

Will Linux Be Computer Games' Dark Horse OS?

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These are strange times. In October, Microsoft released Windows XP and *PC Magazine* gave its editor's choice award to Red Hat Linux. The snub isn't worrying Microsoft. If anything, being able to point to the existence of other viable operating systems, such as Linux, helps keep Microsoft from being tarred with the monopoly brush.

Although Linux is not ready to be a consumer-level OS, it doggedly remains a threat to Microsoft because of its flexibility. The support that companies like IBM, HP, and Red Hat throw at it doesn't hurt either. All three now use Linux in vertical markets and for back-end systems such as databases and Web servers. For example, IBM recently released Websphere for Linux, which facilitates Web and e-commerce services.

THE IMPOSSIBLE DREAM?

One area the Linux community hopes to break into is computer games. To date, Linux has had little success wooing PC gamers. For example, Linux game publisher Loki (<http://www.lokigames.com/>) based its business model on porting the best-selling Windows games to Linux. Although the company marketed Linux ports of Rune, Quake III, Heretic II, and SimCity 3000, it has already filed for bankruptcy protection.

Loki and others who try to make money with Linux games face an enormous challenge: They're trying to cut a slender wedge from a relatively small pie—the Windows PC game market.



Although Linux-based PC games have enjoyed only modest sales, one console giant is betting heavily on the open source OS.

These days, PCs are just a sideshow compared to consoles such as the PlayStation 2 and the newly launched Gamecube and Xbox. Analysts consider a PC game that sells 100,000 copies to be a major hit, yet console blockbusters such as Square's Final Fantasy X for the PS2 sold more than 2.4 million copies in Japan alone this year.

Upgrade treadmill

Even perennial PC champion Microsoft recognized it would be better to switch than fight. This November, it launched the Xbox in a bid to capture its share of the lucrative console business. The console market has more going for it than market size, however.

Although the PC's versatility in function and device support has proven a strong selling point, providing that flexibility drives game developers mad. Writing code that supports multiple input devices such as keyboards, mice, and joysticks is difficult enough. Add support for multiple generations of PC processors and motherboards—most with a market life span measured in months—and driver support becomes a revenue drain and

a coding nightmare. While a game console will typically remain stable for five years, PCs go through major changes and upgrades *every* year.

Faltering support

Linux PC game makers face other hurdles as well. Software and hardware support for Linux games has been uneven at best. Worst of all, Linux can't support Microsoft's proprietary DirectX graphics API—a severe limitation considering that the current version of DirectX is especially popular with game developers because it supports both Windows and the Xbox.

Linux does support another graphics API, SGI's OpenGL, in two varieties. Nvidia supports OpenGL directly for all its graphics chipsets through its proprietary binary driver. Likewise, VA Linux Systems provides open source drivers for most major video graphics cards through its direct rendering infrastructure (DRI, <http://dri.sourceforge.net/>). These drivers ship with the latest release of Red Hat 7.2 for the XFree86 implementation of the X Window system. They use Mesa, a clone of the OpenGL API. Red Hat even includes game demos from Loki. In Nvidia's case, the company has committed to providing Linux drivers for its cards, whereas volunteers drive the DRI effort. So, if you don't have an Nvidia card, and no one volunteers to write a driver for the card you do have, you can't play 3D games on your Linux PC.

Audio for Linux games poses a similar challenge. Creative Labs and the troubled Loki are at work, however on the Open Audio Library, which could provide drivers for the market-leading Soundblaster line of products.

Finally, in a variation of the chicken-and-egg dilemma, you can't create a game

market without games or game developers. Although you can find some 3D games for Linux (<http://www.tuxgames.com/>), the number being sold falls well below critical mass. Moreover, with game-development costs running from around \$1 to \$5 million for a PC title, the Linux market to date has provided little evidence that a game developer could amortize this cost across the small number of home PCs running Linux—an assessment Loki's bankruptcy only reinforced.

LINUX, CONSOLE YOURSELF

Developers have pursued other attempts to craft video games in Linux without fanfare. Until cash flow problems forced its closure, Indrema had a Linux-based console box in development. The company's strategy called for establishing a grass roots alternative to the PS2 and Xbox's proprietary operating systems. Indrema anticipated attracting large numbers of developers who could not afford the expensive royalties and pricey development kits the major console manufacturers required. Instead, the development environment would be based on freely available open source tools and Indrema wouldn't charge royalties. The company claimed that more than 200 games were in development when it closed its doors.

