

Innovative thinking helps Netfinity servers maximize availability, reliability and scalability



IBM Netfinity OnForever Initiative

Goals for improving reliability, now and in the future

Executive Summary

The OnForever™ initiative is a guiding principle of IBM's Netfinity® X-architecture program for Netfinity servers, designed to take Microsoft® Windows NT®-based server computing toward continuous, enterprise-class availability.

The OnForever initiative can help you reduce your total cost of ownership by keeping your Netfinity server up and running, even during service and upgrades to your server.

The OnForever initiative was created at the IBM Center for Microsoft Technologies in Kirkland, Washington. At the Center, over 200 IBM employees work in conjunction with Microsoft developers to maximize performance and reliability of Microsoft Windows NT and other Microsoft products on Netfinity servers and other IBM products. The IBM Center for Microsoft Technologies works to bring you performance, reliability and innovation.

Netfinity servers deliver power, scalability, the latest Intel® processors, manageability and high levels of availability to business-critical applications at an affordable price. The IBM Netfinity OnForever initiative gives your Netfinity server advantages you can't readily get from other Intel processor-based platforms.

Select IBM Netfinity servers offer Hot-Plug/Hot-Add PCI that allows you to add, upgrade or replace PCI components without the need to take your Netfinity server out of service. OnForever intends to extend the high-availability capabilities of Hot-Plug/Hot-Add PCI to processors and memory and provide online, real-time system diagnostics capability.

Together, IBM and Microsoft are developing IBM OnForever technology to allow users to "hot swap" not just hard-disk drives but also fans, memory, power supplies and even processors. Hot swapping is a fail-safe scheme that allows defective components to be replaced while the computer is still running. Traditionally, servers have to be shut down for repairs, which can wreak havoc on companywide information systems.

OnForever focuses on system-level solutions that will provide higher availability and greater manageability for the entire system, including hardware, operating system, middleware and applications.

IBM is also researching ways to apply system and application software maintenance without system reboot. IBM has discrete projects scheduled through future releases of Microsoft's server operating systems to provide these features and more.

Additional OnForever goals will be enabled by implementing technologies such as concurrent diagnostics and "on-the-fly" software upgrades, technologies currently available only on large-system and midrange servers.

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Netfinity Manager™ helps you maximize your resources for peak performance of your clustered servers. For IBM Netfinity servers running Microsoft Cluster Server, IBM Cluster Systems Management delivers ease of use, event/problem notification and high end-user productivity. Other functions include cluster discovery and setup to keep your clusters running optimally.

IBM offers a 99.9% guarantee availability program to customers purchasing selected configurations of Netfinity servers and running Microsoft Windows NT clustering software¹.

This paper describes the OnForever initiative, which is part of IBM's Netfinity X-architecture program and is designed to bring availability, reliability and scalability to our industry-standard servers. Because of the dynamic nature of this industry, changes may occur in IBM's actual implementation. IBM reserves the right to change specifications or other product information without notice.

Examples of OnForever Benefits

The IBM Netfinity OnForever initiative is intended to providing benefits you need. For example, one of the goals of the initiative is to increase availability of servers.

According to an estimate by the Standish Group², the average cost per minute of downtime is \$10,000 in revenue, productivity or profit. Multiplying \$10,000 by 60, that amounts to \$600,000 an hour. As you can see, the cost of downtime can be far more than the cost of the technologies designed to combat it.

For a Web site providing electronic commerce, server downtime can mean that customers can't buy your products and may assume that you're out of business. In e-business, you need availability, or else you may not be in business at all. That's why the OnForever initiative includes ongoing efforts to provide Netfinity server owners greater server availability and an opportunity for reduced total cost of ownership.

Predictive Failure Analysis

Your need for server availability includes the ability to avoid expensive downtime and failures. For example, Netfinity Predictive Failure Analysis® (PFA) can notify you before server problems occur. PFA can even initiate an e-mail or page you with alerts to possible trouble situations.

Hot-add/Hot-swap Features

The IBM Netfinity OnForever initiative includes efforts to keep your Netfinity server up and running. That's not just when you may have problems, but when you want to upgrade your hardware and software, replace hardware using hot-add, hot-swap PCI features and make other changes to your server without having to shut down your Netfinity server.

