



### Overview

**Country or Region:** United States  
**Industry:** High-tech and electronics

### Customer Profile

Based in Sunnyvale, California, AMD designs and produces microprocessors and low-power processor solutions.

### Business Situation

AMD wanted to improve the performance of a key production application, which appeared to run faster on Linux, while preserving its existing, easily managed IT environment based on Windows Server® 2003 R2.

### Solution

AMD worked with Microsoft and Performance Tuning Corporation to identify errors and optimize hardware and software configurations to maximize performance on Windows Server 2003 R2.

### Benefits

- Improves system performance
- Increases reliability, scales to meet growth
- Simplifies IT management
- Expands the availability of third-party solutions
- Prepares the IT environment for 64-bit technologies

## AMD Chooses Windows over Linux, Boosts Performance 58 Percent, Improves Efficiency

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Shane Dickson, Director of IT, AMD

Advanced Micro Devices (AMD) is a global provider of micro-processor solutions for computing, communications, and consumer electronics markets. In 2005, AMD increased the speed of a key Oracle-based production-planning application that ran on Sun Solaris by recompiling it to run on both the Windows Server® 2003 R2 and Red Hat Enterprise Linux AS operating systems. With expert help from the Microsoft Field Services Account Team and Performance Tuning Corporation, AMD identified configuration errors and ways to further optimize the application’s performance. In a key benchmark test, the Oracle application ran 58 percent faster on Windows Server 2003 than on Linux. By running this and similar applications on Windows Server, which is the foundation of the company’s IT infrastructure, AMD also gains a more homogeneous, easier-to-manage IT environment and ready access to 64-bit technologies.



“Windows Server keeps on working even when we change other IT system components. It’s also versatile, easy to configure, and highly reliable. We’re seeing uptime of about 99.98 percent.”

Brian Pogson, Service Delivery Manager for Database Administration, AMD

## Situation

Founded in 1969 and headquartered in Sunnyvale, California, Advanced Micro Devices (AMD) designs and manufactures microprocessors and other microelectronic solutions for computer, communications, and consumer electronics companies. With production facilities in the United States, Europe, and Asia and sales offices around the world, the company employs nearly 10,500 workers. AMD had 2005 net sales of more than U.S.\$5.8 billion.

AMD uses proprietary applications to operate its highly automated microchip-fabrication facilities. In mid 2005, the server computer hardware that ran those applications had reached the end of its supported life cycle. One particularly important application, which ran on the Sun Solaris operating system, helps AMD plan microchip production by analyzing large amounts of data stored in an Oracle database. As AMD upgraded the server computers to faster, more efficient AMD Opteron models, the company also recompiled the production-planning application to run on other operating systems.

Specifically, AMD tested the application on Windows Server® 2003 R2, the second release of the Windows Server 2003 operating system, and Red Hat Enterprise Linux AS. Initial results showed modest performance increases over the previous Sun Solaris-based system and suggested that the application was running faster on Linux than on Windows Server 2003.

Although AMD was prepared to select whichever operating system provided the best performance for its production applications, IT managers understood that supporting multiple operating systems would increase the complexity and cost of the IT environment. (Most of the AMD IT infrastructure is already standardized on Windows Server, the

Microsoft® server product portfolio, and the Windows® XP Professional operating system.)

AMD needed more substantial improvement in the performance of its production applications, and it wanted that improvement to complement the company’s strategy of maintaining an integrated, scalable, easily managed IT environment.

## Solution

In early October 2005, AMD contacted its Microsoft Field Services Account Team. The account representatives recommended analyzing and performance tuning the AMD computers that were running Windows Server 2003 and then comparing their performance to the same computers running Linux.

To help with the analysis, Microsoft contacted Performance Tuning Corporation (PTC). Based in Austin, Texas, PTC is a technology service company that designs, implements, and optimizes IT solutions based on industry-leading database and application architectures. PTC takes a holistic, targeted approach to providing technical solutions for enterprisewide IT challenges.

In late October, Microsoft and PTC consultants examined AMD systems and processes, particularly the Oracle-based production-planning application. For the next several days, the two companies prepared a series of test scenarios to evaluate system performance. The tests indicated that a database configuration error was causing the Oracle application to operate inefficiently when it ran on Windows Server. Specifically, the application was using only one processor in a multiprocessor/multicore server. However, the application functioned correctly (using all processors and cores) when it ran on Linux. This error explained why the application had initially appeared to run faster on Linux.

Correcting the configuration error enabled the application to use all processors/cores when running on Windows Server. Additionally, Microsoft and PTC made minor changes to optimize hardware and system configuration settings, which further improved performance. Final tests revealed that with those changes, the application ran significantly faster on Windows Server than on Linux. To make sure the comparison was valid, technicians verified that the tests were performed on identical computers, under identical network conditions, and with the same configuration to the system's storage area network (SAN).

### Benefits

By choosing to run its production applications on Windows Server 2003 instead of Linux, AMD benefits from faster system performance and from a more homogeneous, integrated IT environment that's reliable and easy to manage. AMD expects that Windows Server will offer a lower total cost of ownership, in part because the company would have needed additional expert personnel to support running production applications on Linux. The company is also well positioned to deploy 64-bit technologies that will further improve performance and reduce operating costs.

#### **Improves System Performance**

Key AMD applications, including the Oracle-based production-planning application, run faster on Windows Server than on Linux. "In performance tests, a key benchmark query of the Oracle application required 19 minutes to complete on Linux versus 12 minutes for Windows Server, a speed increase of more than 58 percent," says Shane Dickson, Director of IT at AMD.