Uwink (<http://www.uwink.com/>), a company founded by Atari console legend Nolan Bushnell, has been more successful, but in a carefully crafted niche market: networked game terminals for bars. Uwink uses embedded Linux on the PC. Its games consist mostly of skill-based 2D classics such as sports trivia and solitaire. Its intent, according to the uWink Web site, is to have "Total Entertainment Systems in locations where other machines fear to tread." uWink's success can be attributed less to selling Linux boxes than to creating a location-based entertainment platform that can thrive in the harsh environment of spilled beer and tipsy patrons.

The Virtual GameBoy Advance offers another use for Linux in video game entertainment. VGBA is an emulator that lets users run games produced for Nintendo's handheld video game console on their Linux PCs. However, this use represents a gray market in the video game industry,

given that most courts hold the duplication of game cartridge ROMs to be a copyright violation.

More promising may be the games built for the Compaq iPAQ (<http://www.handhelds.org>). Compaq recently ported Linux to this handheld, which features a 206 MHz StrongArm processor, 32 Mbytes of RAM, and a 240 × 320 pixel color LCD screen. The iPAQ uses a version of the GameBoy Advance chip so powerful that several researchers have begun exploring the use of 3D graphics on the machine. Compaq is not a game company, however, and may soon be overshadowed by one: Sony.

Sony's PS2 Linux kit uses the X-Windows graphical interface and can function as an OS on the console.

SONY DOES LINUX

Sony tapped the Linux world for its PS2, combining open source code with vast amounts of cash and an ambitious strategy for challenging Microsoft. To begin with, the development environment for the PS2 runs atop Linux. Indeed, Cygnus Solutions originally built a PS2 emulation for Sony prior to the real hardware's availability.

Now, Sony apparently wants more from Linux. Earlier this year, Sony Computer Entertainment announced a Linux-based amateur programming solution for the PS2. In June 2001, the company released 1,000 copies of the PlayStation 2 Linux kit beta version to the Japanese Linux community for about \$200 each.

In October, according to Gamespot.com, Sony confirmed at the Rambus 2001 Developer Forum that it plans to release its PS2 Linux kit in North America. Shinichi Okamoto, senior vice president of research and development and Sony Computer Entertainment's chief technical officer, promised to announce the product's US release date and pricing soon. The PS2 Linux kit uses the X-Windows graphical interface and can function as an OS on the console to run a variety of computer productivity, communication, and entertainment soft-

ware. The Linux kit can also be used as a minimalist PS2 development environment. The kit includes a software DVD, 40 Gbyte hard drive, and a USB keyboard and mouse.

What does Sony have in mind with this offering? Its demos at this year's Electronics Entertainment Expo (E3) provide a clue. Sony ran several nongame applications on its PS2, including broadband Web services from AOL. Significantly, in May 2001 AOL and Sony signed a partnership agreement to provide the PS2 with instant messaging and Web browsing through AOL.

Sony and AOL have both invested in another Linux-based entertainment device as well: the Tivo digital TV recorder. At E3, Sony also showed streaming video and audio on the Linux PS2 via RealNetworks RealPlayer 8. Other high-visibility partnerships included Macromedia for its Flash software and Cisco for its support of IPV6.

The likely target of these moves is not the PC, but Microsoft's MSN, which now comes integrated with every PC that runs Microsoft XP. The Linux PS2 could well provide the means for Sony to deliver more kinds of content to the home via its proprietary Web portals and AOL partnership. Moreover, Linux PS2s could provide a platform for horizontal integration in the home: a PC connected to other Sony devices such as home audio and video systems.

If Sony does plan to use Linux and the PS2 as a Trojan horse that will breach Microsoft's hold on home computing, it must hide the Linux operating system in the belly of the beast, much as uWink has done. Going to Linux should help developers such as AOL move applications to the platform. Venturesome developers and investors should, however, heed this caveat from Red Hat's annual report: "Our open source software business model is unproven" (<http://biz.yahoo.com/e/010419/rhat.html>). ★

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