

# Embedded Linux: Maybe yes, maybe no, but definitely worth a look-see

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While Linux may not be 100% ready to host all your desktop activities, the embedded versions—real-time and nonreal-time—are being quietly put to the test by developers, and may be ready to run your control application. True, compared with Windows CE implementations, embedding Linux may require more work up front if you roll your own, but if you're making thousands of devices, zero licensing costs can look attractive.

Commercial embeddable Linux products are another option. Says Rick Lehrbaum, executive editor of LinuxDevices.com, most vendors of embedded Linux need to charge up front for software developer kits (SDKs)/seats and/or annual subscriptions, since they generally don't have royalty income. Microsoft, on the other hand, keeps SDK prices low, and prefers income from royalties.

According to data recently compiled by Evans Data Corp. (EDC, Santa Cruz, CA), Linux and Windows OSs are running neck and neck in terms of developer use for future projects. The newest installment of EDC's *Embedded Systems Developer Survey*, fielded in July, 2002, shows 30% of embedded developers (444 participated in this survey) expect to use Linux in their next embedded project, while 16.2% say they will use Windows CE and another 14.4% say they will use Windows XP Embedded—giving Windows Embedded OSs a slight edge over Embedded Linux, at 30.6% vs 30.2%. Embedded Linux, however, has double the

growth rate—although relatively small in market value. You can find more details on this study at [www.linuxdevices.com](http://www.linuxdevices.com), or by contacting EDC at 800.831.3080 or [www.evansdata.com](http://www.evansdata.com).

According to a Venture Development Corp. study, *The Embedded Software Strategic Market Intelligence Program 2001/2002 Volume VI: Linux's Future in the Embedded Systems Market*, factors slowing the adoption of embedded Linux include real-time limitations, doubts about availability and support, fragmentation concerns, doubts about vendor longevity, and footprint size.

I thought it would be interesting to get some feedback from someone who has taken the embedded Linux plunge. Steve Schoenberg, president of Sixnet, got some first-hand experience in the development of his company's SixTRAK IPm Open DCS controller ([www.sixnetio.com](http://www.sixnetio.com)). The device runs embedded Linux and supports five Ethernet and three serial ports. Explains Schoenberg, "We need to be able to accurately control character timing for PLC protocols such as Modbus RTU. We need to support party-line handshaking for radios and RS485 networks. CE does not support these features. In all candor, Linux didn't support these features either. The difference is that with Linux we had the source code and could improve the drivers. Moreover, we could submit the code for inclusion in the next release of the Linux kernel, making it a standard product feature in the future."

What about development costs and support? Schoenberg replied, "In addition to the direct development cost savings, we have benefited greatly from the sharing of public code. It is as if we have a hundred developers working for us. There are features along the way we needed that, through postings on the Internet, brought us code from other developers."

Who is buying IPm? Said Schoenberg: "Users fall into several categories. Some just love the many features and the high performance. These customers also love the open concept. It gives them security. We have OEMs who are enhancing their product and making it their own. USFilter Controls has announced its new RTU, which adds features to our RTU. We also have third-party vendors writing their own applications—to turn our IPm into their own product, or to sell as add-on applications. We have integrators enhancing their applications' capabilities with our C compiler. The spectrum is complete from *leave it alone* to *take it apart*."

Is embedded Linux right for you? It's worth a look-see.



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