



Making Multi-Cloud and Hybrid Cloud Work

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Draft Transcript

Featured Speakers:

Analyst Chair: Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC
Amir Khan, President, Founder and CEO, Alkira
Steve Mullaney, President & CEO, Aviatix
Vijoy Pandey, Vice President, Engineering and CTO, Cisco
Oliver Cantor, Associate Director – Verizon Global Products, Verizon

Mark Fox, CEO, NetEvents

Welcome to all the press that are attending this event today, both in the US and around the world. I'm Mark Fox, CEO of NetEvents, and I'm delighted to welcome this esteemed panel. We have some of the big guns from the industry, Cisco and Verizon on this session today represented by Vijoy Pandey and Oliver Cantor respectively. Plus, we have two of the hottest cloud startups in the industry, Alkira and Aviatix, so we have Amir Khan, President and Founder and CEO of Alkira. Amir founded Viptela, one of the first companies in the SDN field that was purchased by Cisco, and we have Steve Mullaney, President and CEO of Aviatix. Steve was also with Palo Alto in the early days as CEO of Palo Alto, and also CEO of Nicera, one of the hot companies in the SD one movement that was acquired by VMware. So I'd like to hand over to Brad Casemore, Vice President Research for Datacenter and Multicloud Networking at IDC to chair this panel today, and also to chair the Q&A with all the media at the end of the discussion. Brad, thanks very much for joining us here today, over to you.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much, Mark and it's my pleasure to be here hosting such a great panel. We're going to be talking about a very important topic today and each of the panelists will be able to provide very useful perspectives and helpful perspectives for you, the audience, and it helps you understand the need out there that enterprises have in the marketplace and how they're addressing it so I look forward to today's discussion. And with that, we're going to present some contextual slides and set the table so to speak



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for the panelists and then they will provide you with some lively and very substantive discussion. So, let's start at the beginning, it's a great place to start. And let's start by defining our terms, what is multi cloud networking? At IDC we see multi cloud networking as a critical support for distributed enterprise workloads. We all know that we've entered, as a result of digital transformation, a cloud era where more and more enterprises are harnessing the cloud. They're harnessing the cloud for agility, they're harnessing the cloud for flexibility, they're harnessing the cloud for perceived cost savings. And increasingly, as a result of the pandemic, we've all been living through and we're hoping to get out of in the not too distant future, they're also leveraging cloud for business resilience and continuity for digital resilience and continuity. So as these workloads in this in this multi cloud and hybrid world begin to proliferate across clouds this is really what multi cloud networking supports. It helps to make it happen, it helps to make it effective and it helps to make it valuable for these enterprises, and of course these workloads are distributed across iOS clouds, they're on private clouds they're across, in some cases industry cards depending on the vertical. So, how you achieve multi cloud networking is through making it simple because this is an inherently complex proposition right. You're dealing with discrete clouds, you're dealing with disparate API's associated with each cloud, you're dealing with different service insertion models, you're dealing with different network constructs and it is difficult. In fact, what we found at IDC in our surveys and our discussions with enterprises is that frequently organizations that are moving to cloud and they've already moved to a single cloud. Look at some of the infrastructure issues and particularly the network issues that relate to do multi cloud, and they find them daunting, they find them intimidating, and it actually has become somewhat of an inhibitor to them fully leveraging multi cloud for business benefits and outcomes. So the idea is to make this simple, to make it very cloud like in terms of being on demand, elastically scalable, highly available and secure. All the things that you've come to associate with Cloud singular but making a cloud plural and this is not a trivial task, there's a lot of abstractions involved to make it simple, but it's absolutely critical for enterprises if they're to fully achieve their objectives around embracing and leveraging multi cloud. And as I said it includes these abstractions that are needed to simplify networking to an across different clouds. And of course as a result of that, multi cloud networking should deliver operational agility and efficiency, it should have all the visibility that's necessary across clouds to clouds and across clouds, and it should deliver actionable insights because in the cloud era, we've not only become used to things being on demand, but things being available when we need them, and they have to continue to be available, and as a result it's not just Day Zero and day one to use a kind of lifecycle term, but you should also have the ability to have fast troubleshooting and remediation of any issues that do arise that affect application availability and performance. And as a result of that you should be able to get more proactive in your operations and your infrastructure operations. In other words, as a result of a robust multi cloud networking and a capable multicloud, network infrastructure, you should be able to basically anticipate and sense problems before they become disruptions or outages. And at the end of the day, what's it about right from a business perspective? Multi cloud networking is essential, it's absolutely imperative to having a flexible foundation and a elastically scalable foundation for the realization of connected clouds, really connected clouds, you know you need a networking connectivity model for that so this is an extremely important topic and I'm really pleased to be here today to have our panelists, hold forth on this very important topic. As we move on to the next slide.



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You know, here's a little more about why it matters. Well we know Cloud today has become a force in the industry, very significant and hugely transformational for us. It's not only a destination for workloads, it certainly is that, but it's increasingly an operating model and a set of technologies. At IDC we see enterprises going through a transition to what we call a cloud-centric operating model where not only the infrastructure is cloud-like but the operating model is too, and it includes all the agility, flexibility, speed, and intelligence that you would expect from really leveraging cloud technologies fully, and of course at the end of the day it's a key means, when we think about cloud in its various forms, it's a key means through which enterprises achieve and realize digital transformation – that's how they're doing it. And one thing you probably noticed that my title used to be, VP of Research at IDC for Datacenter Networking but the datacenter, the whole concept of the datacenter has been changed it's become distributed, right, because that's where the workloads are. When we think about data centers and you think about the data center networks that support them, it was always in service to the servers, which of course hosted the applications the workloads that were distributed there. Certainly many customers today, still have on premises workloads, but the growth is increasingly on the cloud side. They're adding more and more cloud workloads over time, these are refactored applications, these are new applications in many cases, these are cloud-native applications that are built on a premise of containers and microservices, and that's where the growth is right. So, as a result of the data center becoming distributed, it's become - some vendors talk about this as centers of data rather than the data center, but that distributed nature of workloads is the important thing to remember here and why a multi cloud network is so essential. So, why multicloud networking is so essential is because of this distribution of applications and workloads across a multi cloud landscape, and the network has to be able to support that. We effectively need a new architecture and a new approach to networking to support that. And that's really what we're seeing out there today in the marketplace. And at the end of the day, the goals involves about outcomes, and it's also about enhancing digital experiences associated with application access so you have the support for the workloads, which are increasingly distributed, and you also have, of course, a richer, digital experience as a result of that. And if we move to the next slide, I just want to say a little more about that access piece. In multicloud networking, it's an inherently complex undertaking and it's incumbent on the vendors and the suppliers, which you'll hear from today, to simplify the task. There are multicloud networking adjacencies in a complete multi cloud network. From a customer perspective, there is also a needs to address that application experience application and access and digital experience is certainly a dimension of it. You know you have the workloads, and you have the access to applications and the experience that accrues from it. And it's very important for this to be secure, right, so you have to ensure that you have consistent secure policies for network insecurity and connectivity and security out to these multiple clouds and you have to ensure that that the applications are delivered securely, and multi cloud networking access is currently being addressed in many ways but certainly many SDN vendors are providing solutions for the last mile at the enterprise edge. We see partnerships have formed between some SDN vendors and cloud core interconnection and multi cloud networking vendors and certainly major network providers are partnering in this field with both SD WAN vendors, and some of the newer multi cloud networking vendors and some multi cloud networking vendors today are either partnering with SDN vendors or they are capable of integrating SD WAN into their own offerings, and that'll be an interesting development to watch as we move forward for competitive reasons and for customer value reasons, and cloud-

