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## The Deloitte On Cloud Podcast

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

**Title:**            **AI is transforming the US government, and it's powered by cloud**

**Description**:        The US government (USG) is a hotbed of AI innovation right now, and that innovation is powered by cloud. In this episode, David Linthicum talks with Google Cloud's Scott Frohman and Deloitte's Vishal Kapur about how various USG agencies are using cloud as a force multiplier for their AI-fueled efforts to remake their agencies to better serve a modern nation. The trio discusses how the USG is leveraging AI and cloud, the benefits and challenges in the journey, and the future of cloud-powered AI.

**Duration:**        **00:26:37**

**David Linthicum:**
Welcome back to the On Cloud podcast. Today on the show I am joined by Scott Frohman, Head of Defense Programs at Google Cloud, and Vishal Kapur, Partner at Deloitte in Artificial Intelligence and Financial Regulatory Practice. Good morning, guys. How're you doing?

**Scott Frohman:**
Hello, David. Great to be with you today.

**Vishal Kapur:**
Good morning.

**David Linthicum:**
Yeah, good morning. I'm really looking forward to having this discussion. Love this topic, and certainly how not only AI because we're just dealing with that in a big way right now in the industry, but also how it adds value to different industries including the government. We're going to talk about the government today. So, tell me the Scott Frohman story. Where'd you come from, how'd you get to Google, and what are you doing these days?

**Scott Frohman:**
Well, I spent my life in the tech world supporting the government and ended up at Google 13 years ago now. I run a number of our defense programs here at Google, so I think about enabling government to implement AI at scale and at the edge, benefitting from all the unique AI capabilities that we have in Google Cloud.

**David Linthicum:**
Yeah, one of the initial when I was following the space and the rise of AI in the cloud, certainly Google was a leader in the space, so I bet you're all over that. So, Vishal, same question. How did you start, how did you come to Deloitte, what are you focusing on these days?

**Vishal Kapur:**
Yeah, David. Believe it or not, it's my 25th year in Deloitte. I started right out of college. My first foray into consulting was in our mission and practice. I did a lot of work in the automotive industry, and then dabbling across multiple industries, I somehow stumbled on a Washington, DC-based program, and I've been here the last 15 years or so, focused on government work. And the last decade or so, I've been focused predominantly on all things data and analytics, and of course the last few years AI, and it's—my career has been all about sort of bringing these next gen technologies, capabilities to mission impact for government. So, that's been my story.

**David Linthicum:**
Yeah, it's all conflating now, the use of data, the ability to leverage training data and analytical data, and the use of AI finally after many, many years, the ability to kind of make sense in how it defined applications and getting value out of this stuff, which I've been rolling with. I'm almost 60. I was doing AI applications back when I was 18. And it's evolved, I think, in the right direction. We're seeing the value that's coming out of this technology today.

So, let's go into the topic. So, basically the government is leveraging AI in certain ways. I'm interested to hear from both of you how that's happening, applications, what kind of value they're seeing in the data. So, Vishal, I'll go to you first since I think you may have an understanding of larger domains. What's going on these days in the government, them leveraging AI, and where's the value?

**Vishal Kapur:**
Yeah, I think it's an exciting world we find ourselves in. I have a purview across multiple sectors of government. I spend a lot of time in the civilian sector looking through large volumes of data and can we make sense of it using text mining and natural language processing for agencies who are looking at weather data, satellite imagery, to be able to use computer vision technology to detect anything from fisheries compliance activities to detecting rip currents in oceans.

You have—you just name it, IRS looking at which claims, which tax returns to inspect, what's the recommendation on that front, healthcare agencies looking at how do I use AI in large-scale biomedical data science kind of use cases. COVID was a classic use case of AI in multiple dimensions: where should we shore up vaccines, where should we have the right supply chain equipment, what segments of the demographics need those the most. Using AI to be able to predict that and be on the forefront despite challenges in data, and I left sort of the defense and intelligence sectors alone, but that's where a lot of exciting developments are happening as well on how to use AI to really get the war fighter ready and be at the forefront of mission impact in that space.

