Balaji Baktha: Good day everyone. I'm Balaji Baktha, the founder and CEO of Ventana. And it's my honor to be here with you again at The Six Five Summit. A sincere thank you to the organizers for inviting us back and we are thrilled to be part of this year's stellar lineup.

Looking back, it's remarkable to see the strides we made since our last appearance here. Today, I'm excited to share some of the milestones we've accomplished and how we've driven forward in our journey with The Six Five audience.

Ventana's story is essentially one of leadership. Leadership in the development of high performance RISC-V CPUs and leadership in pioneering chiplet technology and its adoption across the industry. We've made a mark as the most recognized brand when it comes to high performance RISC-V CPU course and chiplets, a feat that is a strong testament to our hard work, commitment and our world-class team and their continued excellence in executing, to performance targets that are unforeseen in the RISC-V space before.

Last year, we launched Veyron V1 at the RISC-V summit, setting a new benchmark for high-performance computing. This launch was not just a highlight of the show, but a key milestone in our growth trajectory, solidifying our pole position in the high-performance RISC-V space. This has given us at least two year headstart in the high performance space and we have a very strong roadmap that will continue to extend our lead further to the right for the foreseeable future. In the world of chiplets, we've emerged as a trailblazer. This was affirmed when we keynote it at the inaugural chip summit, putting a spotlight on our early and innovative leadership in the chiplet technology.

But at Ventana, we know that talk is cheap. Tangible results count, and that is where we stand out. For two consecutive years, we were selected by CRN as one of the top hot semiconductor companies to watch rubbing shoulders with industries behemoths, like AMD, NVIDIA, Intel, Qualcomm, et cetera. These accolades are more than just feathers in a cap. They're evidence of the significant contributions we've made. As a founding member of Rise, we are part of the industry's concerted effort to accelerate the software readiness of RISC-V across all of the industries we are going after. Our influence extends to the board of RISC-V International where we are on the board of directors and serve leadership roles in the technical stating committee, as well as marketing committees, driving broader adoption of RISC-V across all markets, all geographies.

Our products have seen tremendous customer attraction in the data center, automotive, AGI, and mobile markets. But while we are proud of our successes, we know that a thriving innovative community benefits all of us. The market is large enough and diverse enough for many, many players to succeed and we are committed to fostering that community spirit.

As we move forward, I'd like to pass the baton to my co-founder and CTO, Greg Favor who'll provide an update on our continued contributions to the RISC-V ecosystem. But before I go, I want to express my gratitude to all of you for joining us on this journey and for your continued support of Ventana. We are excited about the future and we hope you are too. Here's to pushing the boundaries of what's possible together. Thank you and forward to you Greg.

Greg Favor: Hi everyone. I'm first going to talk about the readiness of RISC-V architecture for use in developing a wide range of systems for various application areas and market segments.

RISC-V has had a solid base of architecture extensions for several years now. And with more being developed and added every year, this all is basically serving to make RISC-V a growing, rich, but yet still streamlined risk style ISA, suitable for a wide range of application areas from low and embedded to a high end data center, from IoT to mobile to automotive servers and many other areas. This architecture flexibility is one of the strengths of RISC-V, but it's also a potential recipe for fragmentation. RISC-V has been developing a couple of new things over the last couple of years to address this issue of providing both architecture flexibility while avoiding undesirable fragmentation.

The first of these two things is ISA profile specs. The idea being that a given ISA profile spec targets a particular broad class of applications, a certain application area. And there's expected to be a small number of ISA profiles, some that are more kind of higher end for very standardized software types environments and some that are more oriented towards embedded types of systems. But they basically constrain a lot of the flexibility that's available in the architecture, while still providing enough flexibility for each of those broad classes of applications.

The second key thing is what are called platform specs. They also target, specific in this case, market segments. So again, each platform spec has a focus on and maybe a narrow market segment or somewhat broader market segment, but it's really kind of very focused in that regard. And it also is trying to standardize sort of the complete story, both in terms of hardware, firmware, software and software interfaces for that market segment so that you can take compatible hardware and software but from different vendors and put them together and be fully compatible.

