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What drives the man driving the new data center revolution?

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He's been called "The Professor Who Wrote Google Its First Check" and, with a net worth of $5 billion (Forbes, 8/30/17), David Cheriton could well be the world's richest full-time academic. Last year he put his own wealth behind the Apstra Operating System (AOS) and within months "intent based networking" has become the "the new black" among IT buzzwords

Professor David Cheriton

Image credited to APSTRA

While AOS is set to drive the next datacentre revolution, Alan Zeichick, principal analyst at Camden Associates, decided in a recent interview to find out what it is that really drives David Cheriton…

Professor David Cheriton started researching at Stanford 36 years ago, and he now heads Stanford University's Distributed Systems Group. So, what attracted him to this work?

"I've always been interested in that element of how you build these complex systems and distributed is the ultimate challenge. I was fortunate that networks became a significant factor in computing at the point I get involved in research. The beginnings of Ethernet started basically at the same time as I arrived at

Stanford."
Gigabit Ethernet was the starting point of his entrepreneurial career, when he and Andy Bechtolsheim founded Granite Systems in 1995 and one year later it was acquired by Cisco: "so people thought I knew something about business". Among those admirers were Google's founders, Sergey Brin and Larry Page, who came to him and Andy in 1998 for advice about how to licence their search technology outside Stanford. Actually, it was Andy who wrote that first check – before Sergey and Brin had even started a bank account –then David wrote the second $100,000 cheque.
He has spent more than $50 million out of his own pocket, investing in at least 20 different firms, including VMware and Arista Networks. He confesses that he never realised just how disruptive VMWare's technology would be: "I thought it was cool technology and I thought it was useful and I had confidence in them that they would produce a good product, so I thought it was a good investment." More perceptive was his recognition that software defined networking (SDN) would soon drivemassive growth in datacentre networking and a demand for higher performance and different features. Another of Arista's strengths was the use of commercial silicon:"which meant we could build a networking company without having to build ASICs which was attractive. And from my standpoint I think there was an opportunity to do much better software than what I had seen previously running on switches".
With a track record like his, all eyes are now on his latest venture, Apstra. For a start, why did David fund the company himself, rather than raising venture capital? He points out that, when VCs know you can afford to, they will ask why aren't you backing it yourself? What's more: "something I think I learned from Andy Bechtolsheim was it's great to build a really, really good product so it kind of sells itself and that takes a little bit more time, a little bit more patience. Whereas venture funding is driven by sort of a tighter time schedule of needing to achieve return on investment for their investors and the fund. So it gives you a little bit more freedom to do it in the way you think is really right."
What does "really right" mean in this case? The Apstra Operating System (AOS) is a vendor-agnostic Distributed Operating System for data center networks – it allows for anymix of name-brand or white-box hardware and decouples network design and operations from the lower-level, error-prone, manual workflows required by vendor-specific hardware. At the network service level, AOS lets you specify "intent" rather than a detailed specification, then it will automatically generate configurations for the various hardware options, and continuously auto-validate the network state against the original intent – with massively improved service agility and reliability.
Mansour Karam, Apstra's CEO and co-founder, compare this "intent driven" approach to a driverless car. A simple intent, like "find the nearest space and park", represents a highly complicated set of individual observations,

measurements, decisions and actions combined with on-going monitoring and corrections until completed. But a driverless car will automatically fulfil that intent in real-time without needing a long list of imperative commands. In the AOS context, intent can itself be quite complex. An 90-word example on the Apstra website begins: “Provide connectivity to 1000 servers, using L2 and/or L3 access at the edge, with oversubscription in the core of 1:1 (no oversubscription), with endpoints such as hosts, VMs or containers grouped into isolation domains (including both traffic and address space isolation)…” and so on. Any change inan intent takes a few mouse clicks, and AOS will auto-render new configurations for any chosen vendor equipment.

There is nothing else like it on the market. Some tools are available for automating specific use cases, but not into an integrated whole with continuous real-time validation. There is nothing to compare with this ability to express a near business-level intent and see it right through the design, build deploy and validation lifecycle. Anyone needing to slash the effort pf designing, building, deploying and operating a data center network will benefit.

“Apstra could grow to be a very significant networking company” according to David.“It becomes the operating system for the datacentre network and, in that context, you have switches or devices that plug into it just like device drivers in a conventional operating system. It also becomes a foundation for automating the rest of the datacentre and there is a lot of areas of automation that are required at the server level, at the application level.What's critical for that automation is to be able to have insights into and control of the network. So, I think we're in a great position to grow in that sense to become the datacentre operating system.”

Asked about the relevance to the burgeoning Internet of Things (IOT), David acknowledged the growing pressure on the network for fault tolerance and high availability as well as sheer performance. At the “speeds and feeds” level, AOS is enabling incredible growth. “The real limit of the technology is how solid can we build applications on top of this, and how solidly can we run the communications… It ties back to the Apstra opportunity: we need to automate these systems to run with the reliability and the flexibility that's required for new applications that are all part of the IoT umbrella”.

“Apstra is tackling a really fundamental problem here… the operating system problem. How do you operate complex computer-based systems? And the answer can't be manually. it just doesn't work. Things are happening too quickly. Things are too complicated. It's too hard to figure out what's going on in the right period of time so it has to be automated. Apstra is tackling exactly that problem with datacentre networks, automating the management of these networks. Management is a key functionality.”

“To me, management is detecting when things are going off the rails and correcting the situations before they come completely off the rails. I think that that is going to be absolutely critical.In Google, Amazon or Facebook, if an individual

server fails, you don't notice it. If the network has a problem, everybody notices it. It's absolutely foundational to every company that's doing any kind of IT."

So, what is it that really drives David Cheriton? Is it just finding solutions to problems – albeit complex, distributed problems? Is it to be changing the face of networking, communications and so shaping world business? Looking back over his many successful investments and projects, what makes him most proud?

"I think the thing that I've enjoyed the most is all the people I've worked with. One of the things I really love about computing is there is a lot of intelligent hardworking people that are passionate about the technology and it's just very exciting to build a team where you pull off something that you realise no individual could do by themselves but you've done together. So, I think I personally get a lot of enjoyment out of that.

"I think the other element is that… a lot of people have benefited in their career and in their financial situation in the companies I've been involved with. It's just nice to see people having a better life as a result of companies that I've had some role in pulling together."

To see the full interview go to **http://tv.netevents.org/netevents-special-feature-career-retrospective-prof-david-cheriton-founder-chief-scientist-apstra/**