**David Linthicum:**
Automated intelligence is everything in how that stuff works, so it's going to be amazing to me to see how that evolves over time over the next few years. Just the potential is there. Saw it many years ago. Now it's hugely there, and certainly the ability to leverage cloud computing as a force multiplier and leveraging AI at scale with economies that we haven't seen before is really going to push the ball in the right direction. So, Scott, kind of same question to you, I guess localized to Google. What are you guys seeing in the marketplace these days? Where's the government focused on? What are the applications? What value do you see from this technology?

**Scott Frohman:**
Well, wow, that was some great breadth from Vishal. We've seen some of the same things, like you mentioned, work with text and documents, specifically classification and extraction for tax forms to make the tax processes much more simplified, streamlined, better intelligence, identification documents, and financial documents. So, there's that whole family of use cases. At Google, we see a lot on language translation. AI-based language translation specifically has been a tremendous growth area for us for things like public-facing government websites and improved foreign interactions without the use of a translator. That, to your point, David, applies to some of those military use cases. Sentiment analysis, what are the effective public policy decisions, being able to get feedback on that, and then also back in the military domain, ISR. That's intelligence, surveillance, and recognizance, which enables use cases like search and rescue, wildfire detection, and rescue of people.

There are a couple relatively new areas that we're seeing. One is AI is proving to be a big boon to government sustainability efforts. There's a lot of funding, a lot of attention going on in both the civilian and defense side of the federal government, lots of activity happening state and local as well, but instrumenting smart buildings and understanding planet scale terrain evolution. What's happening on our planet, trying to measure the effects of global warming, of climate change over time. And then the last sort of sub-example I'll throw out is healthcare. Government is using AI to push the edge in things like pathology, detecting cancer better and faster.

**David Linthicum:**
Yeah, it's amazing to me the amount of value—just the human value that's coming out of this stuff as well. It's not just automating government. I think that's a good thing. We want to do things more effective and efficient and translating data and doing so on the fly, and the ability to integrate these various data systems together so they're able to communicate and just kind of do things moving forward. But we're really kind of finding applications that are kind of taking things to the next level.

I love the sustainability example because we're seeing that as well. We're seeing people who are leveraging this technology as not only a way to just muscle down the reduction of power consumption and things like that—but the ability to manage grids in an intelligent way. So, we're not necessarily removing the advantages of having power and cycling power from different government buildings and things like that, but actually leveraging the power in much more intelligent ways where we're able to optimize the use of very little power and really comes out with no negative impact on people who are consuming the power. Are you working on things like that?

**Scott Frohman:**
Yep. Yep. There's a little bit behind us with government and a lot yet to come. Most of the activity in sustainability has been in the commercial sector.

**David Linthicum:**
So, Vishal, I'm going to go to you and talk about some of the—dig deep on some of the advantages and disadvantages and getting the business case for AI-based systems, and one of the things I struggled with in my career, in the early days of AI, was it was difficult to create a business case or some sort of a compelling reason that the government or the private sector would leverage AI capabilities because of the cost of doing so. In other words, many millions of dollars in hardware and software that you had to set up in a data center and have data center space, people who run it and cool it and power it. All those sorts of things were—and also the power of AI wasn't as it is today, many times less effective.

So, now we have cloud computing, we're able to leverage cloud as a force multiplier, as a utility-based model. We're able to sell things, or basically consume the stuff as we need it. It's operating for dollars a month versus hundreds of thousands, or even millions of dollars a month now. So, what advantages are the governments seeing and what are some of the downsides too, Vishal, as to where this stuff is going, and what should people track in the marketplace right now?

**Vishal Kapur:**
Yeah, I think, David, that you brought up a memory from about ten years ago—ten, eleven years ago. I had talked to a client about doing some natural language processing text analytics project. The cost of doing that project in those days was roughly, approximately was $1 million or so. And a lot of that was actually hardware cost and licensing cost. We had to buy things. There's a lead time to get all these things set up, and it would have taken us three to six months to get the basic MVP up. If I were to do that today, it would take me 24 to 48 hours because the availability of the capability in the cloud, being able to scale up and down what I need in terms of processing, and just the sheer availability of the existing models that I can reuse rather than having to start from scratch.

