



IBM Netfinity Advanced Systems Management

Systems management solution for the IT community

Executive Summary

As enterprises decentralize their IT assets and consolidate their IT skills, they need a hardware and software remote management solution that can enable remote problem determination, diagnosis and resolution. IBM recognizes this and provides leading-edge remote management solutions through a combination of hardware instrumentation and software to address these issues.

The IBM Netfinity® Advanced Systems Management solution represents IBM's continuing commitment to fulfill the needs of the IT community, concentrating on both local and remote monitoring and management of your Netfinity server systems. The standards-based tools help you have maximum control of your servers in a distributed environment and are designed to help you reduce the costs associated with the operation and support of your Netfinity servers by providing the maximum remote monitoring and management capabilities.

For system administrators, the Advanced Systems Management solution will help them maximize the use of existing resources, reduce Total Cost of Ownership throughout the system life cycle and simplify operation in an increasingly complex environment. These remote capabilities help to dramatically reduce the amount of travel your IT experts do. It is no longer necessary to have an expert onsite every time a server fails. The IBM Netfinity Advanced Systems Management family of products provides you with virtual remote management capabilities so that problems can be corrected remotely, saving both time and money. Whether you are in the office, at home or almost anywhere, you can now be confident that if a problem occurs with your Netfinity server, you can be made aware of the problem and take immediate action to help ensure the highest levels of system uptime. IBM's systems management solution will help you enhance productivity, increase system reliability and availability, and provide better support center response and assistance.

This paper addresses IBM's Netfinity Advanced Systems Management solution and emphasizes IBM's commitment to be the leading Intel processor-based server and management solution of choice. This commitment is expressed in IBM's Netfinity X-architecture, which takes the best management capabilities from larger IBM systems and adapts them into a framework that will integrate smoothly with a wide range of industry-standard, customer-chosen management and operating system environments. Taken together, IBM Advanced Systems Management and Netfinity X-architecture provide clearly defined, industry-leading solutions for the system management challenges that administrators face today and will face in the future.

IBM's Netfinity Management Solution Tools

IBM has listened to our customers who have distributed environments and want management solutions for their server assets even when the server is switched off or otherwise unavailable. The demands for availability and reliability, application uptime and decentralization of resources continue to increase, and IBM is dedicated to meeting those demands because we understand customers' needs to have their business applications available when they need them.

IBM has designed its Netfinity servers to provide management solutions through a variety of options and hardware instrumentation. From entry to high-end servers, IBM has a solution with varying degrees of manageability depending on the server. These solutions—the IBM Netfinity Advanced Systems Management product family—are discussed in detail in “Netfinity Advanced Systems Management Product Family” later in this paper.

Netfinity System Design

Comprehensive control—it's built into IBM's mainstream and high-end Netfinity servers. Our servers have been architected and designed to provide industry-leading manageability during the entire IT life cycle—from installation and operations to problem management. This gives you control even if your server is down or powered off. Features such as the following are designed into many Netfinity models:

- Mechanicals to allow easy access to components with a limited set of tools
- Extensive use of hot-plug and -swap components to allow replacement without taking your server offline
- LEDs and panels to provide you with at-a-glance problem identification
- Components utilizing Predictive Failure Analysis® (PFA) to alert you before component failure
- Redundant components on high-availability models for greater reliability, availability and serviceability
- Room for expansion on key components like disks and memory
- ROM-based diagnostics for remote access
- Instrumented BIOS to allow for the maximum amount of system information to be provided for inventory and problem resolution

Moreover, the Netfinity 5000 and 5500 server family uses a balanced system design so that your system is running at high performance for the environment. With this system we also introduced an innovative light-path service panel in conjunction with component-level LEDs on the failing component within your Netfinity 5500 to make the identification and replacement of a failing component a snap.

The light-path service panel directs you to the problem area, and the component-level LEDs tell you which component is the problem. This feature helps you minimize downtime and save spare parts for when you might need them.

