

# Windows 2000 Server Family: Delivering the Level of Reliability You Need

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In the IT industry, server operating system reliability is expressed in terms of "nines." For example, 99.99 percent uptime is referred to as "four nines" and 99.999 percent uptime is referred to as "five nines." Regarded as the highest number realistically achievable, five nines equates to less than five minutes downtime per year.

The developers who built the Windows 2000 Server Family targeted 24x7x365 uptime. In business terms, that's what five nines deliver. How did they do? Consider the following:

Today Starbucks, FreeMarkets, and MortgageRamp, an affiliate of GMAC Commercial Mortgage, are using Windows 2000 Server-based systems designed to deliver 99.999 percent server uptime.

Industry leaders such as [Compaq](#), [Dell](#), [Hewlett-Packard](#), [Motorola Computer Group](#), [Unisys](#), and [Stratus](#) can work with you to deliver solutions with up to five nines uptime.

Of course, not all business operations require this level of availability, but one thing is clear from the experiences of the companies above: The Windows 2000 Server family can help you get the system availability you need.

And the three offerings in the family—Windows 2000 Server, Advanced Server, and Datacenter Server—allow you to tailor your investment to provide the level of system availability that's appropriate for your various business operations, without overbuying for situations that don't require maximum uptime.

## Building on "Outstanding" Availability Out of the Box

For the majority of usage scenarios, 99.99 percent uptime is adequate, as this equals less than one hour of downtime per year. The Aberdeen Group found that Windows 2000 Servers delivered 99.95 percent uptime right out of the box, before the servers were fully optimized for the environment, and before the IT staff had gotten up to speed using

the new operating system. [Read the report](#) to see why the Aberdeen Group calls this level of availability "outstanding."

Microsoft treated that level as a baseline. To deliver the ultimate in business availability, the company realized that solutions need to include highly trained people and top-notch processes, in addition to solid technology. So Microsoft created the Datacenter Server Program, which can help you achieve 99.999 percent uptime with Windows 2000 Datacenter Server on [qualified systems from Microsoft OEM partners](#). See the [FreeMarkets](#) case study for an example of the Datacenter Server Program.

## **Analysts and Customers Agree**

In its report on Windows 2000 Datacenter Server, DH Brown Associates says, "Windows 2000 clearly takes a major step up in the enterprise food chain and now resides legitimately on the same field as UNIX competitors. Moreover, the business programs that Microsoft has put in place around Windows 2000 Datacenter Server will give broad classes of users the confidence to deploy higher-end applications on its platform."

## **Technology: Built to Keep Running**

To support customer's needs for up to 99.999 percent business availability, Microsoft changed both the operating system and the way it was developed. First, the development team designed a development process geared to find and eliminate potential failures and operations that required rebooting the system. Then the development team analyzed nearly 1,200 servers running Windows NT Server 4.0. They learned that 65 percent of system reboots were due to *planned* outages for routine administrative tasks such as adding hardware and applications.

Of the *unplanned* outages, 21 percent were caused by application failures, and 14 percent were due to system failures. More than half of the system failures were traced to device drivers, anti-virus software, and hardware failures. (Note: This finding supports industry studies that say as much as 80 percent of system failures can be traced to errors caused by people or flawed processes, an issue addressed in the People and Processes section below.)

Among the culprits for systems failures: faulty driver software. So the

developers conducted tests with anti-virus software and driver software developers. To prevent crashes in the future, independent software developers and hardware vendors can now test their code using the Windows 2000 Driver Verifier tool.

To help keep systems up and running, Windows 2000 greatly reduces the number of maintenance tasks, such as installing hardware and software, that require rebooting the computer.

Other reliability tools include a resource-partitioning feature that prevents application failures from forcing reboots, and an improved Task Manager that lets administrators kill entire process trees to completely shut down a "misbehaving" application.

Lastly, to reduce the amount of time systems are offline, when a system fails or is taken down for maintenance, new boot options let administrators quickly restart the system.

## **Increasing Levels of Availability**

Many organizations will use a Windows 2000-based server to run e-Commerce and customer relationship management solutions to take advantage of its extensive support for custom Web and application development. These applications can take advantage of the added reliability offered by Windows 2000 Advanced Server or Datacenter Server. These versions provide clustering and load-balancing technologies that allow multiple servers to handle the load of a single application. With clustering, if one server fails, another can assume the load so the application keeps running. Load balancing allows you to distribute network traffic across up to 32 servers to increase availability and performance.

For the most demanding solutions, Windows 2000 Datacenter Server is designed for enterprises that need high-end, very reliable hardware and software for high-traffic networks and applications.

## **Closing the Loop: People and Processes**

For Microsoft, much of the work to improve Windows reliability and availability went into improving the operating system software, both to reduce causes of failures and eliminate the need to take the system down for maintenance tasks. For customers, improving system availability starts with the new technology provided by the Windows

2000 Server Family of operating systems.

To get the highest level of availability from any operating system, including Windows, requires an IT environment built around sound operating guidelines and staffed by well-trained employees. To help customers build such an environment, Microsoft and third parties offer a collection of training and support programs suitable for the full range of businesses, from small one-office companies to distributed global enterprises. These programs cover operations training, system support, and for best practices guidelines for system design, installation, and maintenance.

## How to get Started

Windows 2000 Server introduces new levels of reliability and availability for all your business operations. You can obtain the system availability you need in a variety of ways, from simply upgrading your existing system to Windows 2000 Server, all the way through obtaining maximum system availability with Windows 2000 Datacenter Server. Here's how:

- Learn about [upgrading](#) an existing server
- Work with [Microsoft Certified Partners](#) specializing in reliable server solutions
- Get Windows 2000 Server or Advanced Server on a [new computer](#)
- Get maximum reliability with [Windows 2000 Datacenter Server](#)

## Conclusion

The Windows 2000 Server Family is the most reliable set of server operating systems Microsoft has ever produced. The improvements in Windows 2000 mean the systems you need to run your business will be available when you need them. Further, Windows 2000 Server, Advanced Server, and Datacenter Server provide increasing levels of system availability, to let the operating system readily support high-traffic Web sites, high-volume transaction processing, and many other demanding applications. Customers can choose from this line of products for their various operations, investing appropriately to achieve the level of system uptime they need for any given task.

Beyond improvements to the operating system, Microsoft has developed training and support resources that help businesses optimize Windows systems and the environments in which they are used to ensure maximum uptime. To learn more about the improvements in the Windows 2000 Server Family and the resources

for improved training and processes, see ["Increasing System Reliability and Availability in Windows 2000."](#)