Embedded development projects based on Microsoft's "Windows Embedded" operating system platforms (specifically, Windows CE .NET and Windows XP Embedded) are completed 43% faster and at 68% lower cost, on average, compared with similar projects using Embedded Linux, according to a report released today by market research firm Embedded Market Forecasters.

The study, titled Total Cost of Development: A comprehensive cost estimation framework for evaluating embedded development platforms, derives its quantitative conclusions from a cost-based framework for comparing embedded operating system development alternatives that was developed by the report's author, Dr. Jerry Krasner. "The 'Total Cost of Development' framework helps embedded device manufacturers assess and estimate software costs to enhance design results and minimize financial risk," said Krasner.

The report includes data from a survey of 100 manufacturers using 32-bit processors in a range of embedded projects and applications -- 50 using various implementations of embedded Linux, and 50 using Microsoft's Windows Embedded platforms (Windows CE .NET and Windows XP Embedded). The devices and applications included in the source data reportedly covered consumer electronics, handheld computers, industrial controllers, network gateways, point-of-sale kiosks, set-top boxes, thin clients, and others. The report estimates "total cost of development" for each project by multiplying the average embedded design project time-to-market by the software engineering team size and cost.

"While there exist an understandable enthusiasm and interest in using Linux for embedded designs as expressed from a number of OEMs, this does not translate into lower cost or faster development solutions," writes Krasner, in the executive summary of the report. "The data indicate that rich integrated commercial operating systems and development environments such as Windows Embedded (Windows XP Embedded and Windows CE.NET) provide a clear total cost of development advantage to embedded software developers," Krasner adds.

Key findings of the report

According to Krasner, some of the key findings of the study are . . .

- **Time to Market**: Windows Embedded design projects were started and brought to market in 8.1 months on average, versus 14.3 months for an Embedded Linux project. 43% faster project development with Windows Embedded.

- **Software engineering resources**: The average software engineering team size for Windows Embedded projects was 7.9 people, versus 14.2 people for an Embedded Linux project. 44% smaller software engineering teams with Windows Embedded.
• **Total Cost of Development:** The estimated average total cost of development for a Windows Embedded design project was $480,000, versus $1.5 million for an Embedded Linux project. 68% lower total cost of development with Windows Embedded. (The salaries for an Embedded Windows developer and an Embedded Linux developer were assumed to be the same for purposes of the analysis.)

"Embedded Linux can be effective in distinct scenarios, but does not broadly translate into lower cost or faster development," commented Krasner. "Respondent data consistently demonstrated that the Windows Embedded set of operating system and integrated development environments provided a clear and substantial time to market and cost advantage to developers. Windows CE .NET and Windows XP Embedded appear to deliver a significant total cost of development advantage due to their greater degree of maturity, feature-richness, componentization, integrated tool chain, and parallel development process."