



## For Cloud Professionals, part of the On Cloud Podcast

**David Linthicum, Managing Director, Chief Cloud Strategy Officer, Deloitte Consulting LLP**

**Title:** **The Incredible Journey: Mainframe to Cloud Made Easier**

**Description:** Cloud computing is such a hot topic that it can be hard to believe that many of the world's largest companies, across all industries, still have mainframes as the backbone of their mission-critical systems. And even though most companies have realized that a move to the cloud will be necessary, they often have trouble imagining the seismic shift from mainframe to cloud and developing a roadmap for cloud migration. In this podcast, David Linthicum and his guest, Deloitte's Madhu Thejmurthy, discuss how the right strategy, coupled with the right tools, can make the journey from mainframe legacy to cloud future easier and help enable companies to realize the transformative power of the cloud.

**Duration:** **00:20:19**

**Operator:**

Welcome to On Cloud, the podcast for Cloud Professionals, where we break down the state of cloud computing today and how you can unleash the power of cloud for your enterprise. Now, here is your host, David Linthicum.

**David Linthicum:**

So, 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 and the pragmatic use of cloud-based technology – around the pragmatic use of cloud technology. And, so, our guest today is:

**Madhu Thejmurthy:**

Madhu, Thejmurthy is my last name.

**David Linthicum:**

Right. So, welcome to the podcast. You're a senior manager at Deloitte. Spending over 20 years' experience of delivering technology solutions for clients around the industry with primary focus on application modernization, legacy systems to the cloud, and you're a product and technology office leader for Deloitte's application modernization offering and has delivered migrations of large-scale applications from mainframe to cloud technologies for clients across the industry. So, wow, man, so tell me about what you do on a day-to-day basis. I'm more interested in that than – we'll get into the technology. I always love to hear what my peers are doing and what they're working on. You don't have to name clients, but what kind of technology are you working with, what kind of things are you excited about? So, tell me what you're up to.

**Madhu Thejmurthy:**

Sure, so, thanks, David. Thanks for having me. As I said, technology has been my passion and I've spent over 20 years doing that. I'm part of the application modernization studio. I spend my day-to-day here with the product team and our solutions team where we deliver modernization solutions to clients who have legacy mainframe applications, taking them to cloud.

**David Linthicum:**

So, what would be an example of a typical legacy mainframe application?

**Madhu Thejmurthy:**

Well, many organizations across industries still have their critical business systems running on mainframe. So, these are complex monolith applications running, for example, if you look at banking systems and retailers and airlines, you name it, they have modernized their ancillary applications. You know, you can go deposit a check using an app, but the actual processing of that happens on these big boxes called mainframes. That's where the core of the business logic is sitting, that's where all the transactions are processed, so those are our clients, those are our targets where we help them to move those mainframe applications into the cloud.

**David Linthicum:**

I heard mainframes are dead. What are we doing still dealing with mainframes? The cloud took over everything and there's not a one of them around. How can that be the case?

**Madhu Thejmurthy:**

I know. It's surprising if you hear how many systems are still out there. As I gave you an example, even today you deposit a check, it's still processed on those systems, and according to some studies, there are still 200 billion lines of COBOL still active sitting out there, which are running on mainframes, so that's the area we bring that expertise here in the studio, we have the tool set to address those migrations in a more automated and risk-averse way. That's where we're doing our work.

**David Linthicum:**

So, what's the specific example of a mainframe-based system? I have some clients that are converting things into Java first and then putting it up on AWS, or Google, or some other public cloud platform. But there seems to be kind of this thinking that we have to kind of modernize the thing as it's in flight from one step to another, and I guess you do because there are very little platform analogs that exist on cloud computing basis from running an ISAM COBOL system, and I'm an old dude, so I ran this stuff for years when I first got out of college, but there's a number of steps in the complexity of doing this, number one. You have to tell me if you agree with that and what they are. And then, more importantly, they have to be done. So, in other words, if we're going to start eliminating data centers, or at least scaling them back, we're going to have to start thinking about moving some of the apps and the data loads off of those mainframes. And since they don't necessarily port to cloud with kind of a lift-and-shift methodology, there has to be this transformation or refactoring in that, which makes it very complex, or have I been misguided?

**Madhu Thejmurthy:**

Oh, absolutely. As I said, these are systems which are built over 20, 30 years, have complex logic sitting in them, tons of business rules hidden in those applications, and it's not as easy as any other application going to cloud, right. It's not a lift-and-shift. There are thousands of screens running which are the legacy 32 green screens. It is tons of batch programs which run which process, I saw the transactions overnight, terabytes of data sitting either in a transactional space or as data sets on the VSAM or what they call SDASD in the mainframe world. So, it is a complex consortium of applications sitting there, and it's not a click of a button they move, and that's where we step in with our innovative platform which brings the product (Inaudible) experience to start looking at these applications and start moving them in a more iterative and a low-risk fashion to the cloud.

