

NETEVENTS

# INNOVATORS IN CLOUD, IoT, AI & CYBERSECURITY

**DRAFT**

## *New Business and Technology Models: Reinventing the Enterprise and the Vendor Community*

Chair:

**Brandon Butler, Senior Research Analyst - Network Infrastructure, IDC**

Panellists:

Mansour Karam	CEO and Founder, Apstra
Sachin Gupta	Senior Vice President, Product Management, Enterprise Networking, Cisco
Tom Burns	Senior Vice President, Networking and Solutions, Dell EMC
Kevin Deierling	Vice President of Marketing, Mellanox Technologies

### **Brandon Butler**

All right. Good morning, everyone. My name is Brandon Butler. I'm a senior research analyst at IDC where I cover the network infrastructure market. The networking industry is undergoing a massive shift right now. It's led by the rise of what we at IDC called third platform technologies. This is the idea of technologies like cloud computing, the rise of cloud computing, advanced analytics, machine learning and artificial intelligence. Organisations are increasingly realising that the future of their business depends on the successful adoption of these third platform technologies.

There's one thing that all of these third platform technologies have in common. That's that they require a secure, reliable, scalable and robust network connection in order to work. You can't use the cloud without a network and the rise of IoT requires a good network connection, right. The network has never been more critical, but it's also never been more complex. There are more devices and users and things connecting to the network. They're relying on the network more than ever before. All this has created the need for a new network. It needs one that has the capacity to handle higher workflows. It requires using advanced automation to manage the scale and complexity of these technologies.

These folks on the stage are some of the people building these new networks. This morning we're going to hear about the advancements in the networking industry that have emerged in recent years. We're going to talk about the impact that they have on enterprises and the vendors in this industry. We're going to take a look at where these technologies are going into the future.

I'm very pleased to have on stage with us four thought leaders in this industry and so I'd like for each one of them to introduce themselves. I'd also like to not only say who you are and where you work but why you guys think that the networking industry is at a critical juncture right now. Mansour, can you start with that?

### **Mansour Karam**

Yes. Hi, I'm Mansour Karam. I'm the CEO and founder of Apstra. Just quickly about Apstra, we're the pioneers of intent-based networking. I know we're probably going to talk about intent-based networking. Really what we provide is powerful automation of infrastructure, starting with data centre networking infrastructures. We are pure software [play]. In fact, we work with vendors that provide hardware and we work with hardwares from all of the vendors represented on this panel.

Why do we need intent-based networking? Why do we need - why do we believe networks need to be transformed? Organisations are embracing digital transformation, everything that Tom mentioned - IoT, virtual reality, 5G, machine learning. If you think of every one of those technologies, they require a scalable, reliable, agile network at its foundation. In order to scale the network to meet the requirements of the customers, we have to rethink this network. We have to provide order of magnitude improvements in terms of total cost of ownership, in terms of capabilities of those network.

While I think the industry has done a great job from a capacity in terms of 10 gig to 25 gig to 50 gig, the way networks are operated today hasn't really changed over the last 20 to 30 years. Finally the technology is ripe. Finally we have the APIs. Finally we can deliver on this today and the [unclear] can't be larger and so that's why Apstra and that's why intent-based networking.

### **Sachin Gupta**

Sure. All right. Hi, I'm Sachin Gupta. I'm the senior vice president for product management for the enterprise networking business at Cisco. We strongly believe that

modern networks are the oxygen for a digital business. Digital businesses will thrive and survive based on the kind of modern network that they deploy.

When we looked at it and we looked at the trends with enterprise customers on mobility, IoT, cloud, the security implications that this creates, we also have research that indicates there's going to be a million new devices connecting to a network every hour in 2020. We needed to go back and reinvent networking from the ground up, across multiple domains. How can we make it easier through intent-based networking to administer policy, to automate networks not just in your campus, for any kind of access, wired or wireless, but over the WAN, into a data centre, into the cloud, into any application or data service that you're trying to reach. Then how can we deliver the analytics that are required to ensure that the intent was delivered correctly and that we can detect security threats in that infrastructure and respond effectively?