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centric networks. These are all clouds that work are designed around applications of workloads ,as I said earlier, it's really what's happening in terms of cloud and applications and workloads that really is the driving force for this. What this means is we move into a more cloud-native world, there'll be transference of perceived value from the lower layers in the networking stack which, of course, have been with us for a long time, and are still with us, I mean, these aren't going away, but there'll be a transference of value to the higher layers the stack at the application layer and layer seven certainly as we move into cloud-native where you're dealing with, you know, Kubernetes, and you're dealing with containers and microservices, you're dealing with things like API gateways, ingress controllers and, within clusters, service mesh. It is becoming a more API driven and app driven connectivity construct and I think, vendors, if they haven't addressed that today we'll be addressing it in the future because that's absolutely critical in this whole space. So you've probably gotten the takeaway that it is complex, and it's essential. Enterprises need to do this but it's complex, can be daunting and vendors in this space are trying to make it easier for enterprises, they are trying to help them achieve their objectives around multicloud, and the network can't be ignored. We've seen enterprises who have just assumed that they had what was necessary to do this well and they've learned that they didn't. And they had to go back to the drawing board and figure out how to achieve their objectives. So, I would say this is sometimes an underappreciated facet when organizations move on a multi cloud path but it's absolutely critical. And I think with that we will move to the next slide and we'll get to some of the discussion. Before we do that we're going to talk about multi cloud and multi cloud networking and how significant it is for customers and for the industry at large and what they need to do but before we do that, I want to give each of our panelists an opportunity to introduce themselves and provide a bit of context about their organizations and what they do so. Briefly, I'll basically go across my screen in terms of how I'm seeing each of you, each of you gentlemen today. Oliver, I wonder if you could provide a brief intro, please.

Oliver Cantor, Associate Director – Verizon Global Products, Verizon

Thanks very much Brad and it's a pleasure to be here. So, I'm Oliver Cantor. I'm at Verizon. I've been here a long time, and hopefully most people in the audience know who Verizon are. And I sit in the Verizon business group so I'm dealing with the largest enterprise customers in the US and globally. And, we have been providing for years a very large IP backbone IP network and of course in the US, all of our consumer services as well, and moving right now of course rapidly into 5G and beating the 5G drum, very hard but we're very interested in this space. We're very interested, of course for our customers and you described it very well, the evolution of what networking is right. It's been evolving for years and it will continue to evolve and the clever people on this panel have started companies that are looking hard at these, the nitty gritty right, and in the past, you could say that networks connected islands of computes together lands and telephone exchanges and other things. What are they connecting together now? Well workloads, and workloads are moving, right, data is moving, uses moving, everything's on the move. So, as we transition from this kind of this this static world of static digitization that's really been occurring for a number of years we're moving into a dynamic digitization and, you know, dealing with multi cloud, dealing with these complexities is exactly what we've got to keep abreast of so it's a pleasure to be here. It's a pleasure to be on the panel with these guys. So that's me.



Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much Oliver, and now we're going to move over to Steven Mullaney. Steve, please tell us a bit about, about what's happening at Aviatrix and how you're addressing this space.

Steve Mullaney, President & CEO, Aviatrix

Steve Mullaney, CEO of Aviatrix, longtime networking person. I've been in networking since 1985, I was at Synoptics in the early days, I was an Ethernet designer even before 10 baseT so I actually worked on 10 baseT so I saw the last great computing transformation of mainframes to client server and that's really what the model of computing that we've been building for the last 30-35 years. As you mentioned, I was the first VP of Marketing at Palo Alto Networks. I was interim CEO for a while, I was the CEO of Nicera, created a software defined fate craze. We got bought by VMware, I was at VMware for a few years and then I retired, I was done, that was it. I had a great career and for five years, I was just on boards and infrastructure was boring, we'd been talking about Cloud for 15 years and honestly enterprises weren't moving and that's where the money always has been and always will be, with enterprises. And then I noticed two years ago, what I call the Cambrian explosion to cloud where every enterprise finally said 'now we mean it'. And they've been talking about it and talking about it and talking about it and two years ago they said okay now we're doing it. And every enterprise as we all know they move like a pack of Buffalo, they move like a herd, they all do the same thing on the same day and they all decided, they locked arms and said we're now going to move to cloud, and I looked and I said, my god, okay we've now started. Mark that in your calendars, two years ago on a Tuesday. I remember the day we've entered the cloud computing phase is a model of computing, and it's happening. We've got over 500 customers. We've got significant enterprises and every single vertical names that your mom's, no, it's crazy and every single vertical has now gone and said two years ago, that is the center of gravity of our architecture, it is no longer the data center. You said it, Brad, it's not about the data center, right, it's not about that's why you see SD WAN is dead. Why, because it's not about going back to the data center. It's about going to the centers of data that are in the cloud. That is the center of architecture and where Aviatrix comes in is people don't want to go back to the horrific operational model of the 90s. They want a cloud native solution with the agility, the simplicity, the TerraForm automation it has to be that DevOps model. I can't take my Cisco's and Junipers and Aristas of the world and jam into the cloud, I need a cloud native solution. However, I'm like the government, I need the visibility, the security controls that I used to have on prem, and how do I do that combination? That's where Aviatrix comes into play. And then, where we really come into play, it's not just the first level problem is to get to the cloud, people think that's the problem, actually that's not the problem. That's level one, level 10 is once you're in the cloud and we'll talk about this as we go through this. This webcast, but that's where Aviatrix really plays is the entire networking for you as you move your center of gravity to cloud.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Excellent, Thank you very much, Steve. And now we'll move to Amir Khan, from Alkira, Amir please introduce yourself and tell us a bit about Alkira. Thank you.



Amir Khan, President, Founder and CEO, Alkira

Thanks, Brad, thanks for having me on the show. So, I also go back almost, you know, to the mid 80s in the networking industry and have been bringing out leading solutions to the market, including Viptela recently where we pioneered the SD wan space, and I took a year off after the company was acquired by Cisco, and decided to look into the next big problem then in the industry, and we saw a couple of friends. One was that cloud resources are enormous, and they were born in the cloud businesses which were scaling to hundreds of millions of consumers, and also in the networking space, you know, applications were getting delivered and they were scaling to enormous, you know, scale, and networking was lagging right, networking had not adopted the cloud, and we can build networks in the cloud for the cloud, you know, which can solve the majority of the problems that the customers run into today. And what we saw an opportunity was that you no longer need to build those routers anymore because the future, it will be software driven, and we had already done, to a certain extent, brought solutions based on software to the market. It needs to be done as a service, right, and the second major piece was when we started looking deeper into how each one of the cloud providers was providing networking capabilities. They were different, the nuances were different, and limitations were different, so we had the had to build the infrastructure in the cloud to solve those problems because otherwise, all those underlying nuances and details were being exposed to customers and multi cloud environments were not being adopted at the pace that it needs to be. To the point where we have made an announcement yesterday with Microsoft. The cloud providers feel that what we are doing, allows the industry to accelerate adoption of the cloud, and of the multi cloud environment. Right That's enormous. Right. And so, you need to have a ubiquitous solution which seamlessly spans across multiple clouds, and your hybrid environment, and your remote users, right and (inaudible) allows you to bring higher layer services together in a seamless manner, which has not happened today. And the only way you can do it is by building the solutions which are solutions which are horizontally scalable, and which are cloud native and which provide all the details to the large enterprises, right, from routing controls today to visibility to change control to, you know, compliance and so that they can meet the compliance and governance requirements, and those types of solutions did not exist at best, what you see was people orchestrating, you know, things together in clouds, but not necessarily providing what's needed by the enterprise, and that's what we bring to the table is a very comprehensive solution deployed by the largest enterprises in the world, across the globe, as well as, because we are a multi tenant solution. Think of it as we are the future service provider for enterprises, and we allow enterprises to scale. That's what we bring to the table and that's why there's such an accelerated adoption of our technology and solution in the market.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thank you very much, Amir and last but not least, nobody's least on this panel, I want to introduce Vijoy Pandey, to talk about how Cisco sees multicloud networking and what they're doing in the space, Vijoy.