¹ Available only on Netfinity 5500 M10 and Netfinity 7000 M10 servers. Program includes mandatory services from IBM Global Services. IBM reserves the right to change programs terms and conditions at any time, without notice. For more details, visit our Web site at www.pc.ibm.com/us/solutions/netfinity/999guarantee.html or contact your IBM PSG sales representative.

² Standish Group Research Note: Pound Foolishness, 1998 High Availability Forecast.

Chipkill Helps Keeps Your Server Running

Because Netfinity servers can, in many instances, be changed, repaired or updated on the fly, with no need to power your server down. Therefore, your users need never know that you're making changes, repairs and upgrades to the server. Instead, Netfinity server users can continue working without interruption. Netfinity's Chipkill, ECC memory and automatic server restart features also work for you to minimize server downtime.

IBM's Chipkill memory, initially developed for NASA's Mars Pathfinder mission, is part of the OnForever initiative. Chipkill is more than 100 times more reliable than standard ECC DIMMs at preventing system failures due to memory errors.

With Netfinity Chipkill technology, select Netfinity servers will be protected from any single memory chip that fails and any number of multi-bit errors from any portion of a single memory chip. This advanced technology derived from IBM large systems reduce server downtime, resulting in a more robust client-server computing platform.

Clustering

Another addition to select models in the Netfinity server line is clustering, the spreading of computing tasks across several computer "nodes" to make systems more expandable and better protected from failures. OnForever helps protect against problems in clustered systems.

Fibre Channel

Netfinity Fibre Channel technology allows you to connect large amounts of disk storage to a server or cluster of servers. Fibre Channel technology supports increased performance, scalability, availability and distance for attaching storage subsystems to network servers. Netfinity Fibre Channel products will provide this technology and the benefits it offers to businesses requiring enterprise server solutions.

At IBM, we offer innovative ideas, including the IBM Netfinity OnForever initiative, because we believe a server is meant to serve you. Our goal is a Netfinity server that, as much as possible, can be "on forever."

OnForever Storage

With hot-add and hot-swap features, Netfinity storage devices are designed to function with the high standards set by the OnForever initiative. In many situations, you can add or replace storage devices while keeping your Netfinity server up and running, reducing downtime.

The Netfinity server enterprise storage options from Options by IBM provide the following benefits:

- Flexible scalability provided by a wide array of rack, RAID, tape and IBM Netfinity Fibre Channel storage solutions that allow your network to grow with your business. For example, because Netfinity Fibre Channel storage solutions can support transfers over distances up to 10 km (6.2 miles) at rates of 100MBps, companies can more easily configure offsite server and storage systems to keep critical data available around the clock—even in the event of a catastrophe. Netfinity Fibre

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Channel hot-pluggable and redundant RAID controllers support the uninterrupted flow of your business.

- Greater control and reliability derived from extensive testing for compatibility of hardware and software to industry-leading local and remote system management tools.
- Peak performance delivered by high-capacity hard-disk drives and high-speed tape drives. For example, IBM's hot-pluggable hard-disk drives provide storage capacity of up to 36GB per drive at speeds up to 10,000 rpm.

OnForever Today

OnForever represents IBM's continuing efforts to raise the standards for Netfinity servers running Windows NT to the levels of IBM large-system performance.

IBM understands your need for industry-standard server solutions. We also know that you can't afford to sacrifice the performance and scalability that your business-critical applications demand. IBM's Netfinity X-architecture blueprint for Netfinity servers brings our high-end server experience and technology to IBM Netfinity servers, providing performance, reliability and capabilities not readily available elsewhere in today's Intel-based server marketplace.

One of the first deliverables of the OnForever initiative was hot-plug, hot-add PCI support for Windows NT 4.0 in addition to Novell NetWare and SCO UnixWare. The hot-plug capability provides online replacement of redundant adapters (such as network cards or storage controllers), which helps address potential unscheduled downtime.

Hot-plug, hot-add PCI is available on select Netfinity servers. PCI technology allows insertion of PCI adapters while a Netfinity server is powered up. Hot-plug, hot-add PCI will be added to many future Netfinity systems.

