IBM ®

IBM AIX 5L Version 5.1 Advanced UNIX Operating System with Linux Affinity Delivers the Most Powerful and Flexible Choice for e-business and Enterprise Servers

Overview

AIX® is the IBM strategic UNIX® operating system for mission-critical, core business applications. The industrial-strength features and functions of AIX have been well proven over the years in a wide variety of server environments from relatively small, single-processor systems through the massively parallel RS/6000® Scalable POWERparallel® (SP™) servers.

The AIX features include:

- State-of-the-art 32-bit and 64-bit kernels

- 32-bit and 64-bit APIs support

- Dynamic configuration and device attachments

- Robust journaled file system and Logical Volume Manager (LVM) software

- Simplified system management — System Management Interface Tool (SMIT) and Web System Management

AIX 5L Version 5.1 (AIX 5L) represents the next generation of AIX.

Fortified with open technologies from some of the world's top providers, AIX 5L builds on a solid heritage of supplying integrated, enterprise-class support for RS/6000 and IBM @server pSeries systems.

With AIX 5L, IBM:

- Provides an industrial-strength UNIX operating system with increased levels of integration, flexibility, and performance for meeting the high demands of today's mission-critical e-business applications

- Offers an advanced operating system with a strong affinity with Linux and built-in capabilities designed to accommodate future IBM POWER-based servers

Key Prerequisites

- IBM Power systems

- POWER2 systems

- Personal Computer Power Series® 830 and 850 desktop systems

- PowerPC® systems

- POWER3 systems

Exceptions are listed in the **Hardware Requirements** section.

Planned Availability Date

- May 4, 2001
- May 11, 2001, Preinstall for POWER-based systems

Description

Scalability and Capacity

- AIX 5.1 provides a scalable, 64-bit kernel capable of supporting increased system resources and much larger application workloads on 64-bit hardware. In addition, the 64-bit kernel offers scalable kernel extension interfaces, allowing kernel extensions and device drivers to make full use of the kernel's system resources and capabilities.

- AIX 5.1 provides a more scalable application binary interface (ABI) for 64-bit applications. This scalability is provided by changing the sizes of some fundamental data types for 64-bit applications, and will allow these applications to take advantage of the expanded capabilities of the 64-bit kernel.

- Workload Manager has been enhanced to provide functions to manage subsets of workload and control subsets of total system resources. Additional features include disk I/O bandwidth, application tag API, more application isolation and control, a fully dynamic configuration permitting changes while running, and an accounting subsystem performing resource usage accounting per WLM class.

- JFS2 is a new file system type providing the capability to store 1 Terabyte files. It is the default file system for the 64-bit kernel.

Further information on the AIX 5.1 64-bit kernel is available from IBM at:

   http://www.ibm.com/servers/aix/library

Networking Technology and Performance

- Multi-path routing is added to allow users the ability to specify multiple routes to a destination.

  - Offers system administrators the option of either configuring multiple routes for load balancing or setting up alternative paths to direct network traffic when the best route can no longer perform its tasks

  - Allows a system administrator to define multiple default gateways

- A set of APIs provided by Fast Response Cache Architecture (FRCA) enables e-business applications to cache data such as Web content in the Network Buffer Cache (NBC), significantly reducing the path length and increasing the performance of the application.

- The Virtual IP Address (VIPA) function allows system administrators to define a virtual IP address for a host and, from a TCP connection standpoint, decouple the IP address associated with physical interfaces.

- Dynamic Feedback Protocol (DFP) is a way to provide load statistics to a load manager so that load can be balanced by sending future connections to available servers.

- Sendmail Version 8.11 improves performance by having multiple queues, memory-buffered pseudo-files, and more control over resolver time-outs.

- TCP/IP performance over congested networks is improved through increased initial windows, explicit congestion notification, and limited transmit mechanism functions, which are configurable by a system administrator.

- TCP splicing helps push the data-relaying function of a proxy application (from server-side socket to the client-side socket or vice versa) into the kernel.

- Network Interface Takeover is a new option allowing the configuration of multiple adapters, including IBM 10/100 Mbps Ethernet PCI adapter, Gigabit Ethernet-SX PCI adapter, and 10/100/1000 Base-T Ethernet PCI adapter, allowing one or more to be designated as a backup.

- New libpcap APIs help enhance the robustness and ease of use in gathering network traffic data to improve problem determination for network applications.

- Token-Ring emulation support for the AIX Multiple-protocol over ATM (MPOA) provides improved management and performance of an ATM LAN Emulation network by combining multiple edge routers into a single router image.

- MPOA IP packet fragmentation support in AIX provides for cases where there is a heterogeneous network environment with varying Maximum Transmit Units (MTUs) and/or where there are network configurations where normal MTU Path Discovery is not available.

- Enhancements to the ATM LANE and MPOA statistics and trace tools are included to gain better serviceability of these products in the field.