Vijoy Pandey, Vice President, Engineering and CTO, Cisco

Thank you, Brad, it's a pleasure to be here. A fun panel. Indeed, I should say we started out with the bank. By the way, Steve, I think it was a Wednesday, I don't think it was Tuesday, if I remember correctly, but I agree with that sentiment. I think the way we look at multicloud is in the end there are applications



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and there are users, and nothing else really matters. And all of us are in the service of apps and users. And what's happening on the application side is, these big behemoths, these monoliths are being split apart, the guts are being taken out and they're being strewn across the wide open Internet. That's what's happening and you talked about the cloud data phenomenon that's exactly what's happening. There's no longer a big Oracle behemoth sitting somewhere on bare metal. There are services and API's and people are building apps using the services and API's scattered anywhere either public cloud providers which is what most people are talking about here, or SAS, I mean, a bunch of customers we talked to I mean most of the apps, 90% of the API has been used as SAS API's. And then there are of course cloud backends and on prem entities and so on and so forth. So in this kind of a distributed application environment where the network is really the runtime for all of these apps, your connectivity full stack connectivity from the API layer app layer to the cloud native layer virtualization bare metal. So full stack connectivity, full stack security, full Stack observability. Because if something goes wrong, is it the network's fault, which is what everybody thinks, first is the network's fault, but typically we've seen situations where you see latency is going up. And it's actually a ram element on a database server that's actually causing that problem. So, just going through and driving full stack connectivity, full stack security, infrastructure observability is how at least Cisco sees the world. And to your point earlier, I mean yes, data centers, centers of data, to me, actually, the whole sheet metal and brick and mortar is an illusion. I really doesn't matter. What really matters are API's and data objects. And that's what you need to connect, that's what you need to secure, regardless of where they happen to be. And yes, you need to have defense in depth. So you need to secure below that and all the way down to the bare metal, but that's where you need to start and that's at least how we see the world. One last comment before I move on. Sorry Steve but there's a lot of Juniper and Cisco shoved inside of the data of the hyperscalers as well. I've been there, I've run Google's networks for five years. There's a lot of Cisco and Juniper there but I agree what you mean by taking traditional architectures and trying to retrofit it is not going to work, I agree with that sentiment.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much, Vijoy, thanks to all the panelists for the introductions and then we'll move on to discussing the impact that multicloud and of course, the need for having to do multi cloud networking and support multi cloud networking connectivity, the impact that's having on the industry and on customers. We can take it from either perspective clearly customers have been grappling with this. I wonder if you could provide some perspective, each of you. And maybe we'll start with Steve, if you could talk about how you see them grappling with this in terms of their challenges and their most acute problems and what this means for the solutions that need to be provided for them.

Steve Mullaney, President & CEO, Aviatrix

Yeah so I think everyone here is in agreement that this is a business transformation, this is not a technology transformation, this is about the applications within it. I think the thing for me is, you know, has anybody been to a Sandals Resort, you know Brad, Have you ever been to Sandals?

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

I have not, but I know people who have.



Steve Mullaney, President & CEO, Aviatrix

Sandals, you look at the brochure and it looks fantastic. Oh my god, all you got to do is get there, and we have sailboats and we have food and we have wine, its fantastic. So this is the marketing pitch of the CSP, the hyperscalers so they say. All you got to do is get here. We will do everything in anything you ever need in terms of networking and network security and then enterprises go oh my god this is wonderful. I'm gonna have such a great time. You get to Sandals and you realize there's one sailboat. There's 400 people try to reserve the sailboat, and we'll give you the 4:30am slot on Monday Mr Mullaney if you'd like to take that boat. And then you go to the food and it's a buffet style, and when you have wine, its red wine and white wine, and you say well what kind of red wine, you don't understand Mr Mullaney we got red, well let me order off the menu. Can I get a bottle of CAP, no you don't have any of that on the island. This is what you get. And so the difference between the brochure and the reality and that's what happens to enterprises is it's the Sandals style. They get to the cloud, they've been sold a bill of goods, and they realize there's so much complexity, so much that is manual, even within one cloud, and so they get there. And that's why I say the access and the connectivity is a pedestrian view of the cloud that is just step one. There's nine more steps. Once you get there you realize the level of complexity, and you go oh crap. My CEO thinks cloud is clicky, clicky, clicky. They fired half of my staff, I don't really understand cloud, and I'm now in AWS, I started with. And oh, by the way, the business decides what Cloud I'm going to go in, not the infrastructure and the business has said good news. We're now on GCP because of their ml capabilities. We're an Oracle because I'm moving my Exadata database and Larry Ellison has made it very easy for me to move that. And of course I'm going to run that node CI, and I've got office 365 and Active Directory and I'm using, you know that for Azure. And oh by the way I'm going into China so I've got Alibaba. You get the point. So now it's four or five different public clouds, and oh by the way, agility is now part of the word mission critical for these enterprises, you don't get to say What year do I want that service, it's next week. And so, welcome to my nightmares and infrastructure team. And so, it's not that these apps are spread across multiple clouds, no one's dumb enough to do that, multi cloud is. I have this app running in that cloud. I have that app running in that cloud. enterprises will always run the app where it runs best. And if that means GCP that means GCP and the infrastructure team. I say jump you better say Hi. And I get it tomorrow. And so what they're looking for is a common architecture that I can deploy that abstracts away the difficulties and the complexities and the shortcomings of all the individual clouds and they're all different. Right, but gives me a common set of Enterprise Services and controls in visibility across this entire infrastructure of multiple clouds, plus on prem, that's the challenge that every infrastructure team across the world is dealing with.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Excellent, thank you very much, Steve. Amir, what are you seeing in your experiences? are you seeing something similar?

Amir Khan, President, Founder and CEO, Alkira

Yes, Brad very similar and majority of the customers that we are deploying our solution into have a similar problem where they want to, let's say consume Active Directory from Azure but they may be



sitting in multiple clouds and on premise locations, and so you need to seamlessly connect all these environments so that they can consume those services sitting in the cloud, right and the challenge so far has been that as Steve alluded to it. Building distributed applications has been a huge issue in the market, it's not that people don't want to build it, it's just that, to build the infrastructure to support those applications is so difficult. And then there's the data gravity issue, right, because data resides closest to the application and you cannot have the application far from that data. And so once you bring these environments together in a seamless manner, right now, it opens up new opportunities for you to start thinking about how to evolve your microservices architectures. We are starting to see some of the customers grapple with those ideas now but I totally agree that, you know, certain applications they run better in certain clouds and they may be more cost effective to run in those clouds, and that's how customers want to deploy them today and in the future they want to start to experiment with how we can distribute our applications, better going forward. Now, Having said that, the key is that you need to have a common infrastructure and the customers are struggling with security right today the way things are done, because there's a hodgepodge of stuff right you have to stitch all these instances together in the legacy environments right where you bring in either a Cisco virtual router and tied together with the Palo Alto through tunnels, and then on top of that create static policies, etc. And by the way, you cannot even do simple, you know, routing, or segmentation across these environments properly right people are doing it based on static policies, right, and so how do you bring this environment together so that you have a network, which moves at the speed that the business wants to move right not having to understand the nitty gritty details of how each individual environment works. It reminds me of the early days of the Internet standard, right, remember in the 80s and in the 90s we used to have 16 or 20 protocol suites, whether it was deck node or app deck net AppleTalk you know x NS Novell IP X and TCP IP was a small piece of the equation, right. And over time, TCP IP one and we started standardizing that's when we saw the competition and the industry flourished, right, we are still at the early stages of clouds evolving there is no standardization. Right, there is no consolidation, right so what the customer is stuck with, is learning all the nitty gritty details of each one of these environments at that enormously makes their life difficult and that's what we're bringing to the table as the New Age companies is to solve that problem and provide a common solution which is very clean, so that you can improve your security posture, and you can improve your services posture at the higher layers, and at the same time be able to provide day to operations and routing controls or whatever is needed to build this environment in a seamless manner, and that's missing from the equation today. Now having said that, I will go back to Vijays point also, that yes we need to move higher to the API level, to the end nodes or whether it's containers or server less or, you know VMs. But the reality is you will still talk to some customers who are running mainframes, they haven't gone away, right. So how do you bring this environment together so that the old applications, the way they consume. You know, resources, they are able to do that as well as you accommodate the new application, that's the challenge, right, so that is very very important that you have brownfield deployments not only Greenfield deployments in the cloud, that need to be supported.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Yes, thanks very much Amir. That's a great point in terms of not everybody out there in the enterprise world is at the same stage of their cloud journey and some are having to pull forward, you know



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mainframe applications and AS 400 applications, as IDC has seen, in the insurance industry are still theretoday so it's a great point. Now, on to Vijoy. Amir set it up nicely for you. You mentioned the importance of cloud native and the shift to cloud native. I wonder if you could talk about what that means for the customer and what that means for the infrastructure they require. And also the operational changes that are occurring within many of these enterprises and how important solutions are in that context.

