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Research

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The Future of the Server: A Five-Year Outlook

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The next five years will bring significant changes in how we view server platforms. Changes will affect the marketplace from low-end servers through the high-end mainframe.

ANALYSIS

The next five years will bring dramatic changes in how server platforms and operating systems (OSs) are viewed. Changes will affect the market from the low end through the high-end mainframe. Examples of just some of the potentially disruptive forces include:

1. Intel's drive to become the powerful, if not dominant, force in high-end as well as low-end servers

2. New and more-efficient means of scaling performance without exhausting internal bandwidths, from a number of vendors

3. Linux with open-source software as a new economizing force, driven by scale-out architecture

4. The potential disruption Linux presents to Microsoft's paradigm of single OS vendor dominance

5. IBM's future server and OS directions in the light of its increasing success with Linux, which is affecting the competitive balance in the server market

6. Total cost of ownership pressures that drive users toward modular server fabrics that will erode the market for traditional symmetric multiprocessing (SMP) designs

Not all of these forces will create instability, and some will contribute to the need by data center operations to do more with less. However, some factors may have the potential to cause unsettling disruptions. These issues include:

- How will servers and server infrastructure evolve during the next five years?
- How will the Intel architecture road map evolve and compete in the IA-32 (and emerging IA-64) world?
- How will Linux change the OS landscape?

We expect a new breed of servers to appear in data centers composed of common building block modules in high-density, rack-mounted configurations that employ proprietary backplane designs for delivering the high performance of traditional SMP designs. Cross-breeding will enable systems to scale more closely to application demands. As partitioning matures, combined with advances in system and workload management software, users will gain more options to include multiple OS versions, mixed OSs and selective module upgrades with flexible scaling options. Virtualization will affect the volume and makeup of server shipments. We expect many new product entries during the next five years posing as alternatives to the traditional SMP systems: high-density blades, rack-mounted servers, compute cluster and architectures that straddle all of them. Enterprises will be confronted with a wide range of choices as industry working groups sort out how to implement new technologies in common formats and standards, yet allowing vendor flexibility to differentiate servers.

Traditional large SMP systems will not go away; in fact, they will continue to be the workhorses at the back end of the enterprise through our five-year planning horizon. However, the rest of the enterprise will clearly be "up for grabs."

We vigorously dispute the notion that server technologies will become commodity solutions during the next five years. We believe that there will be significant differentiation that will compel IS organizations to "do their homework" on server procurements and weigh the trade-offs of one

platform vs. another, as we see no single, ubiquitous answer to the ever-increasing need for more processing capacity.

Future Directions

The issue of server architectural design — scale-up vs. scale-out — has been hotly contested for years and will remain so. "The Architectural Race Becomes a Marathon" looks at how the coming technology changes will affect the direction of the pendulum in this seemingly never-ending battle.

Intel's 64-bit Itanium processor technology will certainly be a factor in the way the server market evolves during the next five years. The critical question is how much of a factor. "The Future of Itanium: Strengths and Challenges" looks at the ability of Itanium to displace reduced instruction set computer (RISC)-based systems in the coming years, and the challenges still faced by Intel and its partners.

Linux is playing an increasingly important role in server deployments. "Linux in the Enterprise: Now the Real Effort Begins" documents how we expect Linux to emerge during the five-year planning period as a proven solution for a variety of applications and to meet the test of scalability, availability and support/serviceability for many organizations.

One of the current "hot buttons" in the industry is the issue of server utilization levels, with a thesis espoused that many servers exist in the market that are severely underutilized. Server virtualization is the pooling of server resources that masks the physical nature of the boundaries of those resources from resource users. As virtualization technologies improve, the potential impact on server shipments and deployment could be dramatic. "The Future of Server Virtualization" looks at how rapidly changing capabilities could affect the server market within the five-year planning horizon.

Blade servers (small form-factor servers housed in a common chassis) are being hyped by a number of vendors and have captured the fancy of some enterprises. This is a market segment that is quickly evolving. However, with evolution and increased functionality comes complexity. "The Future of Blade Servers: Steps Toward Success" looks at the transformation required during the next five years to make blades an integral part of future server solutions.

Interest in grid capabilities is increasing, particularly in leading-edge enterprises that are looking to see whether grid computing is ready to move beyond the niche employments we have primarily seen to date. In particular, can high-performance-computing grids inside commercial enterprises provide significant competitive advantage? "Grid Technology Is Influencing the Future of Large Servers" looks at how grid computing will influence the directions of large servers and server deployment, as well as defusing some of the hype surrounding grid computing.

To paraphrase Mark Twain, the reports of the mainframe's death are greatly exaggerated. Gartner believes that the mainframe will continue to offer significant value through the five-year planning period, and that many of the other server platforms will continue to strive to emulate the best elements of what the concept of a mainframe represents. Mainframe vendors will face new and increased challenges in an attempt to keep their share of the overall server market. "The Mainframe Continues to Evolve" looks at these challenges and what the hardware vendors are doing to address them.

The availability of Windows Server 2003 represents one of the more significant market developments of the first half of 2003. "Windows Server 2003 Is Ready When You Are" provides guidance to organizations on some of the near-term migration issues they face and the projected Windows road map for the next five years.

"Sizzles and Fizzles in the Server Forecast" provides Gartner Dataquest's perspective on the macro trends (accelerators and inhibitors) that are the basis for the CPU and OS forecasts.

Features

"The Architectural Race Becomes a Marathon" — The architectural race between "scale-up" and "scale-out" computing will continue, with no clear winner in sight. **By John Enck, George J. Weiss and John R. Phelps**

"The Future of Itanium: Strengths and Challenges" — Intel's 64-bit Itanium processor technology will continue to make progress in the market, but challenges remain. **By John Enck and Jeffrey Hewitt**

"Linux in the Enterprise: Now the Real Effort Begins" — IT managers interested in bringing Linux to every part of the enterprise will face five issues for Linux to meet the test of scalability, availability and support/serviceability. **By George J. Weiss**

"The Future of Server Virtualization" — Many server virtualization solutions will emerge and evolve during the next five years, bringing radical change to the server market. **By Thomas J. Bittman**

"The Future of Blade Servers: Steps Toward Success" — Blade servers provide tactical solutions today, but there will be more mainstream use of blades by year-end 2005. **By John Enck, Jane Wright and Jeffrey Hewitt**

"Grid Technology Is Influencing the Future of Large Servers" — Within five years, products will be available to build high-performance-computing grids inside commercial enterprises with minimal integration and customization requirements. **By Carl Claunch**

"The Mainframe Continues to Evolve" — The future of the mainframe will be determined by how well its good traits evolve, and how well it attacks and mitigates its problems. **By John R. Phelps**

"Windows Server 2003 Is Ready When You Are" — By year-end 2004, approximately 75 percent of Windows Server 2003 deployments will be migrations from Windows NT Server; most migrations from Windows 2000 will occur when the server hardware is refreshed. **By Thomas J. Bittman**

"Sizzles and Fizzles in the Server Forecast" — The macro trends found in Gartner Dataquest's forecast relative to CPU and OS groups provide insight into the maturing trends in the worldwide server market. **By Jeffrey Hewitt and Karen Benson**

This research is part of a set of related research pieces. See "The Server Landscape Is Changing" for an overview.

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