**David Linthicum:**

So, do clients know they have to go through this kind of a transformation? Are they kind of shocked at the fact that this much work has to go into moving into the cloud? Because I guess we paint a cloud as something that's almost magical, and ultimately there's a ton of work in making these things happen, both the ability to modernize the data, the ability to modernize the processes and also the ability to, I guess, modernize the architecture. At the end of the day, you're rethinking the way in which you're dealing with architectures, which are typically going to be monolithic. I mean, the path that we had in the past of where architectures were, and kind of the architectural thinking when these things were built in sometimes the late-'70s and '80s is completely light years different than what we're thinking today.

**Madhu Thejmurthy:**

Yeah, absolutely. I mean, you won't believe when we go to clients and show them what they have on their mainframes. So, we use our discovery tool, so that's again part of the (Inaudible) platform. We go in there and look at the mainframe components, the various components within the mainframe, and deliver a standard blueprint of the whole technology landscape, which will basically determine what is the next step of that. And you'll be surprised the kind of things we find, and the kind of dependencies we find, and how much data's out there. Even sometimes clients are

looking at and say that, huh, we didn't know about these things. That definitely is there and that's where they understand the complexity of it and we – as I said, with our discovery tool, we break it down and we show them all aspects, the code, the data and all the integrations, all the third-party products which exist in the mainframe, and then out of that we draw a road map on how you migrate them off of that and go into more cloud and utilize some of the cloud services.

**David Linthicum:**

So, what's your favorite mainframe database?

**Madhu Thejomurthy:**

Of course, VSAM, all the file-based – that's what at least we see mostly used. Some clients definitely have DB2 on Z or some – lot of systems still use DB2 on Z, and again, our products we have migration spot for all of these. And the challenging ones are the file-based ones like VSAM or database. Again, part of the (Inaudible) product suite, we have the transformation tools for these databases to go from a file-based to a relational database, which has been a very powerful tool as well as the value we bring to clients. So, we don't have to go through a journey of two years, but we can get all of those VSAM files into a relational database, and guess what, you can now hook up a data (Inaudible) type of a tool and start producing reports, which the client did not have the flexibility to do before.

**David Linthicum:**

Yeah, I'm actually going to put you on the spot. So, how would you move from VSAM to Aurora? So, Aurora basically is a MySQL database, it runs on AWS. VSAM's an ancient-based database that exists on typical mainframes. How're you going to move us? So, what steps are we going to take to actually migrate and modernize the data from VSAM to Aurora?

**Madhu Thejomurthy:**

So, going back to the toolset which I was talking about, so we have the ability to, one, take those data which are more flat. If you look at the VSAM, it's more of a blob, right. It sits there, and if you look at tons of data can be – if you open to the notepad, it's like a one-liner there. So, we have the tools which can take that and start mapping that into a relational database, and so that's again a part of the tool in the (Inaudible) platform. And the next step is to look at actually what are the things we change when we go from a file base to Aurora, whether it is the data types or is the type of schema we create and how we create the table spaces, et cetera. And through our experience in having done this many times, we have captured all those things, and with the tool and that experience and the standards and guidelines we have put together, we get you off to the cloud database.

**David Linthicum:**

So, is there ever a time when we just want to toss away the existing mainframe system and just kind of redo it from scratch on a cloud-based environment?

**Madhu Thejomurthy:**

Absolutely. So, we have seen those use cases as well. So, it all depends on what situation the client is in and what they are trying to do, and we are seeing use cases where client has two year to move off of their data centers and other use cases where the client is looking for more modern microservices or serverless-based architecture, and they have all the time to move there and not tied to a two-year journey or a three-year journey. In those cases, absolutely makes sense for you to write from scratch, but again, that's exactly where we step in and use our tool, the discovery tool and the mining tools to figure out what makes sense. Is this code in the format where it doesn't make sense to lift and shift? You have to rewrite this from scratch, and in that case, that's where those kind of architecture will come in play.

**David Linthicum:**

Yeah, so moving forward, we have some decisions to make, and the things is, we're talking about kind of rearchitecting the thing and either rewriting from scratch and tossing the existing stuff away but, you know, we're really not tossing the existing stuff away. We're proving out some of the business processes, in essence we have a functional prototype in the form of an application that's been running for 30 years. And, so, we don't have to rethink how we're doing the design, or even selling it to the end user; we just kind of have to get the interface right, but the behavior and the data remain, say 80, 90 percent consistent. Has that been consistent with what you've found?

