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# Kernel Changes Draw Concern

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Members of the open-source community are expressing concern over rapid feature changes in the Linux 2.6 kernel, which they say are too focused on the desktop and could make the kernel too large.

Sam Greenblatt, a senior vice president at Computer Associates International Inc., in Islandia, N.Y., said that while the kernel is evolving for the desktop, server and embedded markets, more and more technology is being included, and the kernel is "getting fatter. We are not interested in the game drivers and music drivers that are being added to the kernel. We are interested in a more stable kernel."

Morton, who works for Open Source Development Labs Inc., in Beaverton, Ore., said there is no formal road map for an enterprise Linux feature set since the development of those technologies rests largely with vendors such as Red Hat Inc., IBM, Novell Inc. and CA.

"We are pumping feature changes into the kernel at an enormous rate," said Andrew Morton, the current maintainer of the Linux 2.6 kernel.

Still, Morton took issue with Greenblatt's contention, saying that most new features are optional and that their use is at the discretion of organizations compiling their builds of the kernel.

Morton said new features should continue to be added to the stable 2.6 tree rather than forming a new 2.7 development tree.

Critics of the development process point to growing competition among vendors to get code for new features accepted. But Morton maintains that the competition is healthy because it helps top-level kernel developers understand what subfeatures are required and what other users need.

On the enterprise front, Morton said he expects to merge code from Cambridge University's Computer Laboratories' Xen virtualization technology into the Linux kernel within the next few months. Xen "does the right thing technically," unlike other technologies, which are mainly workarounds for the fact that the operating system is not appropriately licensed, Morton said.

But CA's Greenblatt disagreed, saying that other virtualization technologies, such as one from VMware Inc., in Palo Alto, Calif., currently fill the virtualization role.

"We would be happy to see a true hypervisor [an application that allows multiple operating systems to run concurrently on the same physical server]. We think [Xen] is great innovation, but its concept of virtualization is still not to the point

that we want to see in there," Greenblatt said.

Ian Pratt, a Xen project leader at Cambridge University, in England, said that Xen is indeed a true hypervisor.

"It runs on the bare metal and provides protected virtual environments for guest operating systems running on top of it," Pratt said. "Because of the paravirtualized approach, where we make some modifications to the guest operating systems, we've been able to allow the hypervisor and Linux to work in a more cooperative fashion."

On the issue of adding more clustering technology to the kernel, Morton said he hopes that clustering teams are working on factoring out common components for a merge into the mainline kernel.

InfiniBand, a channel-based, switch-fabric architecture from Topspin Communications Inc., in Mountain View, Calif., which was acquired last week by Cisco Systems Inc. , has already been moved into the kernel, Morton said, adding that the other InfiniBand stakeholders "seemed fine" with that decision.

Pratt said the Xen team is working with InfiniBand vendors to ensure that InfiniBand channels can be extended into guest operating systems running over Xen in an efficient yet fully protected manner.

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