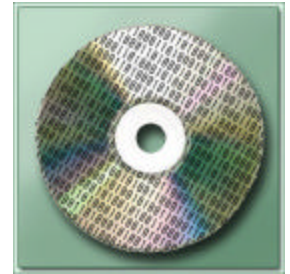


**Venture Development Corporation
Embedded Software and
Tools Practice**



A White Paper On:

***THE 2005 EMBEDDED SOFTWARE
STRATEGIC MARKET INTELLIGENCE
PROGRAM***

Volume I: Embedded and Real-Time Operating Systems

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The following white paper contains some of the top-level findings from the embedded and real-time operating systems segment (Volume I) of VDC's *2005 Embedded Software Strategic Market Intelligence Program*.

MARKET OVERVIEW

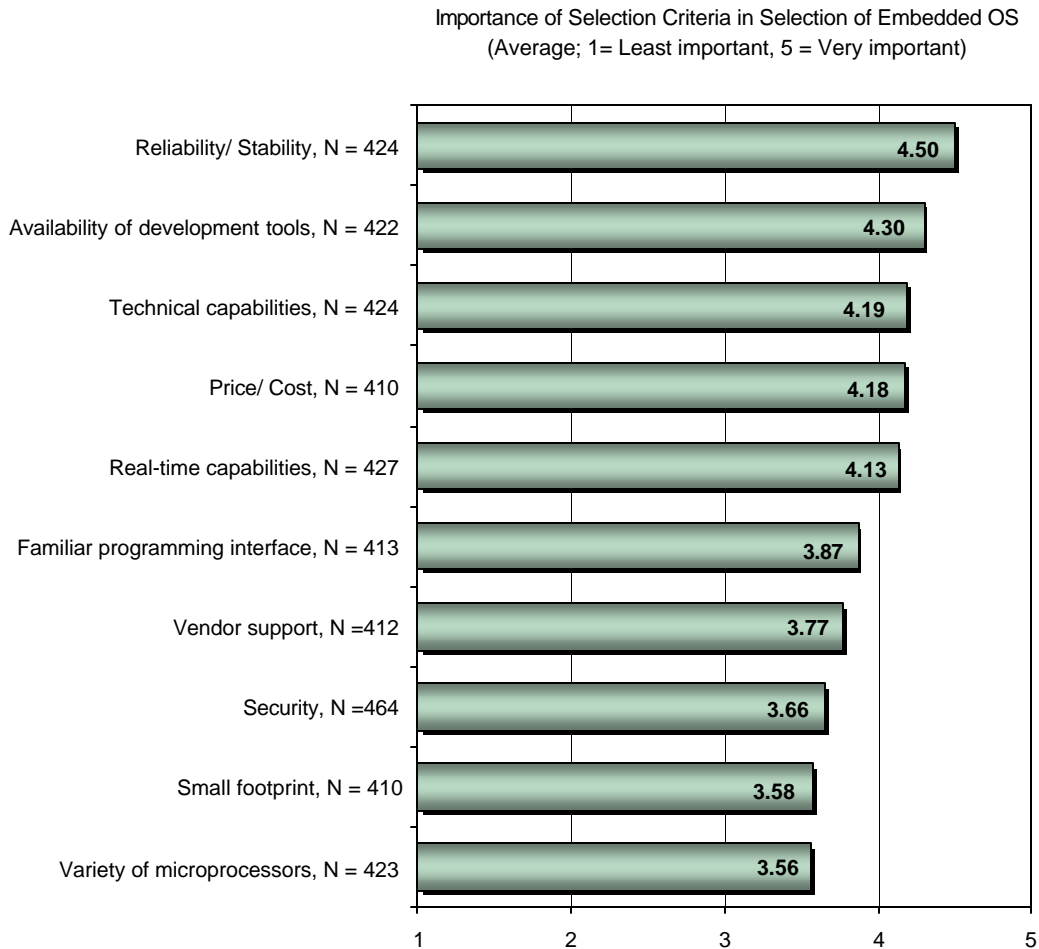
"In general, the industry is strong and growing, and appears to be recovering nicely from the recession that now appears to be a distant memory. New designs are plentiful and budgets are no longer frozen."

- OS Vendor

The embedded market has evolved since the early nineties when software providers were compartmented and offered real-time operating systems or software development tools. Software providers could leverage the technical strengths from strategic partnerships in an effort to offer embedded developers with a software solution for their device development while minimizing research and development costs to develop their own operating systems or development tool chains.

As time passed, many market players converged at the center, either through acquisitions and mergers, internal development, or some combination of both, in offering a total software solution that spans operating systems and tool chains and competing head-to-head in various vertical markets. Regardless of the direction of convergence, the goal was to provide an integrated and supported solution from a single vendor. Some in the industry began to vertically orient or bundle product offerings in an effort to assist OEMs in providing the infrastructure and integrated package for:

- jumpstarting development,
- improving productivity,
- managing development schedule and costs, and
- improving reliability in the development of different devices.