And so essentially, through both ISA profile and platform specs, that brings sort of the standardization to various application areas and market segments and avoids the whole fragmentation issue. Today, RISC-V has matured to being well-suited for many of the markets that Ventana targets both in server and high-end and embedded application areas. In addition, there are some key further RISC-V architecture extensions that are happening this year that are working towards making RISC-V a great architecture for, for example, Android based mobile devices.

Let me shift now to talk about Ventana's involvement with RISC-V International, which for several years now has been a very heavy involvement all the way from at the top at the board of directors level and the TSC, or technical steering committee levels, down into many of the task groups developing specific architecture extensions. Ventana is also heavily involved with helping mature and optimize the RISC-V software ecosystem, which Kumar will talk about in a few minutes. As far as our own high performance processor development work, we've completed our first generation eight wide design last year that was announced at the RISC-V summit this past December. It's called the V1, again, our first generation, Veyron 1 processor. And now we are well along in the development of our even higher performance, next generation, second generation V2 processor. And there'll be a formal announcement planned for later this year.

Among many of the new features also being incorporated into V2, are several standard and also a certain custom ISA extensions that are oriented towards accelerating AI and ML applications.

As I mentioned earlier, Ventana recognizes the importance of a robust software ecosystem. And with that in mind, I'll hand over to Kumar to talk about all the things that have been happening on the software side.

Kumar Sankaran: Thanks, Greg. And hi everybody. The RISC-V software ecosystem has made significant progress over the last few years. Thanks to the efforts of end customers, silicon vendors, and the overall end user community, we at Ventana have taken a lead role in enabling some of these open source workloads in the data center market segment and contributing them back to open source. We have put together full stack based solutions for various applications within the data center. Let's take a look at some of these.

The slide here shows the applications that are available in the open source ecosystem for RISC-V. Starting with the left, we have solutions in the areas of storage, networking, virtualization, security, web applications, and in-memory databases. All of these applications are running on the base platform and OS stack as shown in the picture here. The platform used as QEMU, which is a powerful and fully functional RISC-V emulation platform replicating the Ventana variant, silicon.

GCC is used as a compiler for all these applications. OpenSBI is used for the firmware with an EDK 2.1 based BIOS. SBI stands for supervisory binary interface and OpenSBI is an open source implementation of this firmware. The workload shown here run on Debian and Ubuntu as the OS and all of the workloads are available in open source. Let's talk about each of these workloads.

Starting with the left, SEF is a distributed storage application and is widely deployed by customers all over the world. In this usage scenario, we have ported SEF to use SPDK for storage acceleration. SPDK stands for storage performance development kit, and provides a set of libraries for storage acceleration. The next storage application is NVMe or Fabrics. That is accelerated with SPDK as well.

Moving to the networking space, we have two applications shown here. The first is the deployment of RISC-V in a SmartNIC or DPU, where we are showing OVS being accelerated by DPDK in a packet switching use case. DPDK stands for data path development kit. The second networking application is a use of NGINX as a load balancer. Moving to virtualization, we have KVM as a hypervisor running on Linux and the ability to launch guest OSS in a virtualized environment. In the area of security, we are showing the usage of open SSL in an SSH application. Moving to web apps, we are showing a typical LAMP scenario, LAMP standing for Linux, Apache, MySQL, PHP. The first application is a traditional Apache web server running a web application, a blogging application with WordPress, a search application using Apache's Solar, which works with Java. And finally, on the right, we show an in-memory database workload using Redis, which is a powerful key value pair based in-memory database used in a variety of applications across the world.