Netfinity Advanced Systems Management Product Family

	ASM Adapter	ASM Processor	ASM PCI Adapter	ASM Interconnect Cable Kit	ASM Token Ring Option
Netfinity 3000	Option				
Netfinity 5000		Integrated	Option	Option	Option ¹
Netfinity 5500		Integrated	Option	Option	Option ¹
Netfinity 5500 M10/M20		Integrated	Option	Option	Option ¹
Netfinity 7000 M10			Standard	Option	Option ¹

Note: The Advanced System Management Processor has all the functions and capabilities of the Advanced System Management Adapter as well functions and capabilities unique to itself. The Advanced System Management PCI Adapter has all the functions and capabilities of the Advanced System Management Processor as well as functions and capabilities unique to itself.

IBM Netfinity Advanced System Management Adapter

The Advanced System Management Adapter is a full-length ISA adapter that provides remote system management function independent of the server status and the operating system. This adapter is an option for the entry-level Netfinity 3000, which is an excellent choice for small businesses that require a powerful department or branch office file-and-print, database or application server. The adapter allows remote management from Netfinity Manager™ or ANSI Terminal Emulation and provides control of the server's power supply. It also monitors voltage and temperature and can log system events and errors, and can send alerts to a pager or console if thresholds are exceeded so that corrective action can be taken, thus enhancing server availability.

IBM Netfinity Advanced System Management Processor

The Advanced System Management Processor is integrated on the planar of the mainstream Netfinity 5000 and 5500 family of servers, which are excellent choices for e-business, small-to-medium business applications and file serving, and large enterprise application serving. The processor provides the system administrator with extensive remote management of these servers even when the system has been switched off or when it has failed. The processor is an integrated subsystem solution independent of the hardware and operating system, complementing the server hardware instrumentation by monitoring, logging events, reporting on many conditions and providing full remote access independent of server status.

The Advanced System Management Processor underlies IBM's innovative light-path diagnostics, which is a milestone in maintenance and repair. In conjunction with the light path and PFA, the processor provides extensive alerting and real-time diagnostics, to indicate when a vital component such as a hard drive, power supply or fan is failing. PFA can send notifications about the component—to prevent problems and keep your business up and running. The processor

¹ The Advanced Token Ring Option is available only when the Advanced System Management PCI Adapter is installed. Token Ring and Ethernet networks cannot be enabled at the same time.

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logs and sends alerts for PFA events on the CPU, voltage regulating modules (VRMs) and ECC memory as well as on power supplies.

Other functions provided by the Advanced System Management Processor include the following:

- Remote update of system and processor BIOS.
- Remote access to RAID and SCSI configuration through a Remote POST Console
- Shared serial port allowing connection to the Advanced System Management Processor and/or the operating system through a single modem. The operating system owns the "shared" serial port while the system is up and running; however, during POST and during a critical event, the processor owns the port.
- Warning thresholds that alert the user to a potential problem, thus allowing any necessary corrective action before failure, a feature not included in some other vendors' solutions.
- Notification of more extensive PFA alerts to include disks, ECC memory, processors, VRMs, fans and power supplies.
- Access to vital product data with serial numbers of key components through Netfinity Manager.

With all these powerful remote management functions, security is essential. The system management processor includes security features such as password protection, user profiles (up to 12 profiles with the ability to define the level of access rights), log of last login time and dial-back configuration to protect the server from unauthorized access.

Continuous power is supplied to the Advanced System Management Processor on the Netfinity 5000 and 5500 family of servers through a system board connection to the system power supply.

With continuous power, full remote control of power is always enabled, even if the server is turned off. This is another IBM Netfinity advantage that is not available in some other solutions.

IBM Netfinity Advanced System Management PCI Adapter

The Netfinity Advanced System Management PCI Adapter is standard on our high-end Netfinity 7000 M10, an enterprise server that is powerful and reliable enough to handle massive, business-critical large enterprise, e-business or business intelligence applications.

The PCI adapter allows you to connect via LAN or modem from virtually anywhere to the 7000 M10 for extensive remote management. Remote connectivity flexibility with LAN capability is provided by standard 10/100 Ethernet operation (16/4 Token Ring operation is optional). Battery backup is offered through an optional external power source, which allows greater availability by connecting to an optional, uninterruptible power supply.