An extensive analysis of the world market for embedded operating systems used in embedded applications leads us to the following conclusions on the world market for embedded operating systems, bundled tools, and related services

- In 2004 the embedded software market continued to grow, with many trends seen in 2003 continuing. While market expansion is occurring across many industries, the growth in consumer electronics, especially in mobile and wireless, continues to have a significant impact on the embedded software market as a whole.
- Several factors instrumental in redefining the market and competitive landscape include:
 - Device Software Optimization;
 - Leveraging open source technology;
 - Sale campaigns directed at the executive level within ESMs; and
 - Technology innovation.
- VDC estimates that the market for embedded operating systems, bundled tools, and related services reached \$905 million in 2004. For 2003, VDC's revised market estimate was \$748.6 million. This represents an increase of 20.9% year over year.
- Sales in the embedded OS industry during 2004 was mainly driven by the following factors:
 - Improving economy and health of OEMs, resulting in increased investment in product and device development;

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- Customer demand for higher levels of pre-integrated technology offered through application development frameworks where OEMs can standardize enterprise-wide;
 - Focus on strengthening and building-out product offerings through internal development and strategic partnerships; and
 - Adoption of Linux has focused supplier energies to address the needs of embedded software developers rather than attack the competition.
- Challenges and limitations to OS vendor sales during 2004 was mainly driven by the following factors:
 - Prior years' operational consolidation has affected the availability of internal resources and limited various suppliers' ability to refresh and strengthen product offerings on a timely and ongoing basis;
 - Major program investments have required suppliers to dedicate significant resources that have limited and distracted suppliers in offering new technology;
 - Sales force and channel management issues in maintaining staff and partners with a high knowledgebase with which to assist customers; and
 - Limited sales and marketing resources to increase visibility and name recognition in the market.
 - As a percentage of revenue, run-time royalties increased significantly from 43.6% in 2003 to 49.4% in 2004. Revenue from product licenses (for up-front development and bundled products) and subscriptions fell slightly, and related services and support also decreased.
 - This trend was driven in large part by the continued growth of the consumer electronics market, and the revenue models associated with the key leaders in this segment – Microsoft, Symbian, and Palm. Barring major changes in one of these companies' sales strategies, intense market competition from royalty-free vendors, or a downturn in the consumer electronics space, this trend should continue through 2007.
 - While revenue growth occurred across all of the geographic regions, VDC estimates that percent of global revenue from the shipment of embedded OSs, bundled products, and related services attributed to the Americas region continued to decrease in 2004 to 52.7% from 54.6% in 2003.
 - VDC estimates that the consumer electronics vertical market continues to be the leading source of revenue for embedded OS vendors, accounting for 41.7% of shipments in 2004. The telecom/datacom ranked as the second largest vertical market in 2004.
 - During 2004, the ARM architecture became the leading architecture supported by embedded operating systems and bundled tools vendors as a percentage of shipments to development teams. Growth continues to be driven by wireless devices across multiple vertical markets and aggressive ARM support for a wide range of embedded and real-time operating systems.
 - Both Microsoft and Wind River Systems achieved significant year-over-year growth during the period. Microsoft grew 20% from 2003, and Wind River Systems grew 18.7% in 2004. However, when ranking embedded OS vendors on the worldwide shipment of real-time operating systems, bundled products, and related services, Wind River maintains a commanding lead from its closest competitor, Microsoft.
 - In addition to the two top market share leaders, Symbian, PalmSource, Green Hills Software, Enea Embedded Technology, MontaVista Software, QNX Systems, Accelerated Technology, and LynuxWorks round out the leading vendors.
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ABOUT THE STUDY

This study covers the worldwide market for embedded operating systems (OSs) employed in the development of embedded systems. Specifically, our research efforts focused on the market for real-time operating systems (RTOS) as well as non real-time OSs used in embedded applications.

Geographic Region

- Americas
- EMEA (Europe, Middle East, Africa)
- Asia-Pacific

Leading Vendors

Based on our estimates of shipments from the largest market shareholders.

Application Segments/Product Categories

- *Automotive* – Including electronic control units in chassis systems, powertrain electronics, body electronics/security systems, and in-vehicle information and computing systems.
- *Consumer Electronics* – Including set-top boxes, Internet access devices, home audio/video, mobile phones, and pagers.
- *Industrial Automation* – Including manufacturing and process controls, motion controllers, operator interfaces, robotics, building automation, HVAC and other controls.
- *Medical Devices* – Including patient monitoring equipment, medical therapy equipment, diagnostic equipment, imaging equipment, and surgical systems.
- *Military and Aerospace* – Including commercial aircraft, military aircraft, satellite systems.
- *Office/Business Automation* – Including copiers, fax machines, printers, scanners, multi-function devices, RAID, disk/tape drives and arrays, and server appliances.
- *Retail Automation* – Including point-of-sale (POS) terminals and peripherals.
- *Telecom/Datacom* – Including switches, infrastructure, and datacom devices.

ABOUT VDC

Venture Development Corporation (VDC) is an independent technology market research and strategy consulting firm that specializes in a number of telecom/datacom, mobile & wireless, industrial, embedded, component, and defense markets. VDC has been operating since 1971, when the firm was founded by graduates of the Harvard Business School and Massachusetts Institute of Technology. Today, we employ a talented collection of analysts and consultants who offer a rare combination of expertise in the market research process; experience in technology product and program management; and formal training in engineering and marketing. VDC's clients include thousands of the largest and fastest-growing tech suppliers in the world and the most successful investors participating in the markets we cover.

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