So, we're in a fundamentally different place in terms of the technology availability, the cost parameters that are involved in being able to make this happen for real. So, I think it's an exciting time to be able to leverage these technologies and make a real impact. So, the business case is quite compelling. And you compound that, or you add over the last ten years what has happened is the amount of data that I have at my disposal, you just take an average worker, average government worker in any space, every day I make a few decisions, every week I make some decisions to do my work. The amount of data I access—I have to access to be able to make those decisions, to create—it is some very, very significant decision I have to make, whether it's stability in the financial economy when I'm a financial regulator or national security or global healthcare related decisions.

The amount of data I have at my disposal to be able to analyze that is mindboggling and sort of compounded significantly over the last ten years. So, now couple that with the availability of cloud and these AI technologies, it creates sort of the perfect storm, perfect sort of scenario for me to be able to utilize it. So, significant potential and a lot of advantages of that.

But we still have challenges. How do you scale the talent? How do you look at AI inherently is probabilistic in nature. So, in what problems, how can you sort of land in the spectrum of completely explainable rule-based decision-making to being comfortable with probabilistic decision-making in scenarios where it makes sense. How do you deal with the bias and ethics-related challenges, especially in the government context? A lot of those are questions that government agencies are grappling with as we look at, "Okay, I have a business case, it's compelling, but I do have the competing forces which I have to tackle as well in terms of scaling some of these implementations."

**David Linthicum:**
So, Scott, I'd love to get your perspective on this from someone who's providing these services. Obviously, we're trusted advisors in organizations, agencies in this case, that are consuming these services and trying to make sure we're guiding them through utilization of these things in the right proper way and finding the business cases and almost seeing in the space in many instances we're overly applying AI-based technology, probably AI technologies not necessarily needed, and you're going to overspend in building those solutions. So, what advantages and disadvantages do you see in the market as you're working with the government and working with key partners like ourselves, and, also, how does the business case need to be morphing over time?

**Scott Frohman:**

Yeah, yeah, we've had actually a great run working with Deloitte, no question about that. So, you alluded to this, David, but I'll say in full disclosure, I work for a cloud provider, so I'm a little bit biased here. But I work at Google because I'm absolutely passionate about what the cloud and AI can do for the mission of government. So, first AI requires scale. Vishal brought up a really interesting example. He talked about the impact that AI had on COVID and being able to understand and assess that landscape. In the midst of the pandemic here at Google, we trained a code forecasting algorithm. We trained it, we retrained it as new data came in. We continued to retrain it. You really don't want the 25 years it would take to train that model on a single high-powered server. Only cloud has the GPU or TPU, for that matter, tensor processing unit, infrastructure to train at scale. So, this algorithm that I'm describing to you we trained in a few hours on 74,000 machines. So, that's important to do when you need quick results and you want to iterate how you often do with artificial intelligence.

Second, there's the pace of innovation. The fastest area of innovation in the cloud service industry right now is artificial intelligence, whether it's bringing up data features to market, continuously improving results from retraining, new capabilities, cloud aligns the rapid innovation curve of the private sector to government because the government can take advantage of what's happening in the consumer and commercial industry.

Final thought on this is there's cost. Do you want to buy, operate, and maintain a giant pile of hardware trying to scale? How about inference? Wherever in the world do you need to do that? In most cases, no. The answer is "No" for the government. You want to take advantage of the robust supply of compute that cloud providers offer, and the dedicated network that one of them offers to focus on the mission, on the data, not the hardware. And, actually, not the model either. Largely at this point, and the head of the Chief Digital Office made this point in some remarks, but the model is largely a commodity at this point.

I will say that it's not all roses. It can be challenging integrating your edge, I think inference, with commercial cloud. When you're dealing with high levels of sensitive data—think classified information—you're then definitely using disconnected AI features, and those will tend to lag the connected counterparts.