In addition, the PCI adapter enables more flexible management through a Web browser interface (in addition to ANSI terminal, telnet and Netfinity Manager). It also allows you to download flash BIOS for the Advanced System Management Processor as well as for the server over a LAN, modem or Advanced System Management Interconnect and supports the generation and forwarding of unique SNMP traps.

Like the Advanced System Management Adapter and the Advanced System Management Processor, the PCI adapter supports Automated Server Restart (via the watchdog timer) and orderly operating system shutdown when controlling the server power for these operating systems: Microsoft® Windows® NT® Server 4.0, V4.0 SMP Feature, Novell IntranetWare 4.11,²

² Support for Novell NetWare 5 is expected to be available shortly after GA.

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SCO³ UnixWare and IBM OS/2® Warp Server Advanced, and is hardware and software independent for all other functions.

As an option for IBM Netfinity 5000 and the 5500 family of servers, the PCI adapter extends those servers' existing integrated remote management capabilities to support management over an Ethernet and/or Token Ring environment.

IBM Netfinity Advanced System Management Interconnect

The IBM Netfinity Advanced System Management Interconnect option for mainstream and high-end Netfinity servers extends existing integrated remote management capabilities to share modem or LAN resources, eliminating the need for individual connections to every managed system. By bringing large systems management capabilities to industry-standard platforms, Netfinity Interconnect increases control of networked business systems to improve system availability and reliability.

The Advanced System Management Interconnect Cable Kit makes it possible to interconnect up to 12 system management processors or Advanced System Management PCI Adapters, with a maximum distance between the first and last processor being 90m (300ft). Connecting processors in this way creates a systems management network in which any Advanced System Management Processor or Advanced System Management PCI Adapter can be managed as if it were directly attached.

This allows for sharing of resources like modem or network connection (provided one Advanced System Management PCI Adapter enabling direct LAN attachment is present). All interconnected systems can be managed remotely, enabling dial-in or LAN access as well as alert forwarding through a modem or LAN connection via the systems management network.

IBM Netfinity Manager Software

To complement the IBM Netfinity Advanced Systems Management family of products and instrumentation of the Netfinity servers, IBM Netfinity Manager software is shipped at no additional charge with every IBM Netfinity server. Netfinity Manager complements the hardware instrumentation by collecting, analyzing, storing and forwarding information from the system management features. And Netfinity Manager was just voted the top PC server management tool in overall satisfaction in the Datapro *1998 User Ratings Survey of PC Servers* (Source: Datapro Information Services, January 1999).

A graphical user interface for easy local and remote access, control over these features and the processor, as well as seamless integration into higher levels of workgroup or enterprise management tools such as Microsoft System Management Server (SMS), Intel® LANDesk® or Tivoli™ Management Software, are just some of the advantages of IBM Netfinity Manager software.

IBM Netfinity Manager is a powerful suite of tools and utilities designed to manage networked IBM and non-IBM PC-based servers, desktop, workstation and notebook systems on a variety of platforms, including Microsoft Windows 3.1, Windows 95 and Windows NT, Novell NetWare, SCO UnixWare and IBM OS/2. And because it supports industry standards, such as the Desktop Management Interface (DMI), Simple Network Management Protocol (SNMP), and the Multi-Platform Management (MPM) API, Netfinity Manager can also integrate with robust enterprise and workgroup management systems from Tivoli, Intel and Microsoft.

³ There will be limited support of SCO at GA. There will be no automatic server recovery or shared modem support. Full support is expected soon after GA, available via the Web.

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Netfinity Manager provides comprehensive control of your networked systems with ease to increase system availability and performance while helping you reduce your Total Cost of Ownership. Netfinity Manager provides hardware system management and PC administration across IBM Netfinity, PC, ThinkPad® and IntelliStation™ systems, but can also manage your non-IBM PCs. Included as standard with each Netfinity system, Netfinity Manager simplifies remote management with functions including:

- Scheduled asset (hardware and software) inventories
- Proactive problem notification and tools for problem resolution
- Hardware system component monitors and thresholds to trigger alerts of impending problems
- Powerful alert management with automated actions and/or manual intervention
- Remote help desk and routine maintenance functions such as remote control and file transfer

Netfinity Manager delivers IBM's Universal Management initiative today with:

- Multiple operating system support (Microsoft Windows 95 and Windows NT, Novell NetWare and IBM OS/2)
- Multiple network protocol support (TCP/IP, NetBIOS, IPX/SPX, SNA and serial)
- Multiple user interface options (GUI, command line and Web)
- Management from a Web browser
- Support of the Universal Management Agent

IBM Netfinity Advanced Systems Management Solution Scenarios

The IBM Netfinity Advanced System Management Processor provides extensive remote management of your Netfinity servers:

You can call your server . . . You can dial into the Advanced System Management Processor from a remote Netfinity Manager even when the system is down. This function lets you:

- View the operational state of the server
- Browse and clear a log of events and errors detected by the processor
- Monitor environmental conditions, operating system status and critical components to alert you to potential problems before they occur
- Reset the system and control system power (power system on or off)
- Reconfigure the adapter to alert another source for problem resolution
- View the server boot-up during POST to identify problems⁴
- Access the server configuration utility remotely by pressing F1 during POST⁴
- Run remote diagnostics⁴
- Perform remote BIOS updates of the system to maintain the system at recommended levels⁴

. . . and your server can call you. The Advanced System Management Processor can automatically restart the system and alert the administrator in case of problems by dialing out to a pager or to Netfinity Manager through the use of an external modem to take advantage of its sophisticated alert manager. Alerts or errors being forwarded include the following:

⁴ Supported on selected models; some functional limitations might apply to some entry server models.

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- A monitor for POST completion during boot-up and operating system response during operation that will cause the system management processors to automatically restart the system and alert the administrator of the problem
- Warnings when environmental thresholds are outside the normal range
- Critical alerts when environmental monitor thresholds are exceeded and would cause damage to the server
- PFA errors on disk, memory, processors, fans and power supplies⁵

The alert functions provided by the Advanced System Management Processor are very robust. They range from warning that an event is reaching an unacceptable level to shutting down the server before a nonrecoverable event occurs. For example, the Netfinity server will warn you that a temperature is out of a normal range, but then will shut itself down before it reaches a critical temperature that could destroy its components or your data. Recoverable alerts are generated and logged in the Advanced System Management Processor event logs; recoverable alerts can also generate pages and be forwarded to Netfinity Manager for action. Netfinity Manager's powerful and extensive alert management function can take many different actions to alert the system administrator through pop-ups, e-mail and pagers, can forward alerts to other management systems through SNMP traps, or can automatically execute a command to fix a problem without the need for human intervention.

For example . . . Sam does it all—remotely! Sam is a systems administrator for a large corporation. He receives an alphanumeric page from a remote site: "Netfinity 5500 in Orlando—operating system watchdog expired—system restarted." Sam ignores the page because he knows that the Advanced System Management Processor will notify him again if the system continues to fail. A few minutes later Sam receives a second page: "Netfinity 5500 in Orlando—POST BIOS watchdog expired—system restarted." Now he goes to his Netfinity Manager console, dials in to the system management processor and uses the Remote POST Console to reboot the server and view the POST sequence. He finds out that the POST was not completed because it detected a memory error that requires manual intervention to correct. So Sam runs remote diagnostics to determine which memory module failed and, with Remote POST, bypasses the failing module to get the system up and running with reduced memory. He then calls his support group and schedules maintenance for the server; he also tells them what memory module is required to fix the server. Sam sits back and smiles: He has kept the server up and running even though temporarily in a sub-optimal state, and saved the maintenance personnel from possibly having to make several trips to diagnose the problem and have the correct part to fix it.

Imagine the time and money you might save by not having to send your server expert to remote locations every time a server fails. Just utilize the remote management features of the system management processors to identify problems. If maintenance is required, simply schedule it, instead of having your server crash in the middle of a busy day.

Expanding the management environment: an illustration. A company's remote New York office has a single Netfinity 7000 M10 server and several desktops, but the company is planning to expand the number of servers in its remote locations by adding three Netfinity 5000s. Management of the 7000 M10 is currently performed through a secure Ethernet connection. Access to the server is available even when the server is powered off. As the number of servers grows, the computing Total Cost of Ownership is important to the company executives, and any opportunities to reduce this are welcome. The Netfinity Advanced System Management Interconnect provides the solution. It allows the Netfinity 5000s to be interconnected to the existing Netfinity 7000 M10 management network. The advantages of the Interconnect solution are that the single Ethernet connection to the Netfinity 7000 M10 can be utilized by the system

⁵ Limitations on some models.

