
AMD DEVELOPER INSIDE TRACK

INTRODUCTION TO SIMNOW



This video features Juan Flores, MTS talking all about what SimNow is, who would could benefit from using it, and gives examples on what type of instructions are available in SimNow that aren't available in current hardware available today such as the instructions AVX and XOP. He also runs us through some of the requirements of getting SimNow up and running on your system.

TRANSCRIPTS

Juan Flores, Member of Technical Staff on the SimNow Team

Sharon: AMD Developer Inside Track is here with Juan Flores from the SimNow team. Juan, why don't you introduce yourself?

Juan: Sure, my name is Juan Flores. I'm a Member of Technical Staff at Advanced Micro Devices. I've been here for about nine years. The greater, the good bulk of that nine years has been spent doing SimNow development and support.

Sharon: Excellent. So, you are well qualified to tell us, what exactly is SimNow?

Juan: Well, in a nutshell, SimNow is a fast and configurable instruction level system simulator and with SimNow users can connect together arbitrarily complex software models to form a full PC platform emulation environment. Now, breaking that down a little bit more, one of the key goals of SimNow is to give the users the ability to run unmodified guest software. And by guest software, I mean the software that's run inside the simulator. So, from the platform BIOS to the video BIOS to expansion ROMs to the whole operating system, all of the code that runs in the guest in SimNow is completely unmodified. And that's actually one of the key things that actually differentiates itself from other modeling software or virtual machine software which is a completely different category of software all together, but might be something that some users in the community might compare to SimNow. But it is something that distinguishes itself from other similar software classes out there.

Sharon: Gotcha.

Sharon: So would benefit from using SimNow?

Juan: To put it broadly, really, anybody who's interested in functional simulation would be a customer of SimNow. To get into more specifics, software developers and system analysis are probably two of our major customer bases that we have currently. For software developers, SimNow can be an incredibly powerful tool because it can allow you to do pre-silicon debug and development of your software before silicon is actually available or even in post-silicon stages where silicon is either scarce, costly or not healthy in some situations. The software teams can continue to go about doing their development and debug even in those hardware, in those situations where the hardware is not very available at the time.

Just to mention a particular case study, and one of the usages that we've had a lot for our public version, is for compiler development. For compiler teams out there, when AMD is working on, has published or has worked with other partners to do a new instruction set and is implementing that into its next generation of architecture, typically we make those new instructions available in the public release of SimNow prior to, years before having silicon available publically. And so that allows our compiler teams or people doing instruction set analysis to go create their tools for compiler development or for instruction analysis before the hardware is actually available. We've done that for our virtualization instructions many years ago when AMD was just first coming out with our virtualization technology. SimNow was one of the founding blocks for getting the software community up to speed with the new instructions. And also for some of the newer instruction sets that are becoming available in some of our upcoming generation parts we already had support for those instruction sets in our simulator currently.

Sharon: So, can you give us an example of an instruction that's available in SimNow that isn't available in silicon today?

Juan: Sure. Absolutely, good question, so our current release of SimNow, SimNow version 4.5.2, which is already available on developer.amd.com supports AVX which is the Advanced Vector Extensions instruction set as well as it's follow on XOP. In addition to that, we're going to be having a 4.6.1 release to the public site within the next few days. Probably by the time this airs and that will, in addition to the two instruction sets that I just mentioned will also have the LWP instruction set which is a Light Weight Profiler

Sharon: Ok. Yeah, I can imagine software developers or device driver developers being particularly interested.

Juan: That's definitely one of the classes of software developers. The only thing that would be required is that we have a model for the device that you to develop a driver for. And that's typically not a problem because most companies that are doing device driver development already have a model for SimNow. So, they'll have their simulation environment ready to go and ready to develop their driver with.

Sharon: Ok. So, I heard from our development community that it can be difficult to get SimNow installed and up and running. Can you walk us through that scenario?