**David Linthicum:**

Well, everybody—I think that's the core thing, the ability to feed these knowledge engines as learned over the years, is going to be data. Data becomes the fuel for building these engines. The amount of training data we're able to maintain now in many petabytes is going to—and if you look at some of the generative AI stuff—we'll talk about that in a second—it's really not about the additional capabilities of the AI systems, even though the features are starting to explode there in many different horsepower better than it was a few years ago. But just the amount of data that we're able to manage and train these systems with seems to be kind of the key changes that are occurring recently. Am I getting that wrong? What do you think, Scott?

**Scott Frohman:**

No, there's so much data, and that's where do you want to have a data center that can store all that data, or do you want to put it and let someone else handle the commodity of the network, the hard drive, making sure that that blinking green light stays blinking. That's not—let an IT company, let a cloud provider handle that and focus on the mission of the business.

**David Linthicum:**

So, look at the future and where this stuff is going, everything's talking about generative AI right now. Concept's been around for a bit, but kind of gone from—in terms of AI capabilities into machine learning and deep learning and now generative AI, which is the ability to kind of create things out of lots of information that it's able to maintain, including information that we're all generating out on the open internet. It's able to find things and create points of view and have creative intake into different things that we typically would do as humans. So, the capabilities are fairly unique and fairly impressive, and I think that's why everybody's paying attention to this thing right now. So, Vishal, I'm going to go to you. How is this evolving right now with generative AI, and how are the use cases starting to appear in using this technology?

**Vishal Kapur:**

Yeah, it's fascinating what the last four or five months have been. We've all known sort of AI solutions as the ability to do things which are traditionally done by humans, being able to detect things in a stream of images or summarize documents and text and being able to detect and simulate. This whole notion of generate, while the technology has been there for some time, just recently the way it was rolled out, I think it is has got everybody attention forefront, everybody's talking about the ease of use and what it can fundamentally mean to different sort of businesses. In fact, Deloitte just recently launched a practice on generative AI and how we can help clients across commercial and government sector with how generative AI applies in their core sort of business and in the government context mission use cases.

I would say it's yet another sort of classification of things which are traditionally done by humans. I would say a couple of things. One, generative AI will have significant impact when it combines with other AI capabilities, so techniques such as natural language processing, I think Scott touched upon document processing, call-center AI, dial—the chat bots that we've seen. Generative AI sort of interspersing at the value chain of that entire workflow I think will be a practical manifestation. I would say is there's a lot to be seen. There's a lot that will come out. I think the capabilities are quite compelling, while at the same time, the right—the challenges we talked about, being able to have the right sort of guardrails around this, being able to have some degree of "explainability," especially in the government context, that will continue to stay important and impactive and becomes more important in the generative AI space. But exciting times, significant impact across broad dimensions, but I think a lot remains to be seen and unknown as it unfolds over the next coming months.

**David Linthicum:**

So, Scott, from a provider angle, how are you seeing this growth occurring within Google, and also how are you going to make this stuff scale? I'm seeing projections where we're going to get 10,000 times the use of generative AI systems and these things are processor-intensive and data intensive, things like that. How is Google going to be able to keep up with the load demand from these additional applications that we're going to be onboarding for the next five to ten years?

**Scott Frohman:**
Oh my gosh, what a great question. We've seen all these—every new app, every new capability breaks all the prior records of adoption, and this space is no different. Generating text, whether that's essay, poetry, code, or whatnot is obviously a big thing. I think—so the scale, to your specific question, David, the scale is something that we've been doing pretty well for over 20 years at Google. The data centers, the network, the infrastructure, the people, the way we automate things. This is simply going to be a continuation of that for this new flavor of compute, of generative AI. Trend-wise, Vishal mentioned it's sort of the early days that will evolve. And, actually, I really like how he's thinking about this of integrating this core capability of generative AI with other things to—and I'm going to botch the way he said it, but essentially to get to a decent spot on the value chain, to make it more value-driven for the mission for the business.