And that's just one test. IT managers are seeing significant performance increases in important day-to-day tasks. "Before we moved to Windows Server, we were able to

run only one planning scenario a day," adds Adam Vazquez, Senior IT Manager at AMD. "However, our business needs require running at least two a day. Now, we can often run more than five. By running more planning scenarios, we can plan and manufacture products that better align with customer demand, and this will ultimately lead to increased revenue."

#### **Increases Reliability, Scales to Meet Growth**

IT managers continue to be impressed with the stability of the Windows Server environment. "Windows Server keeps on working even when we change other IT system components," says Brian Pogson, Service Delivery Manager for Database Administration at AMD. "It's also versatile, easy to configure, and highly reliable. We're seeing uptime of about 99.98 percent."

And the environment remains stable even as IT managers scale it to handle larger production tasks. "We are confident that Windows Server will support AMD as our production and other demands on the system grow," Dickson adds.

#### **Simplifies IT Management**

Because the company's core IT infrastructure is already standardized on Windows Server, porting applications from other operating systems to Windows Server makes the IT environment more homogeneous and thus easier to manage. "Having a lot of different operating systems greatly complicates IT administration," says Vazquez. "Also, it's easier to find, and less expensive to hire, IT staff who are experts in Windows, compared with those who work in Linux or Solaris. Having a Windows-based environment is definitely streamlining our administrative processes.

"Windows Server also supports a standardized, patterned approach to building systems," Vazquez adds. "For example, for

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most of our major applications, we can build and distribute across the entire company a standard disk image without having to set up systems individually. Another benefit is that the operating system is well integrated with a whole line of Microsoft server products, which leads to a more simplified patch management process. When a problem arises, we don’t have to go to multiple vendors to determine how to solve it. Working with one vendor is much easier.”

Also, the Active Directory® service—a component of Windows Server that provides a central location for managing and securing user accounts, computers, and applications—further contributes to streamlining the IT environment. “We’re using Active Directory to provide single sign on to other solutions, such as our enterprise resource planning system, which is based on SAP,” says Pogson. “Now, users don’t have to enter multiple passwords into separate systems. We are continuing to look at other areas in the company where Active Directory can improve efficiency by functioning as a single authentication repository.”

#### **Expands Availability of Third-Party Solutions**

For custom business solutions, AMD is moving toward using vendors and third-party products and away from in-house development. Fortunately, finding expert help is easy, in part because the efficiency of developing for Windows has fostered the growth of a large ecosystem of partners that deliver solutions that run on Windows Server. AMD cites the Microsoft .NET Framework as an example of Windows technology that supports efficient application development.

“The .NET Framework makes application development significantly easier because Windows components are so well integrated,” says Vazquez. “Everything communicates with everything else, whether the custom

code accesses the operating system, a database, or one of the programs in the Microsoft Office system. This integrated system just works—the design is ingenious. As a result, third-party vendors can more easily create solutions for us. Developing solutions in an environment other than Windows to support things like our SAP system would require a lot more custom coding.”

#### **Prepares the IT Environment for 64-Bit Technologies**

AMD will soon deploy Windows Server 2003 x64 Editions as part of a strategy to run this powerful 64-bit operating system on fast 64-bit AMD Opteron servers. Because the company has already completed the most important first step—recompiling, testing, and certifying critical applications to run on Windows Server—IT managers can now focus on optimizing those applications for 64-bit performance. “We want to use 64-bit technology especially for our production applications because they process so much data,” says Pogson. “The superior performance of the 64-bit versions of Windows Server 2003 will help us run more planning scenarios, better meet our production needs, and help us increase revenue.”

“Another payoff of 64-bit technology is that it will reduce the number of servers we have to maintain,” adds Vazquez. “Currently, for some 32-bit applications, we need eight servers to run certain simulations. In a 64-bit environment, we will need only two, so we will be able to significantly reduce the costs of new hardware and the IT overhead that goes with it. Additionally, a 64-bit server can run multiple instances of our applications, which will further contribute to improved performance.” This performance increase will also benefit the company’s SAP implementation. “We estimate a 50 percent reduction in the number of application servers for our SAP R/3 Logistics and Business Intelligence environment,” he adds.

## For More Information

For more information about Microsoft products and services, call the Microsoft Sales Information Center at (800) 426-9400. In Canada, call the Microsoft Canada Information Centre at (877) 568-2495. Customers who are deaf or hard-of-hearing can reach Microsoft text telephone (TTY/TDD) services at (800) 892-5234 in the United States or (905) 568-9641 in Canada. Outside the 50 United States and Canada, please contact your local Microsoft subsidiary. To access information using the World Wide Web, go to: [www.microsoft.com](http://www.microsoft.com)

For more information about Performance Tuning Corporation products and services, call (800) 887-4513 or visit the Web site at: [www.perftuning.com](http://www.perftuning.com)

For more information about AMD products and services, call (408) 749-4000 or visit the Web site at: [www.amd.com](http://www.amd.com)

Vazquez concludes, "When you put it all together—operating system, hardware, applications, and databases, all optimized for 64-bit technology—that's going to be a big performance benefit."

## Windows Server 2003 R2

The Windows Server 2003 R2 family helps organizations do more with less. Now you can run your IT infrastructure more efficiently, build better applications faster, and deliver the best infrastructure for enhancing user productivity. And you can do all this faster, more securely, and at lower cost.

For more information about Windows Server 2003 R2, please visit: [www.microsoft.com/windowsserver2003](http://www.microsoft.com/windowsserver2003)

### Software and Services

- Microsoft Server Product Portfolio
  - Windows Server 2003 R2

### Hardware

- AMD Opteron server computers

### Partners

- Performance Tuning Corporation