Juan: Sure. Absolutely. SimNow does have some very strict hardware requirements for the host system that you're running SimNow on. The first thing that you'll need is an AMD64 system. An AMD64 system is basically any system that has an Opteron, Athlon 64, Phenom, Turion, any AMD 64-bit capable processor as its core. Secondly, the user will need a 64-bit OS. For some internal reasons, which I'm not going to get into right now, there's only one 64-bit version of SimNow and there's no 32-bit version available. So the 64-bit OS procurement is probably going to be the biggest pain point in terms of getting SimNow up and running for some users. In addition to that, SimNow does have some hefty memory requirements. We recommend at least 4 gigabytes of memory on your system in order to run SimNow, and that might vary depending on what you're trying to simulate. The more physical memory you try to simulate in your guest, the more physical memory your host is going to require. So, in terms of host system requirements it really varies on what you are trying to do. Most of the platforms that ship with SimNow right now, 4GB of main memory should suffice.

Now, once you have a system that is capable of running SimNow, the installation of SimNow itself is actually very simple. There's just a self extracting executable for Windows® and a tar.gz (gzipped tarball) zipfile for Linux. Both of those are pretty easy to install. And once you have SimNow installed on your system, it's a matter of just opening one of the reference platforms that SimNow actually ships with. The public version of SimNow actually has a number of, or handful, of reference platforms that AMD has developed over the years that the user can immediately open up. The reference platforms in the SimNow world are called BSDs which is just an acronym for virtual platforms. So once you open these BSDs and you start to explore SimNow and start to look at, what's called the device viewer in SimNow, you'll see a canvas of components that are very analogous to what you would see on a motherboard. You have your processor cores, you have your chipsets, your northbridge, your southbridge, your I/O, your peripherals. All of these things would probably be very familiar to someone who's actually looked at a motherboard before. Once you have this platform open you are basically ready to start simulating. By clicking the "go" button on the SimNow simulator will start getting the SimNow's engines cranking and within a matter of minutes, depending on what sort of platform you simulate, you should have your BIOS posted. If you're booting an OS, probably somewhere on the order of 20 – 30 minutes typically to boot a full OS. If you're doing something complex like doing a complete operating system install, you're probably looking at something in the neighborhood of 4 – 5 hours to do a full operating system install. But, once you've actually done that lengthy install process, booting the OS up again will only be a matter of minutes, on the order of 20 – 30 minutes.

Sharon: Ok, so I have a few side questions, but if so you have a 64-bit OS and you're running SimNow, can you still install a 32-bit operating system in that simulation?

Juan: Absolutely. SimNow emulates the hardware, so 64-bit OS's like Windows® and Linux have a compatibility layer which uses pieces of our architecture to run. And so, anything that you... on a real system you can run a 32-bit OS, excuse me, a 32-bit application inside a 64-bit OS because the OS and architecture provide that compatibility and it's the exact same thing for SimNow.

SimNow can be thought of a physical system living inside your physical system, and so the same things that you can run on a real system, you can run in SimNow.

Sharon: Ok. That makes sense. What other kinds of tips and tricks do you have for developers wanting to use SimNow?

Juan: Well, the main suggestions I would have for the users out there is to just take the time to explore SimNow. SimNow itself is a very complex but powerful tool. It can be used for a lot of different scenarios. There is a steep learning curve associated with SimNow, so my best suggestions that I can give to users is to actually take the time to get to know the tool and get to know its can's and its cant's, what it's capable of doing, what it's designed to do and conversely what its good at doing and at the same time. Take the time to think about things that its not designed to do. SimNow is not a good environment for doing time-sensitive code or code that would be sensitive to electricals or things related to the physical layer of the PC platform. But in terms of functional software behavior its an excellent and powerful platform to be used by software developers or system analysis.

Sharon: Ok, so say you're up and running on SimNow, what sort of support options do we provide?

Juan: Sure, well, the first and foremost thing I'd suggest is for users to take a look at the user's manual. And I know that's something that software developers always say, but I'm going to say it anyway, but the users manual has a lot of the frequently asked questions that we get from other users out there. And it also has steps for getting up and running quickly with SimNow.

If you can't find your answers there, there's always our knowledge base that we have on developer.amd.com, in addition there's our support email simnow.support@amd.com and we will certainly be responsive to that, to those emails.

Sharon: Excellent, thanks so much Juan, for giving me the rundown on SimNow and hopefully our developer community finds this video helpful and they can get started running their own simulation of hardware that they can't buy right now. So, that's a pretty exciting opportunity for them and it's a freely downloadable tool as long as they accept the license agreement. Correct?

Juan: Yes, correct.

Sharon: So, yeah, come to developer.amd.com to check it out! Thanks Juan!

Juan: Thank you for having me.