### **Kevin Deierling**

Great, so I'm Kevin Deierling. I'm the VP of marketing at Mellanox Technologies. Mellanox is a semiconductor company, but we also take those chips, put them on to NICs and even switches. I'm actually surrounded by a few of our largest customers here as well as partners. Really it's all about the data here. If you think about what we were talking earlier about digital transformation, what Tom was talking about, there is a massive amount of data.

When people think about something that they're doing on the phone or with their car, there's actually [1000x] amplification inside of a data centre. You do some small query. You look something up. What's happening in that data centre, there's an auction going on for your eyeballs, a real-time auction. People are bidding to show you something that you might want to buy. That means that there's 1000 times more data and 1000 times more communication. The industry is responding to that. We've seen faster processors. We've seen faster storage. Faster storage and faster processors need faster networks and so really the transformation that's occurring - the industry was moribund. It really hadn't changed in 20 or 30 years.

Finally we're seeing all kinds of new applications. Tom talked about the 1000 protocols that you might be buying when you're only using 10. Each of the different workloads that people are running and the types of deployment and use cases might use a different 10, so the disaggregation and open networks provides choice to choose the best platforms for that. That's why we see the industry and open networking as super important.

### **Tom Burns**

Alright, thank you. Tom Burns. I'm senior vice president of networking and solutions at Dell EMC. I think that the network is important as part of this transformation, as I previously stated, really for two reasons. One is the digital transformation. For companies to embrace this, they need to think about their entire infrastructure in a much different way. The traditional way isn't going to work. It's either embrace it or become obsolete. Our studies show that.

The second thing that's happening, I think, is the technology change that my colleagues here spoke about. We've probably all been in the networking space for longer than we care to talk about. In fact, when I joined Dell EMC some six years ago and I was asked to run the networking division, I started laughing. I said, why would I want to get there? It's very boring, et cetera, et cetera. But fortunately I'd say over the last six years, the networking space from a technology standpoint is evolving very, very quickly, very disruptively, giving companies more choice and opportunity, more agility than it has ever before in the last 50 years of the networking industry.

We believe very much in the area of disaggregation, of open source. We're supporting this quite heavily, giving our companies and our customers that choice and flexibility. This is coming from much more the capabilities around commercial ASICs, commodity hardware, disaggregated software, open source. All of these technology changes that are being embraced by the networking industry are happening very quickly. By the way, in most cases, it's proving that it can be very scalable, very secure and very useful to bring tremendous savings into the IT environment overall.

### **Brandon Butler**

Sure. One sort of macrotrend that we're seeing in the networking industry right now is the shift from hardware-based to software-based models. You talked about the software-defined networking market coming into its own. You guys also talked about why this hasn't happened in the networking industry. We saw virtualisation of compute and storage and into networking. I guess my question for you guys is why hasn't that happened and where are we in terms of the SDN movement coming about now? Sachin, do you want to start with that?

### **Sachin Gupta**

Yes, I think the - I think it's a misnomer that networking hasn't been about software. I think there's been a lot of software innovation on top of the ASICs and the systems that have been out there. But I think with the move to intent-based networking, the opportunity to offer that controller layer that provides policy, provides automation, provides analytics and has continuous innovation that flows in at a much more rapid pace creates an opportunity to monetise and deliver software in a very different way.

That's allowed us to take our networking infrastructure and move it to subscription model. You can't take old software features and move those to subscription. It has to be net new innovation and capability that's ongoing, delivered as part of intent-based networking, especially at that controller layer where we can now attach subscriptions. We introduced our new switching product that has mandatory subscriptions with the Cat 9000 that's the fastest ramping product in company history. That also validates the acceptance in the market of that innovation, that people see the ongoing delivery of capability.

### **Brandon Butler**

Sure. Yes, and we will get into intent-based networking and how you define it. But Tom, maybe can you provide a perspective on where we are in the SDN market? We see a lot

of people still talking about it, but it seems like - to get that to the mainstream, what needs to happen to get there?

### **Tom Burns**

I'm not sure. What needs to be happening is a belief in the prove out of scalability and performance. I think that people are concerned around changing their network, because if it works, don't fix it. But in fact, if they don't do something and move to this new world, there's going to be a problem as far as speed and flexibility and agility.

