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S1 EP12 - 400G Driving IPoDWDM

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Samuel Liu, Senior Director of Product Line Marketing at Marvell talks IPoDWDM with podcast host Chris Banuelos. Hear about how surging data demands impact optical integration, why IPoDWDM is expected to become mainstream as well as how Marvell is transforming the industry when it comes to optical transport equipment.

Speaker
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Host
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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 with Samuel Liu, Senior Director of Product Line marketing talking 400G driving IP over DWDM (IPoDWDM). They're about how surging data demands impact optical integration, why IPoDWDM is expected to become mainstream, as well as how Marvell is transforming the industry when it comes to Optical transport equipment. Hey Samuel, it's great to have you on today's episode wanted to get started with what is your current role here at Marvell.

S **Samuel Liu 00:43**
I'm the Senior Director of Product Line marketing responsible for the current Coherent DSPs.

C **Christopher Banuelos 00:51**
Let's go ahead and jump right into our topic today, how have surging data demands changed optical integration?

S **Samuel Liu 00:59**
Yeah, this is for the whole industry, the surging data demand over the last few years especially due to the pandemic really looking for simpler, more reliable lower-cost optical transport networks. So, the optical integration of IPoDWDM solution provides exactly such optical network architecture. The simpler network really comes from only a few. One is an open optical line system one we use IP over durability. And this architecture allows the packet layer to have visibility on the transport layer performance. When the transport layer has a performance degradation packet here can trigger we call the fast reroute proactively to minimize the packet loss. This really enhanced the reliability of the whole network. With IPoDWDM. A simple point-to-point connection will eliminate two pairs of short-reach optical transceivers. This is directly translated to a capex for end-user carriers.

C Christopher Banuelos 02:18

Marvell creates custom solutions, what would you say are some of the most common customer pain points that you're seeing in the industry today?

S Samuel Liu 02:27

The important thing is how to continuously reduce CAPEX and OPEX for the end-user mainly due to the optical transport network and how that will help the carrier to continue building expanding networks to respond to the fast-growing data demand. In the meantime, the network architecture really needs to be very reliable. The main points for global telco carriers is to build low-cost easy to maintain and manage and reliable networks. That's the challenge IPoDWDM data shows a clear advantage versus the traditional optical transport architecture with the traditional one the separate optical layer and the packet.

C Christopher Banuelos 03:18

And Samuel How do traditional architectures differ?

S Samuel Liu 03:22

Traditional architecture is actually dominated for the global carrier nowadays, right. So, it was more like that, more like the electric vehicle versus the traditional gas vehicle that kind of analogy right. So, the traditional network, they have a totally separate packet box-like router and switch co-located with that optical transport node, like switching node so on and so forth. And between these packet box under tons per box, you need to use a shorter reach optical transceiver to handle over and then this optical node, we will convert it to a long haul. Let's say for this case is a current transport. Those are shorter reach for the old days. It's kind of like a low cost when you talk about 10G right? So, let's say 100G but nowadays the data read keeps growing. We are talking about 400G, right so it's 1.6Tb In the horizon. Those transceivers alone are more expensive. If you use IPoDWDM you can directly plug in the current pluggable module on the packet box on the router switch. Therefore, you eliminate the hand over shoulder reach optics transceiver.

C Christopher Banuelos 04:49

Why is IPoDWDM expected to become mainstream?

S Samuel Liu 04:54

IPoDWDM is not a new concept. It came out almost 20 years ago at the time routers and switches became mainstream networking equipment. But the challenge for the last 20 years is, that there is always a mismatch on the DWDM auto transport interface, because the transponder it's bulky, and it's too big. We will sacrifice the router switch density. If we used IPoDWDM for the 400G era, nowadays, the issue is solved. So, the current 400G DWDM pluggable transceiver, they are actually having the same size as a client optics like a DR4 with the same form factor. So, from the router switch perspective, we can keep exactly the same density. Either you support a traditional shorter reach connect optical connection, or you plug in a coherent DWDM transceiver that can support 1000 kilometers. So that's one of the important things. The other one is traditionally the optical transport network with a closed domain. So, each of the optical nodes is very complicated. They integrate so many functions and are more expensive. They're not designed or developed for the simpler architecture or what we call this IPoDWDM architecture. Last few years in the industry, a new kind of very simple low-cost low power because the open optical line system emerged and those new line systems were optimized to support IPoDWDM. And the third important part is the network it used to be on the packet side and the transport side managed by separate control management software and in the last few years is SDN software-defined network controller. So, there's one kind of controller that can manage both the transport layer and packet link.

C Christopher Banuelos 07:20

Samuel wanted to help our listeners understand how is Marvell transforming the industry when it comes to Optical transport equipment?

S Samuel Liu 07:30

As the lead merchant silicon current DSP provider, Marvell is positioned to continually invest in technology to drive more than just the current DSP. So, we are the major player in the industry with a 16nm and the last few years become a leader for the whole industry in 7nm. We are full throttle running to drive 5nm going forward, which enables us to integrate malfunction and better performance, less power purpose into current DSP. On the top-level, the current DSP is the anchor building block for a pluggable optical module. For the overall industry. The optical networking equipment is quickly moving to a pluggable-based solution traditionally, it's all closed domain with discrete components build lying hard pluggable bring to the market, a lot of benefits, low cost, reliability interoperation pay as you grow. So this current pluggable module can support long haul regional Metro access and DCI networks.

C Christopher Banuelos 08:49

So the concept of "Pay as You Grow" may be potentially interesting for some of our listeners, what does it mean and how is it beneficial?

S Samuel Liu 08:57

Let's see a traditional Optical transport line card if you support, for example, four-port by 100G but initially the network, the service provider, only needs two ports active or three ports active. Since it's integrated into one line card is all fixed, not pluggable. In the one, you'll need to spend money to buy the whole four by 100G ports. If I only want to turn on one port I buy one pluggable module plugin. If I needed three, I buy three plugins and leave the last one open until a few years down the road to grow the network. I buy the pluggable module. So that's called pay as you grow.

C Christopher Banuelos 10:04

Samuel has been really great, really great conversation so far. One of my last questions is what are some of the challenges our customers see today? And how is Marvell creating solutions?

S Samuel Liu 10:15

The important thing to introducing IPoDWDM is the whole industry, it will have a strong large ecosystem for the last few years. For the whole industry. There's only one vendor for this case, it's the Cisco Acacia to support this pluggable module with the interface. to feature this OFEC feature, Marvell, what we did is we invest this chip cards it's a 7nm Canopus™ DSP we build the largest ecosystem for the whole industry. It's double-digits, different kinds of optical module players, they can offer the pluggable solutions. This whole ecosystem really eases the concern for the carrier or the end-user. They can buy from multiple different choices, they can plug in with different kinds of network equipment, combined with the one they prefer optical module player. So, they lower the cost, minimize the reach for the supply chain. The important thing is, they all didn't talk to each other.

C Christopher Banuelos 11:32

Samuel, I wanted to say thank you so much for participating on today's episode. I really look forward to continuing our discussion at some point in the future.

S Samuel Liu 11:40

Thank you crease, really glad to have this opportunity to talk IPoDWDM.

C Christopher Banuelos 11:47

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.