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Subject: Tanenbaum-Torvalds Debate

Posted by [Anar Manafov](#) on Tue, 16 May 2006 15:38:54 GMT

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Tanenbaum-Torvalds Debate: Part II

Quote:What Am I Trying to Prove?

Actually, MINIX 3 and my research generally is **\*\*NOT\*\*** about microkernels. It is about building highly reliable, self-healing, operating systems. I will consider the job finished when no manufacturer anywhere makes a PC with a reset button. TVs don't have reset buttons. Stereos don't have reset buttons. Cars don't have reset buttons. They are full of software but don't need them. Computers need reset buttons because their software crashes a lot. I know that computer software is different from car software, but users just want them both to work and don't want lectures why they should expect cars to work and computers not to work. I want to build an operating system whose mean time to failure is much longer than the lifetime of the computer so the average user never experiences a crash...

So what do microkernels have to do with this goal? They make it possible to build self-healing systems. That is what I care about and my research is about...

..In our design, when most drivers fail, the reincarnation server can restart a fresh copy, and optionally save the core image of the dead driver for debugging, log the event, send email to an administrator or developer, etc. The system continues to run, and at the very least can be shut down gracefully without loss of work or data. Some components, such as the reincarnation server itself, the file server, and the process server are critical, and losing them crashes the system, but there is absolutely no reason to allow a faulty audio, printer, or scanner driver to wipe out the system. They should just be restarted and work should continue. This is our goal: systems that can detect and repair their own faults. You can do this easily in a microkernel system...

Quote:Microsoft also has interest in microkernels. It understands the maintenance headache of monolithic kernels like no one else. Windows NT 3.1 was a half-hearted attempt at a microkernel system, but it wasn't done right and the performance wasn't good enough on the hardware of the early 1990s, so it gave up on the idea for a while. But recently, it tried again on modern hardware, resulting in Singularity. Now I know that a lot of people assume that if Microsoft did it, it must be stupid, but the people who drove the Singularity project, Galen Hunt and Jim Larus, are very smart cookies, and they well understand that Windows is a mess and a new approach is needed.

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