I would agree with my colleague that software's always been a critical part of the networking industry. The massive change, though, is it's no longer proprietary stack. There is a lot of companies out there developing different type of intent-based networking, security, NOS operating systems, give customers choice and flexibility, the capability to adapt and use the protocols and features that they need. I think this is absolutely what's necessary. Moving from one proprietary stack to another proprietary stack in an SDN world really locks out that creativity and flexibility. I believe that we've seen tremendous growth and opportunity in just the industry and companies that are adopting this disaggregated approach.

The second thing is companies that are embracing it because they see the tremendous savings. We have examples such as Verizon that have seen a 30% reduction in their CapEx, a 45% reduction in their OpEx just by using consistent tools, building a software stack from scratch using open source, bringing that up to a very scalable [NFDI] situation across five different data centres. There's tremendous opportunities. Companies are beginning to see that in realisation that they can have those savings, they can move to the digital transformation and they don't have to worry about the network going down.

### **Brandon Butler**

Yes, Kevin, I'd be interested in your perspective on the emergence of the open platforms and the disaggregation of these stacks. How are you seeing that playing out? What are the challenges that come about with doing that?

### **Kevin Deierling**

I think the disaggregation with open networking is a critical development in the industry. What it means is that you can decouple your hardware selection from your software selection and choose best in class. It gives the customers choice.

If you look at things like SONiC, for example, which is the Microsoft initiative for an open source networking, we did a demonstration with Apstra at the OCP conference. Now there's OpenSwitch which is another example that Dell has really leaned in on on that open source development. Again if you look at the individual places that you may have media and entertainment, you may have a private cloud, for each of those markets, there's a different set of features and capabilities that are required. We have our own operating system. We have Cumulus as a partner. We have SONiC and hopefully soon

the OpenSwitch. Really giving your customers the choice, both at a hardware level and at a software level, gives incredible value to the customer.

**Brandon Butler**

But how do you balance the agility that you can get from these open networking platforms but the complexity that comes with doing it and the integrations? How do you manage that?

**Kevin Deierling**

Yes, at the end of the day, you didn't want to trade one set of complexity for a new set of complexity, so ultimately you want a supported platform. That's where companies like Cumulus and Apstra and all the partners can come in and really deliver a solution that's turnkey, because you don't want something that you've traded off one set of vendor lock in for another. Having a partner that can manage all of that, particularly in a heterogenous environment, is important.

**Brandon Butler**

Sure. We've heard the term intent-based network. Mansour, I'm wondering if you could define it, in a specific level, what intent-based networking is and how it's being enabled by advanced levels of automation and visibility in the network.

**Mansour Karam**

Yes, absolutely. Well, intent-based networking, really this is the notion that you're automating your infrastructure in a very powerful way across the entire lifecycle, not just pushing configurations but also bringing in advanced analytics, continuous validation to ensure that your network is behaving as you expect it to. Essentially think of a self-driving car. When you get into a self-driving car, you just tell the car where to go. That's intent. The insight there is that the simpler the intent description, the more sophisticated the software needs to be to ensure that your intent is being delivered on. To me, intent-based networking means we're now operating networks as a system the same way self-driving car operates a car as a system, not a set of components, so that is intent-based networking.

If I may, I'd like to answer why this is the right time, provide at least my perspective. In networking, I think what was really missing is APIs. For a very long time, we had just vertically integrated stacks, no APIs, closed systems. Starting with the hyperscales, what we saw was large demand for those interface to open up, because hyperscales were the first to realise that they had to automate their infrastructures. They can't do it without APIs and without disaggregation. Customers have compelled vendors - my previous employer was one of the pioneers there - to really open up their APIs.

Since then what we've seen is that every vendor has responded, including the vendors on this panel. Now we have APIs both to configure devices and to collect telemetry from devices, APIs that didn't exist even six, five years ago. Because we have now APIs, we have a programmable infrastructure and you now can automate your infrastructure

using very powerful technologies. That's really why today is the right time. Going back to SDN, that's why five years ago we weren't able to do it. We didn't have the APIs. The only way we were able to do it was to try and change the control plane whereas really ultimately that was the wrong layer. We had to do it at the management plane using APIs to control devices.

**Brandon Butler**

Sure.

**Mansour Karam**

One more thing. I know that everyone says that networking has always had software. That's true. But innovation in software is different. I'd like everyone to agree that rewriting PGP is just not innovation. I heard that there is now a new rewrite of PGP in Go instead of C++ or in Go instead of Python. How many times does the industry have to rewrite these [unclear] protocols. We've been rewriting them for the last 30 years. It's the same exact functionality. That's not innovation.