**Madhu Thejomurthy:**

Sorry, David, this is where I think I missed the question.

**David Linthicum:**

Oh, no worries. So, is it consistent that you find that if we're rewriting something from scratch, the existing application that's running on the mainframe for 30 years has become the prototype and we're ultimately – what's the word I'm looking for? I'm probably making it more complex than it is. Ultimately, we're able to find the pattern within that, which makes our architecture job that much easier.

**Madhu Thejomurthy:**

Yeah, which is where our – definitely those are the challenges when you go the custom (Inaudible) route. So, this is where our unique approach of (Inaudible) comes into play, where we are able to use our tools and retain some of those core business logic which is in the system and build on top of it using our (Inaudible) tools. Sorry, David, I think I meant to rephrase this.

**David Linthicum:**

That's all right. Go ahead, man. Just a conversation.

**Madhu Thejomurthy:**

Yep. So, I say that I agree with you. That's definitely a challenge when you try to do a custom build of the solution, or a custom build of modernization of their mainframe systems, that's exactly where our unique approach of app mod comes into play. We – our approach to modernization is making sure that we utilize the code of the business logic which exists from years and build on top of it, right. So, we use our tools as enablers to do that. For example, we have our mining tool which could go in and start looking at the mainframe code and extract the business rules out of that, extract the business logic out of that, and show us how all the relationships between the code and how the programs suddenly (Inaudible) to each other and extract some of those common logic, which in turn can be carried over to start building the microservices and the newer architecture on cloud.

**David Linthicum:**

So, how much efficiency do you gain by doing that versus without that methodology, without the tool sets, without kind of the skill sets and way in which you're going through it?

**Madhu Thejomurthy:**

If you look at doing this purely from a custom build, you could spend a year just going through those business rules and validating the business users, you don't have a start point, you're starting clean slate, but just an example, right. So, in this case, within first two months of the project, you are there with 10 million lines of code. Sure, I can extract the 3,000 business rules and sit there and go through them in the first two months of the project, rather than spending a year to go through the whole process and validating. That's the kind of efficiency you're looking at and the acceleration you're looking when you go through this approach of modernizing.

**David Linthicum:**

So, what about security? So, I mean, I don't think – I'm not expecting you to be an expert in security. I'm certainly a not an expert in security, but ultimately as the models change as they move into a cloud, how much does that affect the application modernization or the data modernization aspect of it?

**Madhu Thejomurthy:**

So, I can speak to the application security. Again, of course, we bring in our cloud engineering colleagues to look at the cloud security and what they, as an enterprise, should do for cloud, not just the mainframe system and the modernization of the mainframe, but as an enterprise, what are they looking at different aspects of security? That's that level. What we look at from a mainframe applications is the authentication and authorization which used to happen in the mainframe world and how do we get the (Inaudible) of that on cloud. And again, without experience and without tools, we are able to take that mainframe-based security authorizations and (Inaudible) mechanism and put that onto a cloud-based authorization and (Inaudible) (Inaudible).

**David Linthicum:**

So, do you think a cloud providers moving forward will make your job easier? Will they provide better tools for mainframe migrations and data migrations off of mainframe systems to the cloud, because I don't view them as doing an amazing job in really kind of looking at the mainframes who are kind of a source of the various systems. And, so, legacy is obviously a loaded term, but can mean (Inaudible) stack of maybe 10, 15 years ago or can mean mainframe. Typically, it does mean mainframe, but more often than that, I see them supporting traditional distributed systems, Linux-based systems, things like that in terms of migration, and providing analogs for those platforms, and providing tool sets for making it happen. Do you ever think they'll be a bit more savvy and reaching into the mainframes, and maybe they've done it so far? Maybe I haven't figured it out. So, fill me in.

**Madhu Thejomurthy:**

So, what we are seeing in the market, most of the cloud providers have the (Inaudible) and the products and services, more from an infrastructure monitoring perspective, but there's not really a clear answer on applications and stuff, and this is where we are working closely with AWS, we are working closely with Google Cloud, of course there are other tools out there which does a similar process, but working with these vendors closely, we realized that there's no tool for application specific. There are tools around the infrastructure and the underlying infrastructure and the mainframe and draw balance to those, but what we have on the cloud side is the services, for example, we have Lambda. You can run your services on demand, so we have services like that, but not really a solution or an answer to moving the mainframe applications, which has really – which is really ingrained in the business for our clients. So, that's where we're working closely with those vendors, but I don't think there's a magic answer. And, also, those vendors, as in the cloud providers, are working with us to make that better, whether, hey, what can we do to accelerate the journey of you taking the COBOL code and turning it to microservices, and how can we jointly define that process together, or be composing that business logic into microservices and utilizing some of the cloud-native services? How can we help you to accelerate that or define that process? So, that's what we are seeing in the market.