But other trends that we're going to see as this grows is improved transparency and accountability of these things. We have to. We just have to do that. When you use any generative AI capability, you send your data in there, whether it's a question that you want answered or there's more to it, is that training the tool? Do you want it training the tool? Should the tool provider want these individual data, especially when you're looking at enterprise use cases that tend to coalesce a lot of unique questions, a lot of unique insights? Do we want that training the tool? Does the enterprise user, does the government want their data training a tool?

So, then you've got to get into how sensitive is the data that you're sending into this generative AI answer bot. So, we really need to get to an enterprise state where data is not being used for training unless it's desired that way and there's an actual dedicated generative AI capability for that enterprise, and that's how they want to do it. But be more thoughtful, be more transparent on the generative AI algorithm. And in any case, there is nobody in government that I have come across that wants their data to be splashed out beyond their walls, unless it's putting something on a website and it's intended to be publicly available information. But that includes us, the algorithm provider, the cloud host. We should not have access to that data.

And then the other half of transparency is how accurate is the answer. The answer these algorithms are stated in black and white, but it's basically a prediction, and what is a prediction? It's an answer that has a confidence interval, and so we really need to be getting confidence scores with our result to questions the government asks. You're not submitting a query online looking at a list of rank-ordered web matches like you are with a search provider. You're getting a singular result when it comes to how these capabilities act today, and that answer may or may not be correct. So, whether you're serving a citizen, determining a payment or making a battlefield decision, there needs to be an understanding of how and why this decision was made and the level of confidence of that decision.

**David Linthicum:**
So, a question for both of you, and short answers please. Scott, I'm going to go to you first. What are we going to be talking about in five years?

**Scott Frohman:**
Oh boy. We overestimate what we can do in two years, but we underestimate what we can do in ten, so this should be—we should get this one right. There won't be "a" generative AI algorithm, not even for subfields like language, imagery, and video. We'll have thousands of them, each one designed to do something different. Organizations will use their own data to be used for their own content generation and other tasks. Many parts of our world will be rocked—drug design, regulation of drugs, semiconductor design with the $52 billion the federal government is committing to chips and microelectronics commons will be revolutionized. What are these transformations? We will see advances in these and many other disciplines in ways we did not think of.

**David Linthicum:**
So, Vishal, same question. Where are we going to be in five—what are we going to be talking about in five years?

**Vishal Kapur:**
Yeah, that's always an interesting question. I would say I think we are going to be seeing greater embedding between software and hardware systems, so this notion of embedded systems where AI's embedded within them. So, that's going to be happening. I think we're going to be talking, specifically in government, not only the possibilities that we talked today, like where AI can create an impact. I think we'll be talking about what impact it has created, how it has fundamentally changed several parts of how government does work, whether it's attracting customers and citizens who, with all the other challenges we talk about. I think we're talking about how AI fundamentally changed the way work was getting done, so we really talk about that. And I think we'd be looking at and talking about new kinds of jobs that we haven't imagined in 2023 that are mainstream and we are hiring, government is hiring, and kids are going to college for those new kinds of jobs being created in this space. I think we're going to talk about that.

**David Linthicum:**
So, Vishal, where can we find more about you and your service on the web?

**Vishal Kapur:**
Yeah, sure. I think you go to Deloitte.com, specifically in our public sector space. Lot of content on the use cases we have. We also have specific dedicated pages on what we are doing jointly with Google and the latest offerings we have across cloud, AI, and the different use cases across the different sectors. So, that would the place I would go to

**David Linthicum:**
Scott, same question.

**Scott Frohman:**
Yeah, pick your favorite internet search provider and search for Google Cloud Government and you can learn all about what we're doing in government.

**David Linthicum:**

Yeah, check them out. This is an important space moving forward. The ability to leverage cloud was one thing, moving into cloud. At the end of the day, it's a platform and consumption change, more scalable, more cost-effective, all those sorts of great things we get within the cloud but the ability to use cloud to get to particular business cases and get to particular desirable outcomes for any organization, and certainly the government's going to be part of that, is going to be our main focus, I think, over the next five to ten years, so watch this space for additional information where you can leverage this technology as a true force multiplier for whatever you're doing in the business, and whether you're in the business of government or a small startup.

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