

# Where are the Async Millionaires?

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## Abstract

Fear and Greed drive computer projects. It's no coincidence that it matches the motivators in the stock market. Fear: The competition will have something you don't. Greed: That you might be able to do something the competition can't.

So far, no one's done anything with Async that instills Fear in me. I'll talk about why not, and hopefully inspire someone to create such fear. Today, when Async has been used in general purpose computing, it's been fairly simplistic. The Async people could add value in several areas — high-speed signaling, power management, error-correction, etc. — if they weren't so dogmatic about what's a clock and what's not. Dogma doesn't create enough Fear.

Greed is the reason I'm looking at Async solutions. CPU and computer system design issues are always evolving. Synchronous everywhere is not the solution. But it's not the broken solution that it's sometimes made out to be. No one thought 5 years ago we'd be talking about 2GHz synchronous CPUs today. It was supposed to be impossible due to clock skews. Async was supposed to save the day. Well that's not what happened. Additionally, the important architecture issues have shifted since the days of 50MHz CPUs.

Too often, Async methodologies are postulated to be a "possibly" better solution for various problems in the design of computers. I'll talk about the real current issues with general purpose computing, where async methodologies will come in, what shape I think it should take, and what are the barriers. I'd like to talk about the possibilities for real breakthrough tools, chips, or intellectual property that could have immediate impacts on computer development. Hopefully I can give some opinions that will cause a recalibration on what problems need to be solved. The issues with using Async technologies are complicated enough that the motivator has to be a big bang. Not incremental goodness. That's why I use "millionaires" as a goodness metric.

Where are the Asynchronous Millionaires?

## Bio

Kevin Normoyle is a Distinguished Engineer at Sun Microsystems. He was the chief-architect of the UltraSPARC III, and currently works on UltraSPARC CPU architecture and design projects.