Vijoy Pandey, Vice President, Engineering and CTO, Cisco

No, absolutely, I think just to like hammer on that complexity statement, again, is actually much worse than what Steve and Amir talked about, if we think about it, what's happening right now is there's evolution happening on two axis. The X axis to me is geographical so everybody was in private clouds or on prem whatever you want to call it, self hosted. And then there was this big movement towards let's go public cloud and that's all that matters and let's move towards the left. Go public cloud and then now we're looking at the balkanization of cloud which is everybody's having their own, every country has their own governance and legal requirements and so on and so forth. So we are moving back into some foster, private in country, but further and further out to the right, we are actually going (inaudible) Edge locations because we are working on data sets. And to me, you're looking at data sets, you want to drive insights, And you basically want to throw it away, because guess what, shoving it back all the way to the public cloud and bringing it back again when you need it is super, super costly right so just that data movement is super costly it might be. There might be legal issues governance issues and so on so you want to have data gravity, you want to have insights, which then these things which are sitting in our hands are getting more and more effective over time so there's a lot of competition happening on those handhelds as well so this is X axis which is almost like a cached environment where you might do computations anywhere and actually have data consistency across the X axis that's complexity, number one, and then the complexity number one is on the wire. Number two is on the Y axis, which is what I talked about earlier, you're moving from bare metal, which was either so monolithic which was bare metal or virtualization. Both were monolithic environments to cloud native which is composable which is either microservices containers or serverless, and maybe in the future low code no code, whatever it happens to be. Developers are lazy, they will want better abstraction, they want to go higher up the stack, I mean, that's something that you cannot stop, so you have this space, X and Y which is complicating things like crazy. So, in this kind of environment, everything that Steve talked about the cloud operating model all of that is valid. I would say this is driving a bunch of things. One is the whole operating model is changing, which means you don't have a database admin for example, you have SRS that handle thinner and thinner services, which means your organizational structure is changing because you don't have database admins you have (inaudible) that tackle thinner and thinner things you have development teams that are developing services, not databases as a whole. So, operational model is changing, they are sorry the SRU model is coming in full force. And you have this complexity and two axis. The one thing I would say that is a silver lining in all of this is, I think, either it was one of the panelists who mentioned that oh, Brad, you did. But declarative models are the way to go forward in all of this because what you're telling, you need to build systems and you need to tell the system take me to from point A to point B, not how you get from point A to point B, but just get me to point B. I think that's the way that as an industry we need to evolve towards, that will be the way we

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abstract complexity and make it simple, but it's a hard, hard problem and it needs the startups, it needs the big companies, it needs the hyperscalers, all of us to collaborate to make that happen but that's the only way that'll abstract out the complexity and make things simple for the for the customer.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much, Vijoy. Oliver, you're coming from Verizon, the problems are similar but you might have a different perspective on it from a service provider vantage point or not? I'd love to hear what you have to say on the topic.

Oliver Cantor, Associate Director – Verizon Global Products, Verizon

No, I am very similar. Great discussion. I did just quickly look up Sandals on my device and it came up straight away with all exclusive holidays for two people in love, which is quite nice, so I thought I'd mentioned that, so perhaps we don't talk about love enough here and in this in this pandemic age but what the guys have said is fantastic. If you take an even bigger step back, we've seen a lot of this before I started my career coding XC 10 telephone exchanges in Erlang funnily enough to talk about declarative languages. I never thought I'd say that again but when we evolved C seven signaling and iron networks and a lot of these network trends have been seen before and of course the balkanization the regional governance, the wiretapping, the evidence that goes on per country in the nationalist world that we live in and that we might be somewhat returning to at the moment geopolitically but we've seen a lot of this and it's happening now, but on a larger scale with the internet. The one common denominator that we have here, which is from a technical point of view, is IP, but from a practical point of view as Vijoy pointed out, we're connecting users and apps right. But this is happening. If you step back where we're all building, everyone in the game here right, a giant utility. We're just know when they're finished building it. Yeah, you know to amaze point, and, and there's a lot of chasing the ball right, you know, not looking at the game and that's inevitable and big business does that, it's got the money, and, you know, and on a certain day decides to go cloud right and then, go zero trust or go SD wham, you know, and you can all have your opinion on where that'll end up. But the one thing that's noticeable is that it's relentless and it won't wait, I think that's true. We have shifted, very much from a supply side market to a demand side market. I mean that is absolutely massively true. So whereas in the past we could build technologies to add a certain speed and supply them into the market probably without jumping a few steps. Maybe you're waiting a little longer to get things, I know we were always slow but maybe waiting to get things perhaps a little more standardized and a little more ready for the market. We cannot do that now, we're being dragged forward and not just by the enterprise customers, by their customers. So this supply side digital market means that we have to move quickly, forcing the whole agile moving, forcing us to really look ahead and you could actually say all of the hyperscale has been even priced on the difference between the.com boom and now is that those companies were all priced, Probably at their market value at the time, all over the hyperscale is now a somewhat price for what they might do in the future so we have increased the clock speed something chronic at the moment, but coming back down to earth a little bit more, so we're building out this this commodity. So this utility, and all of the complexities the guys mentioned here have to be solved for light and have to be solved for at scale. You talked about customers, I've talked to many customers, some of these large customers don't realize yet that this problem is hitting them. Well they do but it's lost

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in their sort of developer land because that landscape is a little crazy and I like that quote, you know, I think, Vijoy said developers or developers are lazy, right, and that's not get started on our dear developer friends and the whole world of coding that's another conference. They're not generally speaking network engineers and I mean that in the sort of robust longevity sense of building things at scale, that will work for a long time and that are federated right you know and that deal with these kinds of complexities. That's good because they move quickly and build things that solve business problems immediately bad because you'll get fragmentation and then you get cost and complexity and we're in this environment at the moment. As these clever people on the panel here, and others these new breed of providers, come up with solutions together with some of our clever people as well. We are definitely going to be looking at offering these kinds of services so that enterprise customers wherever we can make DevOps simpler take cost out of platforming take cost out of you know the complexity of multi cloud. We'll be doing that so there was a long way of saying yes, I agree with everyone.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much Oliver. We'll move on to the second stage of the panel discussion. We've talked about some of the challenges already, but I want to talk about the business benefits that enterprises are getting from this that you're seeing. Some of them may appear, may seem obvious, but some of them may be less obvious. And I think this is a great opportunity to really dig down into the benefits and the value, right, so not just operational benefits, although I'm I know those, those definitely come into play. But we'll talk about the business benefits that customers are getting from the technology. Amir let's start with you.