This is why it's really exciting that we're seeing open source there. We have actually now some open source projects that are extremely viable. With Dell, we have a production deployment of an open source operating system by a tier 1 service provider, operated by Apstra. Think about that. That was just impossible two years ago. This [BGP] stack works and it's open source. I'll leave it there.

**Brandon Butler**

Yes. Sachin, I wonder if you could provide a real-world example of how we're seeing intent-based networking used to increase business value of the network. I guess my follow-up question to that would be does an IBN require disaggregation and an open networking platform underneath it?

**Sachin Gupta**

This is a two-part question, so let me answer it in two parts. First of all, let me give you a concrete example, so Children's Hospital of Los Angeles is a customer of ours, adopting intent-based networking. What they're trying to do is translate their business intent that says doctors should have access to medical records, heartrate monitors should have access to administration systems, patients should have access to the internet and to their guest services and restrict all other access, make it based on a whitelist. At the same time, video conferencing, video applications should get a high priority.

They want to make sure that the systems that we offer can translate that intent, can activate it on all the underlying infrastructure of any kind - physical or virtual - and then assure that it's being delivered as designed. They see our intent-based networking solution as the only way to go achieve this through the innovation at that software controller layer. Now at the same time, these customers are looking for that infrastructure to detect threats, to detect malware in encrypted traffic without decrypting

it. That kind of innovation requires the entire stack, right, ASIC technology, system software technology all the way to the top.

On your second question, look, the majority of our enterprise customers want the business outcome. They want it supported. They want intent-based networking delivered to them. But there are customers who are very large service providers. There's certain kinds, [Web-scale], who want open APIs. They want to bring their own controller. They want to write their own software stack on top. We deliver that. You can run our software on third party. You can run it in a virtual environment. We have open APIs for provisioning and for streaming telemetry. I think you have to offer that choice. It's not one way or the other way only. I think for the markets that we serve in, you have to understand the customer need and offer choice.

### **Brandon Butler**

Yes. Tom, what do you think are the challenges of managing that disaggregated heterogenous environment when you have multiple different infrastructure layers in the networking stack? How do you manage that?

### **Tom Burns**

I think, first off, to go back to the intent-based networking, sorry, just to back up, I've got to jump in on that one. I absolutely agree with what the panel's stating. I also believe though there's an evolving story around intent-based networking with the technology changes that we talked about - the programmable ASICs, the separation of the control plane and the data plane, the capabilities around third party or open source software. Intent-based networking means the network is doing what you intended it to do, which starts with did you configure it right? Things such as fabric automation, auto-configuration as it's connected to the server and storage and so forth, is critically important.

Then at a software level, moving to an SDN environment, if you see through telemetry or other things that you have an issue with your network, rather than sending a [CCIU] to a closet or to a particular data centre to use his or her CLI to reprogram a switch, you can do that in a software fashion rather than a manual fashion, which actually brings productivity and ease and much more quickness in the environment, and examples was given obviously at the children's hospital.

On the area of the difficulty of managing, I think the management of these particular disaggregated areas becomes easier, because there's more of this mindset of a DevOps environment across the data centre and across the infrastructure of itself and the adoption of common use of tools that look across server storage and networking again as a platform rather than a single box. Why do I need a specific type of orchestration or management for network that is different than my compute? So we see the explosion of things like Chef and Puppet and other type of configuration and automation tools.

Obviously one of our strategically aligned businesses, VMware, plays an increasingly important area not just in compute virtualisation but in network virtualisation and the capabilities across NSX, with their recently announced virtual cloud network

capabilities taking NSX all the way from the data centre out to the edge with their VeloCloud acquisition, with their vRealize and [Vr unclear] capability and being able to monitor what's happening in the entire stack.

I think in fact that the scalability and the automation, the configuration is becoming easier by this disaggregation, because you're embracing a common set of tools across a larger part of your data centre or infrastructure employees. You don't have to be specifically trained to run a specific box. You can use a DevOps environment and enable that in a much quicker, much more flexible fashion.

### **Brandon Butler**

To get to this self-driving network, is that going to require the use of machine learning and artificial intelligence to be integrated into that IBN system? Are we seeing that already, Mansour?