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management network. Now any of the servers in the remote New York office can be managed as if they were directly attached, and any alerts from any of the servers on the system management network can be forwarded out through the Advanced System Management Interconnect and across the Ethernet network. In fact, even if the Netfinity 7000 M10 is powered off, the system management network is still available, because the continuous power provides power to the management processor and its attached devices.

The company and executives like this solution and the Total Cost of Ownership savings that it brings. By utilizing a single Advanced System Management PCI Adapter, the company can manage multiple servers through the Wide Area Network. They know that the Advanced System Management Interconnect solution provides capabilities to the servers as if each is directly attached.

The powerful Netfinity Advanced System Management Interconnect also brings powerful features and savings to an environment of mainstream servers, where the Advanced System Management Interconnect can share an external modem attached to the Advanced System Management Processor on the system management network.

With all these powerful remote management functions, security is essential. The system management processors include security features such as password protection, user profiles (up to six profiles with the ability to define the level of access rights), log of last login time and dial-back configuration to protect the server from unauthorized access.

In addition, remote dial-in is also supported from an ANSI terminal if you do not have Netfinity Manager for viewing the server state of operation, browsing and clearing the error log, resetting the server, controlling power-on and -off, and invoking the Remote POST Console.

Conclusion

The IBM Netfinity Advanced Systems Management family of products has been designed as a remote software management solution that provides remote problem diagnosis. A group of standards-based, leading-edge technology tools, it integrates with various system management tools to help you protect your IT investment while maximizing returns to your business.

Independent of the hardware and operating system in your server system, the IBM Netfinity Advanced Systems Management products leverage existing technology with enhanced hardware instrumentation and system manageability to help you reduce service and support costs, enhance productivity and increase system reliability and availability.

Working with the proven, reliable IBM Netfinity Manager systems management software, the Advanced Systems Management products simplify server management for proactive control of your business systems. The products provide the same level of control, service and support as is found in large systems to reduce downtime. They provide comprehensive local and remote control for improved responsiveness and improved availability.

The IBM Netfinity Advanced System Management Adapter, Processor, PCI Adapter and Interconnect Cable Kit make up the Advanced Systems Management product family in the Netfinity line of server products, reaffirming IBM's leadership position as the Intel processor-based server and management solution of choice. Our commitment to Netfinity customers is also evident in the Netfinity warranty and in the range and availability of service and support programs worldwide, with 2,500 specialists in 10 call centers expertly trained and ready to help customers through the IBM HelpCenter[®].⁶

⁶ Response time varies. May exclude some holidays.

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We understand that it is vital for your servers to be available for your business-critical applications when you need them. Our Netfinity family of products continue to help make that requirement a reality, now and in the future.

Additional Information

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

Management

Implementing IBM Netfinity Server Management
Integrating IBM Netfinity Manager with Microsoft System Management Server
Integrating IBM Netfinity Manager with Intel LANDesk Server Manager
IBM Netfinity Advanced Systems Management
IBM ServerGuide for Netfinity and PC Server Systems
IBM Netfinity Systems Management for Servers

Other Topics

IBM Netfinity X-architecture
IBM Netfinity Predictive Failure Analysis
IBM Netfinity Cluster Directions
IBM Netfinity Web Server Accelerator
Lotus Domino Clusters Overview
Lotus Domino Clusters Installation Primer
IBM Netfinity ESCON Adapter
IBM Netfinity Hot-Plug Solutions
IBM Netfinity Storage Management Solutions Using Tape Subsystems
IBM Netfinity Servers and Intel Architecture
IBM Netfinity 8-Way SMP Directions
IBM Netfinity Fibre Channel Directions
IBM Netfinity Server Ultra2 SCSI Directions
IBM Netfinity Server Quality
IBM Netfinity 5500 Server Family
IBM Netfinity 7000 M10 Server
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IBM Personal Computer Company
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Printed in the United States of America
3-99
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