Amir Khan, President, Founder and CEO, Alkira

Yeah, that's a very good point. I mean from the business perspective, I think people are facing the challenge where it was okay for the network to be slow, right, and now that people are getting used to the cloud, they know how quickly they can adopt and deploy new newer types of applications in their environment and start offering it to the broader community. The challenge is that network becomes a hindrance in that adoption today. Right. And so the benefit from the business perspective is huge as one of our customers says that we need to move at the speed of the business not at the speed of the network. And that's what we are changing. That equation is completely changing now that you can deploy these global networks within minutes or hours rather than months or years that it used to take. So people went through this transformation, as they are adopting to the cloud, they deployed, number one phase was (inaudible) facilities, right with hardware based solutions where you connected your data center to the (inaudible) from the (inaudible) into the cloud, right, that took them approximately 12 months to two years to deploy. Then they realize that that merely brought them to the edge of the cloud, but my cloud applications are residing deeper into the cloud and I don't know how to handle my network as my complexity is growing inside a cloud. So what do I do? I try to do it on my own. So DIY solutions came up, and every customer was doing it on their own. That was the second phase, that still took them 6 to 12 months to adopt a single cloud, and that was not enough to move, to have the agility, which is required to move in today's business world. So now everybody wants these as a service offerings where you could mould the solution to the requirements or match it with the requirements of

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the business and that's what we're seeing with the larger and midsize and smaller customers today, is that everybody wants to have that agility, so that they can offer services quickly to the market.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Absolutely, I think those are all great points. Vijoy, what are you seeing as the key benefits that customers want to achieve and are achieving as a result of this shift?

Vijoy Pandey, Vice President, Engineering and CTO, Cisco

I think there is a there is a pendulum swing that happened and everybody wanted to move to the cloud. There are reasons for that, I mean we've talked about operational simplicity because it's not my headache, it's somebody else's headache. I mean that's what I'm paying somebody else for. So that was one reason I mean from the developer viewpoint, it's again, new capabilities that I could not get from my own Prem provider. That's another benefit, and then the velocity. I think let's not let's not ignore that. The speed at which I could move is actually much faster if I'm picking and choosing API's that matter to me and my app, rather than waiting for somebody to provide that to me in my homegrown environment. So I think those are the three big reasons and then again we are shifting back and forth, and coming back to on prem man, and the edge, but I think if you again think about the Y axis here. I don't know if you guys have seen what cloud native does to a monolithic app. I mean it just looks like the COVID-19 virus, I mean it just looks horribly, horribly scary and you have these nodes and you have these edges and it's like a behemoth of a hairball. Right and I think you look at that and you would think Why would anybody just do that to themselves, I mean it's just scary to imagine what that would cause to the uptime of your app or to the to the feature velocity of your app and actually it's exactly those statements why one would do it. Because suddenly when you want to upgrade something you're not bringing on there's no maintenance window. You're not bringing down the entire Oracle back end and want to upgrade the Oracle back end just to get on version 17.1 dot 1.1 or something like that. Right, so you could upgrade a tiny piece of your app and maybe 99% of the time, there is no visible hit to the customer right. If something goes wrong, the blast radius, or something, goes wrong, is really tiny, So your availability numbers go up. It allows you to scale because you can scale out piece parts of that application. So, I think the benefits of going can go on and on but the benefits of breaking down an application, making it making it multi SAS, multi cloud, cloud native are tremendous. But you need to have the tools and the capabilities to monitor it so that's why I think the full stack observability piece comes in handy. You need to have discoverability and you need to have security at the API layer all the way down, so you need to have all of those tools from the connectivity security observability viewpoint, so that you can manage these things properly but the benefits are huge, of doing this.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Excellent. No, I think those are those are extremely valid points, and Oliver from your perspective, what are you seeing in terms of our customers coming to you with certain KPIs, certain benefits they want to achieve and SLS and that sort of thing?



Oliver Cantor, Associate Director – Verizon Global Products, Verizon

Yeah, they will always want to offer us delays. The traditional connectivity challenge and I see multi cloud, and almost sort of three layers. The connectivity piece, which you've got to solve for, there's the sort of multi cloud management which is really where a lot of the complexity is that some of the new guys have a solving for which is how do I handle my user to app, app to app, you know, policy, and sort of federated if you like, single pane of glass, so that I don't have to be hampered by as you put it you know clouds plausible. Now I can start to rein in my upskilling costs, my platform costs and my DevOps costs. You know, just talking to a friend, a senior guy in procurement at a large enterprise saying, and he doesn't know technology but when I mentioned DevOps he just shook his head and he said those good old DevOps engineers walking around in their jeans, this is obviously pre COVID But, you know, they're the lifeblood they're like the creatives at an ad agency, probably now the lifeblood of what enterprises need to focus on which is their brand, their intellectual property, you know, up the stack. All of the apps their customers, their customer experience, and the complexity to offer these guys everything they want in a cloud wherever that cloud may be, I think to Vijoy's point, the edge journey is kind of inevitable as cloud spreads itself from hyper scalars to the edge and networks become cloudified from the bottom up. There are two sides of the same coin, really but enterprises are just shaking their heads with all of this complexity that's growing and growing and so they are looking for the as a service model. I think to Steve's Sandals analogy, enterprises at some point fell in the past, on a certain day fell in love with the cloud, and what did they fall in love with? The utility, the usability and the Pay As You Go ability sort of the cloud and everyone went that's the oxygen I want to talk about now. That is, you know that takes all the oxygen in the room, nobody knows CIOs go into their business units and talk about the (inaudible) anymore the network they want to talk about this usability to enable business. But it's not all available in, just because of a location in, as Vijoy pointed out, and B is getting more complex with multi cloud so businesses are definitely asking for that and ultimately, it's still about cost. We're still mostly stuck on the cost side of the equation, but most enterprises, want to be on the profit side, in the revenue side and we increasingly are getting us, in our share of that, whether it's 5G and Mac and getting more vertical right, but we're mostly on the cost side, and the more that we can show agility and remove cost or complexity out of what's emerging, the better. And, you know, customers want that at the connectivity layer, is sort of multi everything layered but multi cloud layer. And lastly, I didn't mention the user experience layer right, it's got to be presented in a single pane of glass with the outline API's, the right pick and mix so that you get the service, okay. And so, yeah, we're seeing it from a lot of customers, not all of them are able to articulate perhaps the problem but it's definitely the next big challenge,

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Fair enough and thanks Oliver. I was going to say, you guys have been very kind and respectful to one another but Sandals has really taken a beating today. Probably, there won't be much customer acquisition going on there. And now I want to hand it over to Steve, You've seen at Aviatix a wide range of customers, I wonder if you can speak to the commonality of what they're trying to achieve and also some of the differences.



Steve Mullaney, President & CEO, Aviatix

Yeah so, I think the reason why we all agree on this panel is this is a transformation that's happening, this is a business transformation happening. And, we all see that we're talking to customers, we absolutely see that, and this is driven not by the infrastructure teams. The infrastructure teams didn't wake up one day and say let's go to cloud, wouldn't that be fun. No, they fought this cloud thing for years. Why, because that's what infrastructure teams do, they do not want to do anything new, because they're going to get fired because the risk of doing something new is just far too great. So, they're gonna hold on as long as they can. The business benefit is a driver of the most fundamental driver of every organism in life, survival, right, that is what every organism, the number one thing is survival. Number two is reproduction, number one, survival. That's what is driving this. This is the business people, this is the board, the CEO, saying we have an existential threat to the survival of our company. And it's not from the other legacy vendors, you know banks aren't worried about other banks, they're worried about the Neo banks, they're worried about people that have digitally transformed their leverage cloud, and have the word that everybody's talked about here which is agility. Because it's all about driving the business and if I'm competing with people that I'm playing by the rules that we set up 30 years ago, where we do things in the timeframe of years. And they're doing things in hours and days, we're going to die. And so that is a huge business benefit. And that's what's driving it and so all the things in the infrastructure, the applique, I like to say the application rocks, the infrastructure roles like you have to go and follow the app and the app is what the business cares about and the agility of doing being able to roll these things out quicker, you see what's happened with COVID its just accelerated this movement into cloud. And so the number one thing is agility. We all talk about that is the business benefit, how do I do that now from an infrastructure perspective is, oh okay, I need it simple, right complexity is the killer of speed. I've got to automate, I've got to get the human out of the way, I got to use TerraForm, I've got to go and have API's are going to automate all this stuff. And oh by the way, have to operationalize this, I need visibility, I need controls, I need security controls and performance controls, I have to be able to double, triple, quadruple click down if I need to, to understand what's going on. And this is the problem with as a service and what the cloud providers. This is part of the samples analogies, guess what they say, you don't need to know what you mean or don't need to know. You don't need to know. It's a service niggle, well what happens if something goes wrong, they say, well, nothing will go wrong. You go, well what happens if something goes wrong, and they say, nothing will go wrong, and you have this standoff. It's, and the problem is, enterprises are the ones that need to know. I need to know. I've got to have that visibility, I have to have that control. Now I need it in a simple, in an automated way. So I can scale this thing out quickly and have that agility, but I need to know and you know what, there's a lot of people that loves, I hate this, pick on Sandals, again, a lot of people that love Sandals, not me. Right. Why, because I'm a discerning client. I don't want red wine. I don't want white wine, and oh by the way they talk about abundant, beverages, guess what, Oliver, if you go there you cannot get a buzz at Sandals. I tried and I drank and I drank and I drank and I drank. There's no alcohol in those drinks. So, if that's what you like go to the CFPs and go to other people that have a SaaS model, because that's what you're gonna get. Every enterprise I know is like me, and they don't like Sandals.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

There we go.