Now let's get to the demo. The first application we are showing here is the Apache web server and its usage in a typical web application. We are running our own Ventana Micros web server on the RISC-V QEMU platform. Let's move on to the next application. The second application is a usage of a WordPress. WordPress is a blogging application that is used throughout the internet in a blogging application where you would go to a web server, you would look at content, you would look at video, you would look at blogs that have been posted and comment about that. And WordPress is a typical application that is used for these particular scenarios. So let me click on WordPress here. So as you see here, we had announced the Veyron V1 at the RISC-V summit in December last year, and this was a press release we had done on behalf of Ventana at that point in time. So this is rendered using WordPress, and you can kind of see some comments at the bottom where we have some comments written by people. And once you post a comment, it appears on the website.

Moving to the next application here, we will focus on search, which is done via Apache Solar. So the screen that you see here is a very typical search screen that you would see with Google Search or Microsoft Bing or any other search engine that you have. So this is written using Apache Solar, which is completely implemented in Java. So let me search for any search string here, like American Airlines. And the backend database for this is a Wikipedia database. So it would search for these articles from Wikipedia and show you the results on the screen as you see here. So this shows the implementation of a search engine running on RISC-V. Moving back to our primary page here, let's move to in-memory databases, which is using Redis.

So Redis is a key value stored database. It's a very powerful high-speed database that is used across the world for many different applications. So as you see here, we have two categories, actors and movies. And if I click on this, you would see within movies, you would see many keys and the associated values for these. And these are arranged in no particular order. So there is a key value here. As you see, the value is a thousand, and then there's a description of a movie. So it's a key value database store, and it's completely an in-memory database.

Moving back to our homepage here. So let's go on to the use of OVS with DPDK in a SmartNIC application. So I'm going to click on this one. This is a long video and we won't play the video here. I'll pause the video because it's a nine minute long video. But I'll just talk through the topology here of what we are trying to show with SmartNIC, accelerated with OVS and DPDK.

So in the topology picture that you see, it's a packet switching application where a packet is switched from a one VM that's running externally to another VM that is running on another external host. And the arrow color red that you see here is the packet going from the top VM and then coming back to the bottom VM in blue. And the box that you see on the left side is the actual SmartNIC that's implemented using RISC-V, and it implements a packet switching application where the packet comes in and then it goes out of the network into the outside world and there is a loop back on the outside world and the packet gets switched back on the blue line that you see. The packet comes back, and then again it's switched back to the bottom VM.

So we are showing two use cases here. One is a plain text use case where the packet is in clear text, and the second case is encrypted text where the packet is in clear text and the SmartNIC

encrypts it and then sends it out of the network. And then once the packet comes back in, it gets decrypted and switched back to the bottom VM.

The last thing I wanted to update you on was a concept we are working on at Ventana called the domain specific accelerator, or DSA. Here, we provide a mechanism to optimize data center workloads via high performance connectivity between the Ventana CPU and the closely coupled accelerator. More information regarding this will be made available in the next few months. As you can see, we are making significant strides in our software ecosystem. Now to tie everything together, I'll turn it back over to Travis. Travis.

Travis Lanier: Thank you, Kumar, for that overview of our software ecosystem readiness. To recap, we're making a remarkable impact across various markets. Whether it's data centers looking for differentiation, the automotive industry pursuing advancements in ADAS, AI revolutionizing every sector or the growing clamor for high performance solutions in the client and mobile space, Ventana is there. Our innovative high performance RISC-V solutions are ready to meet these diverse needs.

But what truly sets us apart is our world-class team. We're fortunate to have many of the same talented minds who helped other architectures, such as ARM, reaches current success in the data center and mobile spaces. They bring a wealth of experience and a proven track record in driving success. More importantly, we don't just have ideas, we have fully capable RISC-V platforms ready to go. Kumar's demonstration highlights how well our software ecosystem is coming together to support these platforms.

In summary, Ventana is not just keeping pace with the future, we're actively building it. And we are excited about the journey ahead. Thank you again for having us at The Six Five Summit and for your continued interest in Ventana as we accelerate the future of computing.