cheapest way to run that stuff. It's going to have least amount of power consumption and the most business benefit that comes back.

And so, it's going to automatically make that decision for you And therefore there's no, you know, big projects and lifting and shifting everything into the cloud, and going "upsy daisy", and then shifting everything back to on-premise because we made a mistake and moving an application and a data set that wasn't quite, really designed to run on a cloud unless you make the investments and change the code and all those sorts of things. There's a lot of under-optimized things we have done in the last 10 years, and so this will fix some of that not everything.

But the idea being is that everything that we own is going to be participant in this network, everything that we own actually becomes a cloud, and has the potential for providing benefits to the business. So it's maximizing what we have and the ability to leverage other resources, such as cloud and managed service providers, and co-locs as we need them.

Raquel Buscaino: Yeah, which is a compelling case to say: "Hey, listen, it's about utilizing and making the most of what you have, rather than going and getting something new" because to your point that you mentioned earlier throughout 3% utilization, that's a lot that you're leaving on the table.

David Linthicum: Yeah. And you know, I live in Northern Virginia, and this is the center of the universe where it comes to data centers. There's some something called "Data Center Alley", which is, you know, probably a hundred different data centers along this big path. If you would go into those things and check the utilization of a typical server, it may be less than 5%. It's because, they're not utilizing it to its fullest extent, because it doesn't need to be used to its fullest extent, running one single application, one single database. They need to have the capacity on that system to allow it to dynamically scale-up as process load increases and scale down. But average, it's going to be way underutilized because it has a single purpose that's assigned to that system. This is about assigning multiple purposes and providing better shareability.

When you think about how to do that within cloud computing, the ability to leverage multi-tenancy, the ability to leverage massive amounts of compute and hardware resources as single amounts of resources, this is in essence, taking that to the next level, the ability to extend it out to everything that you own, everything that you control again for a larger business benefit.

Raquel Buscaino: My mind is just blown in so many ways, and I'm excited for this future that we're talking about but maybe I'll turn it back to you and say, what makes you most excited when it comes to the future of ubiquitous cloud computing? What's really something that you are looking forward to if we realize this future?

David Linthicum: Well, I've been into this game because of the efficiency of resources, I knew for a long period of time and started thinking and dealing with cloud computing back in the nineties, that we have this thing called the Internet.

And it provides access to other systems that are outside of our direct control, that we are able to leverage, and become a shareable resource that we're able to share among different entities. So I never liked the idea of buying a piece of hardware and a software support, particular application plugging in the wall and forgetting about it. And we did that for every application and database that we needed to build. And that was the way you built systems, and normally, you started a company, you had to buy a data center and put systems in it, things like that. So cloud computing allows you punch above your

weight, but also allows you to provide better shareability, and so, the shareability promise of cloud computing has always been there but it's not always going to be the answer, it's not always going to be the least expensive process to move in, and it's not necessarily going to be right for every application.

It is the ability to find any piece of data, anytime for any reason, and the ability to find access to the resources and leverage them at an almost fully optimized way. It's not going to be completely optimized, but just moving from probably 5 or 6% optimization to something that's be at 90 to 95% optimization and the amount of business benefit that come back from this. So businesses would be able to re-engineer themselves, to take advantage of innovations that are coming along, take advantage of the scaling take advantage of the business opportunities of this and it's thinking differently in the fact that we don't necessarily have to own everything that we run things on.

And so we're able to use the loads that we have, we're able to broker it, we're able to manage it, able to deal with the complexity of these situations. We're able to do this in a secure way, and it provides our businesses to scale, but scale with less impact to the budget, less impact to the planet, and I think that's a good thing.

Raquel Buscaino: It's about optimizing resources to maximize business value at its core. It sounds like there's definitely some milestones along the way. But really, Dave, I just can't thank you so much for an incredible discussion on the future of cloud, what an ubiquitous cloud future looks like, I mean, it's truly incredible. So thanks for, thanks for sharing all your knowledge.

David Linthicum: Well, thanks for having me. It's great to share with you.

Raquel Buscaino: To all our Tech Savvy listeners out there, if you enjoy this episode, please share and subscribe, and if you'd like to learn more about the future of Cloud, you can follow myself and Dave to stay up to date. Our socials are listed in the episode description. Thanks for tuning in. And I'll see you on our next episode. Until then, stay savvy.

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