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Amir Khan, President, Founder and CEO, Alkira

So, I think Brad those are great points and the challenges, again, if you can bring the business agility to the enterprises, it's going to be a huge issue for them on an ongoing basis. So, what they're looking forward to summarize is simplicity. They want agility. They want control over their environment so that they can come up with the policies which meet their compliance and governance requirements and costs as another major issue. Right, so they want to be able to reduce the costs and the fifth element that I would say is security right to streamline the security across the environment and some fundamentally important to the enterprise's because there's a hodgepodge of stuff that they have to do today. And of course, of any solution, if you don't provide the control for the detail oriented folks where you can have your routing policies or intercompany routing or inter segmentation routing and all the detailed stuff that the customers have been used to in the existing environment, then you are not able to do justice to it, and I would go back to the analogy that people are doing segmentation in the cloud based on static policies you'd fat finger three commands and your network comes crashing down. People forget that there's, you know that you can create loops very easily in those environments. And, you know, so you create a loop in the environment as a mission critical environment, your whole network goes down, all applications go down so that's how important this infrastructure is. And that's something that is needed by the enterprise's solution that not only is a journal, which does things very quickly but at the same time gives all the elements that they're looking for.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Yeah, thanks very much and I think Amir you made the point and Steve made the point and others made the point earlier, is that one of the challenges in the first stage of cloud was you could have agility, but, you know, control would be too much of a drag on the agility. I think now what we're talking about and what many of you panelists have talked about today is there's a way of reconciling the two so that so that it doesn't involve. It doesn't involve a trade-off between the two, you can have both you can get agility with control and that's exactly,

Vijoy Pandey, Vice President, Engineering and CTO, Cisco

If I can just chime in a little bit. I think this is where we also need to be careful because control is the harbinger of complexity. So, we just need to be careful as to how much control, and how we provide that control and that's why I go back to my declarative comment earlier because providing policy is important. And when we say declarative and intent based and all of those things. There are various levels of intent. Is it configuration intent, (inaudible) design intent is a topology intent? I mean you can have intent or various layers, and so the policy layer the design layer is the right place to provide intent to provide the controls. Anything beyond that drives complexity. So that's one comment I would make and then building it out in layers is the other way to think about this, because just like as divine and all of us have as you and solutions here, just like as the wind does not remove the need for laying out intercontinental fiber, there is need. There needs to be layers that needs to be built up on the stack. So, so what as demand does and what a service mesh would do and what act an actual physical network would do, I mean these things need to build out nicely in a simple way that provide declarative policy intent, And that's the way to drive this architecture. Excellent.



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Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

No thank you. I think we'll move on now to the third discussion point. Now we get to talk about how you solve the problem, right, so we talked about the problem, we talked about the benefits customers can accrue from addressing these challenges and problems successfully. I know that the panelists here, you all come at it from different perspectives, and you all have different approaches to solving the problem, which is great because I can think of some other markets not too long ago where they were fairly uniform in terms of the architectures and the way the approach to solving the problem but I think one of the things that's very exciting about the multi cloud networking and connectivity space is the variety of approaches. There are some very clear alternatives that customers have, and they can select the one that is most suited to their environments and their requirements so we'll start with Vijoy. I wonder if you could talk about how you solve this problem.

Vijoy Pandey, Vice President, Engineering and CTO, Cisco

Yeah, I think we've all been talking about some of the solutions already. So, to summarize, I would say yes the movement to cloud is going to be there, I'm interested in the comment that there is a Cambrian explosion happening right now, that is going to take place, that the movement is going to take place and it's going to take place across the X axis that I talked about. The movement to cloud native from bare metal and monolithic is going to take place. No matter what we decide to do as infrastructure providers, that's going to happen. So in this space, how do we make sure that our customers journeys are simple and straightforward and so going back to building it out in layers, making sure that every layer has clean API's and those API's are the ones that are tickled and not, not architectural we merge these layers together so that's principle number one, making sure that these things are built in cloud native ways so that you have availability of velocity or agility, you have blast radius protection so all of these things are important, because suddenly like I said, apps are now distributed across the globe, and so your fat fingering like Amir was pointing out is going to have massive consequences across. And one of the things I realized that this was back at Google is you make a change at one point, and it's like a butterfly effect, you don't even think that is going to impact something else like across the globe and that does happen. So being safe when we do these things is critically important. So, that's where all of these design principles come into play. And then, because these apps are widely disparate, I think, going back to, from the app, all the way down, so making sure that your API's are connected and there is declarative definitions of those API's and how we want to connect them, your security policies are connected at the API layer and you define your policies at that layer, but then making sure that things are threaded all the way down, and to ensure that things are humming nicely, your full stack observability is key, because you want to observe what's happening at the API layer the app layer, what's happening across your network from users to your distributed app, and they're going again all the way down to the physical infrastructure because believe me, all of this needs to hit the road and the road is your fiber and your switches and your routers, those things are not going anywhere. I mean, as much as we all like to talk about the API layer. That's what's carrying the internet and we are back to where we started, because I've seen those things drive the hyperscalers as well I mean that's where the rubber hits the road so we need to thread all the way down from the API to the bare metal and do it in a layered approach.

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Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much Vijoy and it's a nice transition you actually provided because now we're going to move over to Oliver. Oliver, I would imagine being at Verizon the importance of transport and transit is absolutely key in this equation so I wonder if you could talk about what Verizon is bringing to the table in this context.

Oliver Cantor, Associate Director – Verizon Global Products, Verizon

Well it is of course 5 million. Look, everyone should probably buy shares in fiber companies if they don't already because 5G is driving a lot of fiber right and I think so. But I'm going to give a slightly different answer and keep it away from technology right. I'm gonna say that it's not a technology answer, I mean it is right and we're evolving the technology, but probably the big value apart from investing billions of dollars, which I have to say to put my Verizon hat on, huge billions of dollars every year and embracing, understanding enterprise customers is probably one of the biggest values. Look technologies come and go, they evolve, they will they all perform a job. We get the luxury sometimes of getting it right as a whole industry with our technology and sometimes. Well closure is too hard a word, but let the internet itself had plenty of closures if you like, and some people view them as terrible mistakes and other people say that they make the internet very usable for example, so the technologies will come and go but once, and there are many roads right moving forward many paths, there's the DIY model we talked about, which is just inevitable at times, there's many different ways you can lay on your solutions to digitizing your entire enterprise. We at Verizon (inaudible) would basically state that unless you come to a big global company that has a lot of engineering skills that we will get you there faster and if you want safer, because you can go and string together a lot of different technologies, if you want right now, but you can try and do that but you may get it right, you may get it wrong and by all means do it but if you want longevity and you want to really do things properly, you are going to need to go to companies that know how to scale, know how to operate in multiple countries, have done it before doing it to themselves, and will inherit, vendor agnostic will inherit in us the best and the cleverest, like these guys are talking about, in our solution so I'm going to give you an engineering, global big company, answer to make. And I think that's important.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Yeah, that's fine. I know we're running into Q&A so, maybe very briefly Amir, and Steve you talked about the use of TerraForm and TerraForm providers, in terms of, you know, the, the mechanism that you use to provide this solution, and I know Amir, you have a very much a network as a service SaaS approach but very briefly if you guys could summarize and then we'll move to Q&A