### **Mansour Karam**

When someone asks me or when someone says, I'm using machine learning, my answer to them or my question back is can you please tell me what exact machine learning techniques you're using? Because I feel like sometimes this word is strong and when people use it just to make an impact without really understanding what it means. Certainly you need advanced analytics. Certainly you need powerful methods to collect telemetry, process the telemetry and the [unclear] as it pertains back to your intent. Does it require artificial intelligent techniques? Absolutely, but to me, we have to be very precise about those terms and how we use them.

A lot of times in automation there are some basic things that - making sure that your network is behaving as you expect it from a connectivity perspective, these are basic things that you need to do that may not require very sophisticated techniques. But then ensuring that you have the right security posture, that you have the performance you want, that your traffic distribution is what you wanted, that your workloads are being placed where you want them to, then you need to get a lot more sophisticated. I'd like everyone to be more precise in how we use those terms and what techniques we're using.

### **Brandon Butler**

Sure. Oh, Sachin.

### **Sachin Gupta**

Yes, I just wanted to say that there's - with intent-based networking and with a lot of the data moving into a common place and contextually stitched together, there's a bigger opportunity to use advanced data analytics to provide better outcomes. There's two ways that we're very excited about delivering this to the market. One is through [TELUS] which is our threat intelligence in the cloud, which sees 20 billion threats a day, many more threats a day than Google searches in a day, that provides a dataset for us to be able to identify and react to threats much, much, much quickly than anybody else in the industry.

The other way is much more predictive. A lot of our customers are saying that if you know what the wireless association times are and the experiences across enterprise networks globally and what new drivers and devices could be causing issues and what kinds of problems are emerging, how can you apply richer, more advanced analytics capabilities to be more predictive in helping identify where a failure could occur? We're excited about using some of those methods to solve these kinds of emerging problems with the dataset that we have in intent-based networking.

### **Brandon Butler**

Sure. Yes, Kevin, I'm interested in your perspective on - we're seeing in the networking industry a huge divergence between what we're seeing at the hyperscale level in terms of the big vendors and pushing higher speeds into the switching market and then, at the other end, you see these enterprises that are struggling to get up to those increased levels of automation and, on the hardware side, push those higher speeds. How should organisations think about what they're seeing happening at the hyperscale level and what that means for them?

### **Kevin Deierling**

Yes, so we've really led the growth in high-performance networking, so we're the leader in 25 gig ethernet and above NICs with about 70% market share. That initially was driven by the hyperscalers, so that's the public cloud and the Super 7 and all the big guys that you know. They realised that they just wanted to solve the networking issues by throwing bandwidth at it and really intelligence. The rest of the industry is seeing that and saying, hey, we want to achieve the same efficiency and agility and scalability and operational efficiencies. The challenge is they don't have the 1000 PhD computer scientists in the back room that a Google or someone like that has and so what really has delayed that from happening in the industry at a broader scale is the ability to take software that you're writing yourself. You can't do that.

But now with all of this open source and disaggregation that we're seeing, you're seeing that software and the automation and the management become available to the second tier, so the real challenge for businesses now, we're seeing lots of second-tier businesses. These are still the Fortune 2000 businesses. These are very large enterprises. We were just looking at some [Deloro] data that showed how the private cloud is actually growing very, very nicely and so not everything is moving to the cloud. The pulling your hair out that Amazon is taking over the world, yes, they're growing, but the private cloud is a very vibrant market. Now we'll see those second-tier guys be able to deploy with open platforms and adopt those.

## *Audience Q&A*

### **Brandon Butler**

Sure. I wanted to open up for questions from the audience. Anybody have a question they wanted to ask one of the panellists here? There we go.

### **Jerry Caron**

Jerry Caron, Global Head of Research & Analysis – Technology Group, GlobalData. Okay, good. This is great and I think the technology is really moving in a great direction. All you guys and others are coming up with really innovative stuff. I'm wondering, though, networking heretofore for the last 20 years or so has really been driven by the expertise that was in place around Cisco engineering and all that coming in and the training involved in that. There's a whole world of experts in a specific way of networking. Is the expertise in place now to drive forward and utilise all the great stuff that you're doing now or is that going to be a process that's going to delay all of the great stuff that you've been talking about for the last 20 minutes?

