S1 EP14 - Serial 100G I/O Era and AECs

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Venu Balasubramonian, VP of Product Marketing and podcast host Chris Banuelos discuss Marvell's AEC Platform solutions addressing interconnect needs for data centers as well as Marvell's strategy in entering the AEC market. Be sure to read more about Marvell's recent announcement of the Alaska® A AEC family, leveraging its PAM4 SerDes technology leadership, to enable leading cable makers to deliver optimized solutions for the world's largest cloud data center customers. Read the press release: https://bit.ly/3IBZQca

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C **Christopher Banuelos 00:04**
Welcome to the Marvell Essential Technology Podcast. I'm your host Chris Banuelos. On today's episode jump into a conversation with Venu Balasubramonian and I discussing Marvell's AEC platform solutions. Be sure to stay tuned to hear Marvell's strategy and entering the AEC market and Marvell solutions addressing interconnect needs for data centers. Venu it's great to have you on today's episode, what I thought we could do today is jump right into our questions. And my first question for you is what is driving the growth of 100G serial interconnects in cloud data centers?

V **Venu Balasubramonian 00:43**
So 100G serial interconnects are getting deployed in two parts of the networks in cloud data centers. One is at the at the switch layer, where as the switches transition from 12.8T to 25.6T and 51.2T the IO's go from 50G PAM4 to 100G PAM4 the other place in the inside data centers were facing a transition 200G serial is on AI accelerators and smart NICs where the IO's are going from 25 and 50 Gig PAM4 200 Gig serial is support the bandwidth needed on these devices.

C **Christopher Banuelos 01:31**
Now this is a little bit of a longer question. But what are the key challenges for the three to five meter short interconnects at 100 Gig serial speed?

V **Venu Balasubramonian 01:41**
So this three to five meter short interconnects are deployed predominantly in two places within data centers. One is for the links from the server to top of rack switches, and the other is to interconnect switches and the aggregation layer to create a cross network. So these links have predominantly been served by passive Direct Attach Copper cables, which are basically coax cables with two active components 100 Gig serial, the physical

reach that you can get with these cables is significantly lower than the 3-5 meter reach that is required for these applications. This is primarily driven by the fact that you're doubling the signaling rate when you go from 50k to 100k. And even to reach this lower lengths. You need thicker cables, which also pose challenges for the end customer in terms of the bend radius and the deployment challenges that those pose for them.

C Christopher Banuelos 02:46
Can you explain to our audience what an active electrical cable is?

V Venu Balasubramonian 02:50
Yeah, as I mentioned previously, these three to five meter short reach links today are predominantly served by passive Direct Attach cables, which have no active competence in sector. So what this means is the entire link from the server to the top of rack switch, which includes a PCB loss on the server, the loss of the cable, and the loss on the switch PCB are all driven by the SerDes on the two ends, the one on the the NIC and the one on the switch. So as you go to the 100 week serial speed, that loss becomes higher than what the service is on the two ends can dry. So what an active electrical cable does is breaks that link into three pieces by adding every time or inside the cable. By virtue of which the this the SerDes on the switch and the server only need to dry up the PCB trace. And the last of the cable itself is handled by the retailer inside the cable.

C Christopher Banuelos 03:27
Let's talk about Marvell's new product offering in this space. Can you give some insight?

V Venu Balasubramonian 04:04
So we recently announced our Alaska A product family that is targeted to This PC market. So the Alaska A product family is a family of retirement products that leverages our PAM4 DSP leadership and our Ethernet IP to create a solution optimized from a power performance features perspective for this emerging active electrical cable market.

C Christopher Banuelos 04:34
And Venu, what would you say is Marvell's strategy in entering this market?

V Venu Balasubramonian 04:38
So what we're doing for this market is actually building an reference platform that includes hardware design for 400G and 800G Ethernet cables in different form factors and also a complete software stack and we are working very closely with all tier one cable vendors for them to build cables based off of this reference design. So what this enables us to do is truly leverage our strengths in the DSP SerDes space and the cable vendors strengths and manufacturing and assembly to provide the best in class solution to our end customers, which also addresses their concerns on ability to scale and provide supplier assurance which is very critical for our end customers.

C Christopher Banuelos 05:28
My last question of the day is what are the other products that Marvell offers to address interconnect needs inside data centers? Marvell has a comprehensive offering of interconnect solutions that are truly optimized for the different reach requirements within data centers. So we talked about the ACPs, which is targeted to that three to five meter reach, then we have products optimized for active optical cables, which are typically used for reaches from that three to five meters all the way up to 30 meters. This includes our PAM DSPs and TIA Driver Solutions. Then we also have solutions again, PAM DSPs. And TIA drivers that are optimized for multimode and single mode optics. That support reaches from 100 meters all the way up to two kilometers. We basically have solutions that address the entire gamut of interconnect reaches that are needed in the cloud data center applications. Venu wanted to say thank you for participating on today's podcast and I am looking forward to continuing our discussion in a future episode.

V **Venu Balasubramonian 06:39**
Hey, thanks, Chris. Thanks for having me. And look forward to future conversations with you.

C **Christopher Banuelos 06:46**
Thank you for listening to the Marvell Essential Technology Podcast. As always, please feel free to visit our website to learn more. And we'll see you on the next episode.