Steve Mullaney, President & CEO, Aviatrix

Yeah, I just think the first thing is, everybody knows, has to be cloud native right. I call you know the old world stuff is cloud nine, right, it sounds the same one letter difference but it makes all the difference in the world. So, you have to understand that native concepts in the cloud is just, just different. So that that's number one. And part of that being cloud, cloud native, is that you know the API's and TerraForm and everything we've talked about has to be simple, it has to be automated, all those kinds of things. I



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think for us, for Aviatrix, you know, it's not just to and across clouds but it's also within clouds and that's kind of the analogy of the Sandals thing is, it's not just about getting to Sandals when you get there, that's when the trouble really starts. So, we tend to in the industry think it was just, we just got to fly there, we just got to get here and then everything will be fine. It's not going to be fine. And so it's too, it's across and it's also within and you need a platform that enables people to have a common architecture with a common set of services, whether I'm an AWS, Azure, Google, Oracle, Alibaba, it doesn't matter, that understands and programs needed services that those clouds provide, and then augments with advanced services around networking security are then with a global common single pane of glass for visibility across all those clouds as well as on prem. I need that networking platform that's what Aviatrix does and then where we're going with this is we are building, as an industry, in autonomous infrastructure which the networking is part of that Aviatrix will be that layer of that stack. That is going to optimize the application which is what the customer really cares about performance, security, actually, and cost and that was invested event metric that we didn't have to worry about. I'm proud, and you see it with bars people you know, it's going to go autonomous, so that infrastructure is going to be through API's talking to each other, and is going to do that in a very self-optimized way that around, the optimization of the application and that's where that's where we're going to date matrix.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much, Steve then very briefly Amir, and we'll get to Q&A because I know there are questions awaiting you folks so there we go,

Amir Khan, President, Founder and CEO, Alkira

Yeah, in addition to what Steve said, I agree with those points but at the same time you need to be able to build something which is global and reach right, and because even the smallest companies can have partners who are sitting somewhere else, and they need to be able to move very very quickly to accommodate those environments, whether it's a merger or acquisition of stuff. So, two points. One is the customer needs, right, You always have to look at the customer needs. And the second piece is how the technology is evolving, right, and the architecture needs to meet those both requirements and take into account how the clouds are evolving. I would say routers are not no longer needed, I won't say that, you know technologies are not needed, there's no technology religion right as we used to say early days at Cisco, but the way we build the solutions, it's going to be purely software cloud sitting on your on prem cloud sits in the edge. Cloud is going everywhere so you will have utility, which will be the network then you'll have all the intelligence services residing in the cloud. That's what we are taking advantage of. So, as a service solution, which is simplistic but at the same time meets the requirements of the, you know, advanced users control from agility perspective as well as compliance GDPR requirements as an example where the data resides. It's fundamentally important, and be able to manage that environment in a very simplistic manner is fundamentally important. And so that's why we bring in the solution which is called cloud network as a service, which spans the globe, and provides the capabilities which are seamless from security perspective as well. So, simplicity is very important streamlining is very important, otherwise your network will not be secure, and the industry needs to evolve, and we are transforming that market.



Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Thanks very much Amir and now we'll move to Q&A. I think we've got some questions, awaiting, awaiting the panelists.

George Rickman, NetEvents

Hi, Brad, George here, I'm just moving over to the Q&A slide. Ah, first question, that is to anyone that you want to pitch it to, is:

'understandably, a lot of attention has is being paid to the RE architecture of the hybrid cloud network in order to address application, availability and optimize performance, but how important is it to also consider the migration management strategy, given how many CFOs have had their budgets burned by lemming like plunges into the cloud. Yeah, yes I'm talking to you DevOps guys, only to find out how expensive cloud services can be.'

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

It's a great question, of course it's a broader question, but are there any panelists to want to want to move in and provide an answer to that. Just give me a quick signal, in terms of who wants to wants to step up and answer that one

Oliver Cantor, Associate Director – Verizon Global Products, Verizon

Yeah, let's try. It's a great question that plenty of money gets burnt in good ideas at the beginning, Why? Look cloud computing as a concept, offers so many good things, that's why it became so hard. However, in application and in practice in the world it's only at the beginning like that's why we have this movement to the edge. That's why we've been evolving data centers, and we have private cloud etc etc so you know this rush to the cloud, again as I said people chase the ball and unable always to see the whole game that's playing out, so budgets have been burned. And again, as I said, you know, that's why at Verizon seeing the bigger picture is very, very important. And understanding that it's not just about the technology you got to know where the technology is in its lifecycle, and where the whole of let's call it networking whether that evolves to, you know something high (inaudible) or not, where that is in its lifecycle as well. We've seen it all before, and we'll see it all again, no doubt, but I'm learning and working with how you migrate enterprises to the cloud to different clouds to the edge, and giving them tools to do that is very, very important. That's why these tools and these capabilities these guys are offering are very important because if they can reduce the cost and reduce the complexity, they're good.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Yeah, this is very much a kind of governance question right I mean it's, it's about how you govern your shift to cloud and multi cloud.

Amir Khan, President, Founder and CEO, Alkira

Exactly Brad and that's the reason you need to have the control over these things and automate things, because let's take an example, an employee goes and spins up an instance in the cloud, they may end



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up spinning up extra large instances where they could be able to get away with a medium instance and that's where the cost comes from. You don't know who's using what and how do you control that and there are tools being put together, to be able to address that. So at least from the networking perspective, the level of automation that we are bringing is based on your needs, right, it needs to be elastic so it goes an up and down based on your needs, right, and that's fundamentally important to control the cost going forward whether it's networking, or whether it's compute, storage and other elements of the network. So what we are doing to the network is as a service, bringing something similar to what I Azure and AWS did to, you know, your compute and storage and data base of applications, we are doing that to the network, but taking it to the next level because we had the luxury of learning from the mistakes of the past so that we can cater to the needs of the customer is very, very important to control the cost going forward.

Steve Mullaney, President & CEO, Aviatrix

Brad, this is Steve. And Steve, your question is exactly right. So, you know, prior to two years ago, it wasn't involved it were the bad guys that we went around does what's called Shadow IT, and people were running around naked drinking tequila, right, and they were having a grand old time, it was fun and games man is beautiful. I don't worry about compliance, auditing, security, we were having a hell of a time. And then, and then two years ago everyone said okay, This is not fun and games anymore. We are now going to the cloud. Thank you for your help, you know, Mr DevOps and all you guys running around naked, where we're B N F N melon right now, right, we don't do that. So, we're big boys are in charge now. Now, we thank you, We need to maintain that philosophy of DevOps and agility we get it, we learned our lesson, we're not going back to the 1994 Horrible complex model that we used to have an on prem client server, we're going to be new, but we can't run around naked drinking tequila. We have to have visibility we have to have control operationalize this, that's what happened two years ago and so, so the question from Steve, you're absolutely right. They had issues, and they would then now they're realizing, okay, This is our strategic architecture, we have to do this right, this is not fun and games anymore.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

We talk about DevOps but, but, you know, what we're what we're talking about in this in this context is a reassertion of ops, as a governance control on some of the some of the debauchery that you spoke about.

Steve Mullaney, President & CEO, Aviatrix

I can't lose that velocity and that agility. I absolutely that's requirement number one, your customer told me the other day was if the word agility is now part of mission critical. And that's so true. So, how do I do that, but yet bring back some of that visibility and control that I used to have in my optimized infrastructure on prem,

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Absolutely I think Vijoy, you're saying something as well.



