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S1 EP13 - EBOF Enablement and Industry Trends

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Khurram Malik, Director of Product Marketing at Marvell, talks EBOF Use Cases and Industry Trends with podcast host Chris Banuelos. Take a deep dive into EBOF Architecture, how Marvell's EBOF approach is transforming the way data is moved and stored in the data center, why the industry should use Ethernet SSDs now, and how Marvell is bringing EBOF to fruition.

Speaker
Khurram Malik
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Host
Christopher Banuelos
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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, I'm going Khurram Malik talking EBOF use cases and industry trends take a deep dive into how Marvell's EBOF approach is transforming the way data is moved and stored in the data center. Hey Khurram, it's great to have you on today's episode. I'm looking forward to our discussion today. What I thought we could start off with is why don't you tell our audience what is your current role here at Marvell.

K **Khurram Malik 00:41**
I am a Director of Product Marketing for storage accelerator under flash bu my primary roles and responsibilities is to enable the Ethernet SSDs and EBOF ecosystem industry partnership and working with customers and working on this technology.

C **Christopher Banuelos 00:59**
Let's jump right into our topic. Can we talk about what are some of the trends driving infrastructure storage requirements for the data center?

K **Khurram Malik 01:09**
Yeah, the trend is data is generated everywhere, at the edge in the data center and in the cloud. But the most interesting part is the applications which runs on these data centers keep evolving, I can give you a couple of those. For example, high performance computing enables the simulation and analysis of huge volume of data which would not be possible. And it runs on Cloud, multi tenant cloud requirements. Today, they are in the order of magnitude higher than the most demanding application a decade ago. Another application artificial intelligence machine learning enables the accelerator for every use case starts from low cost inference to high performance training that itself continuously generating a lot of data. So when we looked at it, data centers

need an efficient infrastructure to meet the growing requirements for the next generation of applications, which needs scalable, flexible, high bandwidth utilization of storage. And that's why Cloud and Enterprise are trending towards disaggregated accelerated technologies.

C **Christopher Banuelos 02:28**
Would you be able to explain what an Ethernet SSD is and how does it fit into the EBOF architecture?

K **Khurram Malik 02:36**
Yeah, Ethernet SSD's is an SSD which has Ethernet fabric connectivity. And this Ethernet fabric connectivity is used to run industry standard NVMe over fabric protocol. And when we look at this NVMe over fabric protocol, it is designed to disaggregate compute and storage and provide the full throughput full bandwidth of NVMe over a standard learn. So this Ethernet SSD is bringing storage drive level disaggregation and extend its sports to multiple transports like RDMA over converged Ethernet, TCP, Ethernet SSDs, enable and ecosystems with better connectivity, disaggregated storage and throughput. And when we look at the EBOF, which stands for Ethernet bunch of flash, it's a simple backplane which has high bandwidth, ultra low latency switch. It says ASIC which sit inside an enclosure and Ethernet SSDs on the front end for the connectivity EBOF provides a scalable, flexible, high performance cost optimization solution.

C **Christopher Banuelos 03:51**
My next question is how was the EBA approach transforming the way data is moved and stored in the data center versus what was done previously?

K **Khurram Malik 04:00**
Yeah, so if we look at it, flash controller companies like Marvell and NAND vendors have done a great job to offer the high performance, fast speed SSDs moving from SATA interface to SAS to NVMe. And when we look at the end customers like Cloud and Enterprise customers, they will like to use these high performance SSDs in their platform to take the system level performance to get most cost optimized solution in terms of dollar per iovs and dollar per gigabyte. So now we talk about what the existing architecture out there and how these SSDs use. So in an existing JBOF, which stands for just bunch of flash uses these high performance SSDs behind the smartNIC, right, which cause the system level performance bottleneck limited to the SmartNIC connectivity, smartNIC bandwidth, the performance of these SSDs does not scale linearly corresponding to the number of drives inside the systems and that cause the under utilization of the storage. What we have done with EBOF replaces this bottleneck components from the JBOF like smartNIC with the Ethernet switch and there are different tiers of Ethernet switch, the starting tier has minimum 4x The higher bandwidth compared to SmartNIC what does it do? It provides the wider pipe for all the Ethernet SSDs to the connectivity and using Ethernet SSDs on the front end for NVMe over fabric in a termination. So, EBF of architecture provides scalability flexibility, high bandwidth utilization of these Ethernet SSD's and we have validated some of the use cases by working with our partners and customers to ensure these requirements meet their standard needs. For example, if I talk about it, first application lustre file system. It's a back end storage parallel file systems run by the many of HPC cloud provider EBOF have delivered 95% bandwidth utilization in a system level artificial intelligence machine learning for this application, EbOF delivers for extra higher throughput now 72% lower latency compared to JBOF.

C **Christopher Banuelos 06:34**
Why should the industry use Ethernet? SSDs? Now?

K **Khurram Malik 06:37**
Yeah, this is a very good question we have been asked by multiple times, so I would categorize into three different buckets. Number one is the infrastructure storage BU (Business Unit here at Marvell has been shaping HDDs and SSD controllers for over 20 plus years to enable a new emerging technology like Ethernet SSD it is extremely critical to select the right ethernet port. So we use these 25 Gigabit Ethernet port connectivity for the first generation of product line and the underlying infrastructure is built on top of it is NVMe over fabric protocol, right, we not only focus on the speed but also the key features like storage discovery hotplug

multipath into the Ethernet SSDs and do the compatibility to all the Ethernet switches which is out there and shipped in the industry. The second is a protocol. Industry standards has [kept eveolving] over NVMe over fabric protocols using RDMA over converged Ethernet to NVMe over TCP and the third one is the management interface. We are leading the industry with discovering a new standardization and validation of management, management and all these enables the industry ecosystems and easy for our end customers to use Ethernet SSD.

C **Christopher Banuelos 08:07**
So what is Marvell's role in bringing EBOF to fruition in the industry?

K **Khurram Malik 08:12**
Yeah, we have a breadth of knowledge and expertise in storage, networking, processing, automotive all across Marvell, we are in a unique position to have these expertise under Marvell our company culture is to look at each product line and have the right expertise to work on it under Ethernet SSDs. We have dedicated expertise both from storage as well as on switch which is essential to make the product line successful. For example, some of the key features which use in the networking like congestion management priority function control, DC QC and are really essential and required for the Ethernet SSDs can evolve to be successful. And we have the expertise on both and both expertise work under one Marvell and under one product line is give us the competitive edge and no other customers can say it like this. They have either one expertise or the we are leading the industry by partner with OEMs NAND vendors collaborating with Cloud and Enterprise and their end customers on this technology

C **Christopher Banuelos 09:26**
Khurram, Just want to say thank you so much for your participation on today's episode thought we had a great conversation today. And I look forward to continuing our discussion at some point in the future.

K **Khurram Malik 09:37**
Thank you so much. It was nice talking to and have a very wonderful experience here. I look forward to talking to you again on this product line.

C **Christopher Banuelos 09:43**
Thank you for listening to the Marvel essential technology podcast. As always, please feel free to visit our website to learn more. And we'll see you on the next episode.