### **Sachin Gupta**

Just from a Cisco perspective there, I think your question is spot on. First of all, that is one of the key questions we get from our customers, from our partners, from anybody really we talk to on what kind of skills do we need and how do we retrain? We've made a huge investment in [developer.cisco.com](https://developer.cisco.com). We call it the DevNet programme. We've been at it for a few years now where we have 500,000 people on that, the majority of whom are actually network engineers who are getting reskilled in this new world of intent-based networking, API driven, software layer driven.

We feel comfortable that we've got the assets and programmes in place, but I would say we're early on in the reskilling of that expertise and those engineers that are out there. We're also bringing in new types of people who are coding on top of the networks, the pure software developers and application developers who can now interface with the network in a very different way, but we have to bring the network engineers along. There's programmes through DevNet that Cisco leads to make that happen.

### **Brandon Butler**

Sure.

### **Mansour Karam**

Yes, so that's a great question. Yes, indeed, all vendors, I think the entire industry is investing in changing the skillset for the engineers, but at the same time, what I'll say is that a lot of these tools are consistent with what network engineers know. Ultimately when we talk about intent, that's what the network engineer has in his mind, in his brain. He just didn't have a way to express it without going deep into configuring specific devices. He had to do all the work yourself. It's like you want to write a game, but then

you have to go and program assembly. That's where the industry was and so we needed to change that paradigm.

The other aspect I will point out is that vendors are critical here in that especially when we wanted a tier 2 to jump on the bandwagon - there is this expectation that now network engineers are, all of a sudden, going to become software engineers. No, that's the job of the industry. We're going to deliver turnkey solutions to our customers. We're going to deliver simple operational models to our customers. We're going to provide support to our customers. Solutions that we will provide, they will be able to deploy, hopefully extremely quickly. In some of our deployments, within an hour they have a network that just works. There is no expectation that to use these types of technologies, you have to become a software engineer.

In a sense, while we're delivering the capabilities of a hyperscale, it's an Apple interface that we have to wrap around it and so that is our job as an industry and certainly our view as in Apstra. When we said that disaggregation really enabled all of that, that is true. But disaggregation without vendor support, without making those choices risk-free will not work, because otherwise if you have disaggregation and you're putting the burden on the user to go and test out all of these different choices and make it all work, no user wants that. Users want networks that work, networks that are simple to operate, networks that provide really cheaper, much more cost-effective total cost of ownership.

### **Tom Burns**

Yes, I've got to jump in on this one. Maybe I'll show my age a little bit, but as the former head of Alcatel-Lucent telephony division, I've got to say something. I remember visiting customers, some many years ago. You would have a PBX group and you'd have a networking group. The PBX group would stand up and say, there's no fricking way you're running Voice over your network. Well, I actually visited a university recently that hadn't gone to VoIP yet. I told them, why bother? Because [VODG] is coming in. They're not going to need either.

But my point is no-one ever thought that the PBX [upstarts] were going to go away and over a course of period of time, they become part of the network and they become part of the network excitors. When 80% of the ASICs that are being deployed are merchant silicon, when there's disaggregation of software, when there's a huge upbringing in the open source community around NOS that is Linux based, that is unmodified Linux in many circumstances, why do you need to continue to maintain specialists to run a box? You can't think that way anymore. I'll give a projection that in 10 years we'll be in the same position as we were with the PCX with the need for network-certified engineers.

### **Kevin Deierling**

Yes, I'm going to take a little bit of a contrarian view and say that businesses don't care about their network. They want it to be completely invisible. They really care about business outcomes. You need to take a holistic view, so you're really not talking about just the network infrastructure or the attachment into the server. You're thinking about your business level and the rest of it needs to disappear, so giving the telemetry and the ability...

Mellanox is a semiconductor company. We actually have more software engineers at the application level that are doing application accelerations. All the stuff that's happening at the network level is vitally important, but ultimately we need to jump up. In 10 years, I think we're going to be talking about all of the applications. How is my business improving because of all of the infrastructure? But the actual bits and bytes and nuts and bolts of individual switches and servers and storage boxes is going to disappear.

**Brandon Butler**

Great. Well, a lot of exciting things happening in the industry, so thanks very much to all our panellists.

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