Vijoy Pandey, Vice President, Engineering and CTO, Cisco

Yeah, I think just to add to that, I mean and to the question earlier. It's also feels like a one way street right because the tools on this freeway are asymmetric once you go in, it's very hard to come out. So, when you want to go in with a cloud provider, when you want to move and all your data to your AWS or GCP or Azure or wherever, you need to be a little cautious in picking the right partner as well and so doing the What If analysis on what will it get me. If I move my workloads there I mean that's some of the products that we have in inter site and (inaudible) allow you to do that because you need to be pretty sure that once I move in, I mean, I'm good to go for the next couple of years and then moving out is going to be a problem. So it's not just the data costs and it's not just a cost analysis but it's also performance analysis. Should I pick A, or B, because it depends on where my customers are and where the data centers from that providers reside? So it's not a simple, just an onboarding question, I mean I hope it was but it's not. And it's a much more complex analysis that you need to do.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Absolutely, and George, any additional questions for the panel.

George Rickman, NetEvents

Sure, yeah, just, just a reminder if anyone would like to ask a question please either type it into the Q&A, or raise your hand and I'll unmute your microphone. We have another question - what is the clear differentiation between these two startups: Alkira and Aviatrix?

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Well we'll put it to our two panelists from those respective companies, Amir if you want to be first.

Vijoy Pandey, Vice President, Engineering and CTO, Cisco

Yeah, I'm just, I'm just getting my bag of popcorn. Hold on.

Amir Khan, President, Founder and CEO, Alkira

Steve, you you're welcome to go first if you want.

Steve Mullaney, President & CEO, Aviatrix

Okay, yeah, yeah, I mean, I guess my, my view of this is, this is going to be a monstrous. This is monsters, this is it. This is a transformation that, you know, eight o'clock Aviatrix is going to be minimum \$20 - \$30 billion dollar market cap, probably \$70-\$80 billion. I'm sure out here I don't really know what they do. Exactly. I'm sure they're going to be successful to just because this is just a monstrous transformation in the computing model, what I will tell you is the customers that that we talked to, I'm going to make another prediction, And I'm generally, it's a curse, but I'm usually right. And I'm usually a couple years ahead of everybody else. You know, people now see multi cloud is happening, two years ago when I talked about multi cloud everybody thought, oh that's just, you know, what are you talking about. Now everybody goes and says, okay, Yeah, no, I think the other thing that's gonna happen is poor infrastructure, a SaaS model is going to become a four letter word. And that's actually an old view of how you would do things. Every single one of our customers and again like I said, about 500 enterprise

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customers do not want it as a service. And the reason is because exactly what Vijoy you were saying, You've got to be very careful. I want my infrastructure. Now I want it to look like SAS I want it to be simple, I want it to be agile, I want all the benefits of SAS, but I don't want it as a service, because I want to know that I have my infrastructure that's optimized for my infrastructure. And oh by the way if I decide I want to run in AWS or Azure or whatever. I want to be able to go and do that and I don't want to rely, I'm not going to trade one black box of the favorite CSP for another black box, right, who black boxes on top of each other, is even worse than one black box. I need that visibility that control and I've got to be able to have that fine printer. When you talk to an enterprise, there's two words they love visibility and control access drives them they love that. And prior to two years ago. Everybody loves Sandals, right, they didn't need the visibility and control they were fine with red wine, but not the enterprise, I need that visibility Trump now. Don't push me back to the old horrible complex Cisco model of the 90s right I don't want that to have a DevOps model, but I still need that visibility and control and that only comes from having your own infrastructure, and having the best of both worlds. So that's that people don't understand now they're about Aviatrix, and in two years, I guarantee we'll do another one of these events, everyone will go and say wow, you're right.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

So, thanks for answering, and there's, there's Amir. please respond.

Amir Khan, President, Founder and CEO, Alkira

So I think it's interesting, I think the key is that moving things slightly beyond where they are is not helping the customer right so similar architectures to before where you have to deploy a node in every VPC to get any level of intelligence or build your infrastructure in the way that all technologies were built, or bringing out a technology which is similar to how the network management solutions used to be where, you know, you were always lagging behind or dependent upon the equipment vendors, providers, whatever they offered you had to accommodate your solution to, you know, bring out that capability to the market. And that's why we took the approach of building our own infrastructure in the public cloud providers infrastructure so that we didn't have to rely on 10 different clouds to bring out a feature, and you know how difficult it has been historically, to bring out features, even if you have cross department dependency level on cross company dependency, right, and that's where I think the struggle will be in majority of the market and that's why we took a very unique approach, we have for the first time in the history of computer networking industry. We are building a solution which is cloud native, which is, you know solves the cloud as well as hybrid environment problems with full visibility and control, right, so let's take an example of MPLS, MPLS took away the layer three control from you. We are bringing that back to the market, you know, a part of that was done as a Pella solution with a control plane was extracted and put into the cloud, right so that your routing control could be back because you want it to use multiple transport underneath, right. So say, similarly here, what you need to do is extract out the underlying clouds, not necessarily the transport, but at the same time provide more control to the enterprise, if they needed their levels of enterprise requirements right some customers do not want complete control some customers do want complete control. So, you want to build a solution which is simple, which is a trial, which is offered as a service, so that you can move into an environment in minutes, and build your infrastructure literally across the globe. In minutes, right, and do the testing for



two days and you're in business move at the speed of the business not at the speed of deploying multiple nodes or doing policies in a very simplistic manner where you cannot even do segmentation, and you have to do static policies to build that infrastructure out right. So we are trying to avoid all the pitfalls of the other vendors who started before us or the legacy vendors or cloud providers that, you know, so we did a very deep analysis and you took a clean sheet of paper and we solved the customer problems in a very step by step manner that's what you get from ELQ era is as a service solution with control with governance capabilities built in with day two operations with strong as Vijoy was saying that, declarative policy control full visibility of what applications you're running full visibility of how you control your infrastructure from security perspective, and all the other applications like how do I integrate third party, you know, best of breed solutions into my environment, and that cannot be static getting going anymore, it takes you ages to get there simple environments, which are point to point or very simplistic you can get away with, you know, doing it yourself. I'll give you an example of firewall deployment, right, today you cannot even maintain state across the globe of if the traffic hits one firewall, it has to go through the other firewall, normally the firewalls are deployed in line or the elasticity of firewalls, how do you bring them automatically up or down or the high availability of firewalls. So that level of third party services integration needs to be done so you can have common security across your all your environments, that's where you need visibility, that's where you need, you know control over what applications are running, and you need to be able to do it based on API's like TerraForm and, you know, so we provide full capabilities from the API perspective as well. It's a very comprehensive solution with deep level of control for your environment.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

I want to thank both of you for answering that question forthrightly and I think you both made some great points as to how you address the problem you both address the problem and you're very clear on, on your distinguishing characteristic so thank you very much for that.

George Rickman, NetEvents

I've got to apologize to the press that we haven't answered that some of their questions but I think we're, we're out of time. So I'll just pass it back over to you, Brad and then we'll go to Mark.

Brad Casemore, VP Research, Datacenter and Multicloud Networking, IDC

Sure, absolutely. I want to thank each of the panelists for joining us here today. I think this was a lively and informative session and I hope the audience shares that view. Thanks again, Oliver, Steve, Amir, Vijoy, I'm tremendously grateful for your participation today and for the insights you shared with the audience. And with that, I will pass it over to Mark because I think he has some parting words to offer.

Mark Fox, CEO, NetEvents

Yeah, thanks very much, Brad, that was a great session everybody. Yeah, very lively as Brad said, and some good points made just to let the press know, and thanks for some of the press staying on the extra few minutes. For transcripts, will be provided to you by Helen so you'll get those through she's also provided a link to the BIOS photos and media kits in the hidden area on the website, so you've got that link, if you haven't sent her a message. We'll also provide brand slides, they're available on the website

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as well. And as you know as normal, we'll be putting together a webcast and podcast on this session, and you'll be able to link to the webcasts and podcasts, the podcasts will be on iTunes and Spotify and the webcast will be made available on YouTube as normal and you'll be able to embed that in the articles that you write so thanks very much, everybody, and thanks again to the press for this event, I think that was a great session. They thanks to you as well, Brad. Thank you. Cheers for now.

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