S1 EP31 - Automotive Megatrends

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Join Willard Tu, Associate Vice President, Automotive Compute, and podcast host Chris Banuelos on this week's episode as they discuss some of the latest automotive megatrends, OEM business models for software-defined vehicles, and how the next generation of vehicles will radically enhance the driver and consumer experience.

Speakers

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Christopher Banuelos 00:04
Welcome to the Marvell Essential Technology Podcast. I'm your host, Chris Banuelos. On today's episode listen to Willard Tu, associate vice president of automotive compute at Marvell, discussing some of the future mega trends in automotive. Take a deep dive into software defined vehicles, including some of the latest and future business models for OEMs and service providers. Hear about peak compute demand, and how software will change accessibility for customers, and much more. To stay up to date on future episodes, please be sure to subscribe to the Marvell essential technology podcast. Hey Willard, it's great to have you on today's episode, really looking forward to our discussion today. One of my first questions is what are some of the future megatrends in automotive?

Willard Tu 00:54
Chris, you know, there's three major mega trends that are going throughout the automotive industry right now. I mean, the first one, I think everybody knows about, you know, autonomous, everybody's talking about the self driving vehicle. And we're enamored with that. But there's a couple of other ones too. There's autonomous, there's connected, and there's software defined vehicles and connected as when, you know, we're using, you know, Wifi, Bluetooth, the cloud, you know, connectivity to do things like vehicle to infrastructure, you know, leveraging the cloud to do voice recognition, or over the air update. So there's a lot of activities. And then again, like I said, there's software defined vehicles, which leverages both the concept of connectivity, but enables things like autonomous. So, you know, like I said, three major mega trends out there autonomous, connected software defined vehicles.

Christopher Banuelos 01:49
Wanted to take a deep dive into the term software defined, can you speak on some of the latest and future business models for OEMs and service providers?

Willard Tu 01:59

Yeah, so Software Defined vehicle is this idea that the vehicle will adapt and be defined by software. So you know, think of it as your mobile phone, for example, you know, how you can load new apps onto your mobile phone, and then it becomes another type of feature or capability on your mobile phone that it gives you and so OEMs love the concept of software defined vehicles. And the reason why they love it is that they want to get reoccurring revenues the same way mobile phone, you know, game, game application guys will get, you know, a monthly fee, perhaps to get a game or even to have like, you buy things in the game and things like that. So, for the OEMs, they want to get this reoccurring revenue for things like self driving mode. And, you know, and be able to get this reoccurring revenue, a subscription fee on top of selling you a vehicle and want this reoccurring revenue. And then the consumers kind of like it, because you think about it, the potential of getting new features over the life of the vehicle that may not even existed at the time they purchased the vehicle, right? So maybe this feature didn't exist, but you know, you bought your car, and now it does, and you now want it but you don't want to go buy a new vehicle, you just kind of want to upgrade your car to be able to support that new feature. Well, you just download it, so to speak, and, and then you have it. And then the consumer also kind of likes it. Because you can imagine that if you had a feature and it improved over time, you could then say, hey, I want to upgrade my feature. Yeah, I might have to pay a little bit more this might be like, let's say your engine control or your EV car had a better algorithm to get better mileage, well, who wouldn't want better mileage, and if it only cost you, you know, $1 a month, you know, hey, you probably be for it. Or maybe there's a new graphical cluster, graphics display to make your car look more cooler than it did when you first bought it. You know, those things people may pay, you know, various amounts of money. You know, in some cases, maybe you're talking $1,000 a month for self driving. But maybe for something like a little bit better mileage or a cooler graphic, maybe you're paying a couple of dollars a month. So and then, of course, the consumer could like it for another case where let's say you're buying a used car from somebody. And now, you know, the previous owner didn't have the feature that you want it but you can just add. So there's a lot of things for the consumer. And then the third party, you know, service providers. I mean, think of it as an ecosystem of app developers, you know, who wouldn't want to be able to leverage an existing car base or deployment out there like the the Fords and the GMs and all these car makers who have this great deployment of vehicles out there, and then be able to sell new features and capabilities into that market?

Christopher Banuelos 04:41

What is peak compute demand? And how will the software defined vehicle change accessibility for customers?

Willard Tu 04:48

So you know, the peak compute demand is a question. All the OEMs want to figure out I mean, it's not easy to do. Obviously, self driving vehicles are probably the most compute intensive requiring, you know, have 1000s of KD mips, and, you know, hundreds and 1000s of AI tops. So, you know, that's the, that's the the highest probably compute demand out there. But you can imagine on top of self driving, there could be a lot of other applications running concurrently. And, and those are things that you have to start thinking about now, just like on your mobile phone, you can be running in a lot of different apps. At the same time, I could imagine that there could be this mode for all those creators out there that create content on the internet. And, you know, as a creator, he might be driving on down the road, and he's, let's say, in the National Park, and he wants to take a selfie. And, and that would be great that he could leverage that what we call a driver monitoring camera, take a selfie, but then he could use the surround view camera, to look at the surroundings around his vehicle. So he could then have this overlay where he has a selfie of himself, and the surround view picture and say, hey, yeah, I'm in the National Park. And this is where I'm at today. And here's what I'm seeing today, isn't it awesome. It's not a feature I would want. But the new generation, certainly, it's probably something they would want. But then you can have more practical applications that could also add to the compute requirements, like student driver mode, you've got a young teenager, and, you know, he's learning how to drive. And if he had an abrupt braking event, you'd want to capture the 10 seconds before the 10 seconds after. So you could sit there and review all the cameras and say, Hey, I know why you had a near accident, you were on your cell phone, here's the camera picture of you looking at your cell phone while you were driving. So you know, there's a lot of compute, that needs to support all these different applications. And you got to aggregate all these things, because it could be all running concurrently or instantaneously. And, you know, it's complicated, it's pretty complicated.

There are other compute elements that could come in, in terms of, you know, concurrent workloads. And it could be anything from other applications like pet mode, where you're, you're monitoring, whether your pets are in distress when you leave the vehicle, or it could be sentry mode, where you have the surround view and the interior camera act as a security system for your vehicle. So all these different types of applications can kind of come into play. But you know, you can have other things just as logical as park assist, biometric identification, or even video conferencing. So a variety of things that could be out there in terms of that would demand more compute power, and they all could be running at the same time in theory.

Christopher Banuelos 07:38
One of my last questions is why Marvell? Or what does this mean for Marvell?

Willard Tu 07:44
Well, that's a great question, Chris, I mean, OEMs that are embracing Software Defined vehicles. As I said before, they're they're really adding a lot more compute to the vehicle. And because they're not sure what the peak demand will be in the future. This is why Marvell is coming into the picture. As you add more, you're going to need five nanometer technology because five nanometer allows us to integrate more CPUs, more hardware accelerators, more security, more Ethernet switches, more AI, you know, five nanometer allows us to do the integration and do it at 30% more density than seven nanometer. Five nanometer allows us to consume less power 40%, more than than seven nanometers. So, five nanometer is a huge enabler to allow the OEMs to put more compute capability in the vehicle so they can run more software defined workloads.

Christopher Banuelos 08:39
Willard great topics today. Looking forward to a future discussion, and thanks for being on today's episode.

Willard Tu 08:45
Thank you, Chris. Really appreciate it and look forward to as well.

Christopher Banuelos 08:50
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.