The hot-add capability addresses some of the much more common "scheduled outage" situations for upgrades. You no longer need to take your server out of production for storage upgrades; new drives, adapters and enclosures can be added on the fly. You can even add new network adapters for additional network capacity.

The OnForever initiative extends the benefits of PCI hot-plug and hot-add technology to other major systems components such as processors and memory.

Netfinity servers already provide features found in IBM large-system and midrange servers, including adapters for direct-attach to IBM S/390® large-system systems, hot-swap components, light-path diagnostics, multibit error-correcting memory technologies, scalable parallel clustering and integrated service processors for improved management. These Netfinity server features are a result of IBM's Netfinity X-architecture program, which brings enterprise computing features to Netfinity servers.

OnForever Tomorrow

OnForever is intended to bring closer the goal of uninterrupted computing to Netfinity servers running Windows NT and other operating systems.

OnForever will tie together the technologies of IBM Netfinity servers with Microsoft Windows NT server operating systems.

In addition, the Netfinity hardware and firmware will be developed in accord with the Netfinity X-architecture model. This will provide a platform for system diagnostics to be run concurrently with the operating system instead of the current "offline" approach.

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IBM Netfinity servers are designed to minimize downtime. IBM Netfinity PFA for processors, voltage regulator modules (VRMs), memory, fans, power supplies and HDD options can warn you before problems occur.

Innovative light-path diagnostics, hot-pluggable PCI adapter slots, drive bays, fans and power supplies allow you to replace components and make upgrades without powering down the server, keeping your business up and running. The IBM Netfinity OnForever initiative enhances and adds to these convenience and reliability features, while enhancing Netfinity server performance, now and in the future.

For more information on IBM Netfinity servers and features, visit our Web site at www.ibm.com/netfinity.

Conclusion

The OnForever initiative represents a key component in IBM's strategy to bring large-system availability and reliability to the world of Windows NT. To provide the maximum support for Windows NT and your applications, IBM created the OnForever initiative to raise the standards of Netfinity servers and the Intel-based server industry.

The OnForever initiative and Netfinity servers reinforce IBM's commitment to help you lower your total cost of ownership by delivering availability, reliability and manageability to run your business-critical applications, no matter what the size of your business.

When you need a server, you need a server that can be "on forever." IBM's OnForever initiative for Netfinity servers is working to fulfill that need, now and in the future.

Additional Information

For more information on IBM Netfinity direction, products and services, refer to the following white papers, available from our Web site at www.ibm.com/netfinity.³

Achieving Remote Access using Microsoft Virtual Private Networking

At your service...Differentiation beyond technology

8-Way SMP Directions

Enterprise Storage Solutions

Examples Implementing IBM Netfinity Server Management: Air Conditioning Failure

Fibre Channel Directions

IBM Chipkill Memory

IBM Netfinity Advanced Systems Management

IBM Netfinity Cluster Directions

IBM Netfinity ESCON Adapter

IBM Netfinity 5500 Server Family

IBM Netfinity 7000 M10 Server

IBM Netfinity Storage Management Using Tape Subsystems

IBM Netfinity Web Server Accelerator

IBM Netfinity X-architecture

IBM ServerGuide for Netfinity and PC Server Systems

Integrating IBM Netfinity Manager with Intel LANDesk Server Manager

Integrating IBM Netfinity Manager with Microsoft Systems Management Server

Lotus Domino Clusters Installation Primer

Lotus Domino Clusters Overview

Netfinity Manager 5.2

³ Are you Year 2000 Ready? Visit www.ibm.com/pc/year2000 or call 1 800 426-3395 (and request document 10020 from our faxback database) for the latest information.

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Netfinity Manager Plus for Tivoli Enterprise Overview

PCI Hot-Plug Solutions

Predictive Failure Analysis

Server Quality

Server Ultra2 SCSI Directions

System Management for Servers

For more information on the IBM 99.9% availability guarantee, visit our Web site at **www.pcco.ibm.com/us/solutions/netfinity/999guarantee.html**.

For more information on the IBM Netfinity OnForever initiative, visit our Web site at **<http://9.39.75.236/onforever>**.

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