**David Linthicum:**

So, I'm kind of hitting an epiphany right now. I think you guys become kind of the smartest guys in the room, because not only do you understand about the newer cloud technologies such as serverless and containers and Kubernetes, and even some of the stuff that's coming from the different public cloud providers like Anthos with the Google stuff, but you need to understand the old stuff as well, which is like – I mean, I know a lot of very smart people in the business, and either they're an expert on one particular pattern of technology or another, but you guys have to be an expert on two, or am I giving you too much credit?

**Madhu Thejomurthy:**

No, I'll take the credit. I know our teams are excellent. It's just where I've seen the differentiator is knowing the mainframe world in and out and talking the same language as our clients that are talking from their mainframe perspective, right. Connecting with them and saying that, look, these

are complex systems, I know you've built it from 20, 30 years and they work like a charm, and we understand that, but you can't stop here. And we know how to get you off of this. It's just that before we start our conversation on how to get you off of this, the conversation we have on their existing system, the experience we bring on talking their language, understanding what it is and also showing how we have done this in the past and how we have moved it, that definitely is a value we bring to the table. Up until now, whenever we hit a mainframe, it's a big black box and, you know, the single solution was, yeah, let's look at it and rewrite everything. Sometimes it takes five years, six years and there's a lot of risk written all over, and there's no clear success path, but with this approach, this group, I think we are bringing that specialty, so if you hear the word mainframe anywhere during your conversation call us.

**David Linthicum:**

Yeah, I knew we had those capabilities, and I have been talking you guys up and it's really good to kind of put the face with the words and also with the core capabilities. So, where can we find out more about your team on the web, or even reach out to you directly or reach out to whomever is kind of interfacing with clients on your behalf?

**Madhu Thejomurthy:**

You know, we are very well-structured within the application modernization, so we have industry leads who represent each industry, but the first stop would be to go on the DeloitteNet, look for application modernization. From there, I think you will reach us.

**David Linthicum:**

You still there?

**Madhu Thejomurthy:**

I'm still there. You there, David?

**David Linthicum:**

Yeah, okay. I'm sorry, I didn't hear you complete your sentence. We'll edit that out. Go ahead.

**Madhu Thejomurthy:**

If you want, I can repeat it.

**David Linthicum:**

Yeah, why don't you repeat it? We're going to do a pickup there, guys.

**Madhu Thejomurthy:**

Okay, you said the question was how can we reach you?

**David Linthicum:**

Yeah, how can we reach you on the web and just basically tell us what's open, what you want people to reach out to, even if you want to reach out to your personal e-mail address or web site, whatever, that's fine too.

**Madhu Thejomurthy:**

Got it. Let me – yep. So, yeah, so, David, we are well-structured within the application modernization offering as in we have industry leads representing each industry, and the first place to start will be to go to DeloitteNet and look for application modernization, and from there, you can reach our modernization studio main box, and you have all the contacts in there.

**David Linthicum:**

Yeah, one thing I'm going to do is look into this topic more because I did write and speak a lot about it back in the day, because I think people had some questions. And now I think that people are actually doing it. I think we were thinking through it, kind of the approach and the architecture and what's changed and the different tools that are out there, and now this is a big thing that's facing us. I know when I'm interfacing with clients, the key question they get, or ask me, is basically the application modernization stuff and the ability to move these systems which are critical to their business and move, to, into the economics and agile platform of the cloud but do so without killing their business, which was a really tough thing to do. It's very much like changing the tires of a truck while rolling down the street.

So, anyway, if you enjoyed this podcast, make sure to like and subscribe on iTunes or wherever you get the podcast. Also check out our past episodes, including On Cloud podcasts hosted by my good buddy, Mike Kavis, and his show, "Architecting the Cloud," and if you'd like to learn more about Deloitte's cloud capabilities, check out [www.deloittecloudpodcast.com](http://www.deloittecloudpodcast.com). And Deloitte is D-E-L-O-I-T-T-E, and cloud podcast is all one word. And if you'd like to contact me directly, you can reach me at [dlinthicum@deloitte.com](mailto:dlinthicum@deloitte.com). That's D-L-I-N-T-H-I-C-U-M. So, until next time, best of luck on your cloud projects. We'll talk to you next week. You guys take great care.

**Operator:**

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