- Virtual LAN (VLAN) provides the ability to create virtual LANs across multiple physical LANs or segments and/or divide physical LAN segments into virtual LANs.

- AIX 5.1 adds Gigabit support to Cisco's EtherChannel technology, which builds upon 802.3 Fast Ethernet and standard Ethernet. This enhancement allows the aggregation of up to four Gigabit Ethernet ports.

Reliability, Availability, and Serviceability (RAS)

- A SMIT-configurable mechanism can be used to detect system hangs and initiate preconfigured action.

- Enhancements made to error logging include detection of consecutive duplicate errors, which is intended to help prevent the error log from being overloaded.

- An automatic dump analysis tool enables accelerated customer support with reduced interaction time.

- A new error log retrieval API can be used to retrieve error log data faster, as compared to the errpt raw mode.

- System dump capability has been improved via compression and dump size estimation to ensure that large system dumps are consistent and reliable for easy problem determination.

- New capability is available to generate a core file for an application without requiring application termination. This helps increase the application availability and serviceability.

System and Networking Security

- System Security

  - Native Kerberos V5 KDC Server/Client support

    Network Authentication Service is the IBM implementation of the MIT Kerberos V5 Release 1.1

- Trusted Computing Base available as an optional preinstall feature

- AIX Lightweight Directory Access Protocol (LDAP) Security Audit plug-in

- Pluggable Authentication Mechanism

- SecureWay® Directory Version 3.2.1

• Network Security

- Support of API PKCS#11 Version 2.01.

- Enhancement of the Internet Key Exchange protocol, providing Virtual Private Networking (VPN) support to enable the use of Certificate Revocation Lists (CRL) when authenticating remote users or devices.

- Name resolver routines, which include resolving hostnames through a LDAP server.

Interoperability

• Enhancements to increase affinity with Linux

A set of Linux-compatible routines has been added to AIX 5.1 so that Linux applications using these routines do not have to supply their own libraries.

• AIX Toolbox for Linux Applications, delivered on a supplemental CD, which contains a collection of open source and GNU software built for AIX and packaged in RPM format

These tools provide the basis of a development environment for many Linux application developers. The AIX Toolbox for Linux Applications is not supported by IBM and is provided by IBM "AS IS", under the terms of the licenses on the AIX Toolbox CD or Web site.

• AIX Fast Connect Version 3.1.0 available as a licensed program providing file and print services for Windows™ and OS/2® clients on AIX 5.1

Base Operating System

• NFS statd multithreading can be implemented as a daemon that runs on all NFS-configured machines, providing a simple protocol allowing applications to easily monitor the status of other machines.

• Active paging spaces can be deactivated without rebooting when changing configurations, moving paging space to another drive, or dividing paging space up between drives.

• An optional buckets-based extension of the default memory allocator helps improve performance for applications that issue large numbers of small allocation requests.

• The UNIX System V file spooling subsystem is available as an option, which can be configured by an administrator.

• System V Packaging Commands are available for customers to create and install a package in the System V format.

• AutoFS is enhanced to support the multithreaded automounted daemon.

• The /proc file system provides access to the state of each process and thread in the system.

• The number of concurrent groups per process has been increased from 32 to 64.

• The argument list limit has been increased from 24 K to 512 K.

Storage

• AIX 5.1 includes the implementation of the Data Management Application Programming (DMAPI) as defined in the Open Group's Data Storage Management (XDSM) API specification.

• Volume group logical track group size can be specified at volume group creation time and can be changed to different sizes including 128 K, 256 K, 512 K and 1024 K.

• The mirror write consistency (MWC) helps ensure data consistency on logical volumes in the event of a system crash during mirrored writes. In addition to the existing Active MWC, AIX 5.1 also supports the Passive MWC, resulting in better random write performance on mirrored logical volumes when compared to the Active MWC.

• Logical Volume Manager now has the option to provide hot spare disks within a volume group and automatically synchronize stale partitions to increase availability of mirrored data.

• The Logical Volume Manager provides an ability to move physical partitions to any member disk of the volume group.

Development and Performance Tools

• AIX Developer Kit, Java 2 Technology Edition, Version 1.3.0

• Extensible Markup Language (XML) parser for Java, Version 3.1.1

• New, enhanced Performance Analysis Tools

• Performance Toolbox Version 3.0 available as a licensed program

• The new Inventory Scout tool —used to determine the correct components to ship when a Miscellaneous Equipment Specification (MES) upgrade is ordered

• Addition to the existing "pax" archive utility of a new archive format "pax," compatible with the proposed IEEE POSIX 1003.2b standard

• Enhancements to dbx debugging tools, which include full-speed detection of random memory storage and enhancements to the POSIX threads debug library

• Additional administrative tools for throughput statistics, maintenance of database file sparseness after restoration and logging of startup and shutdown utilities

• Enhancements to compiler products, which include exploitation of the 64-bit large datatype model and execution on both 32-bit and 64-bit kernels

The compiler products for AIX are available as licensed programs.

System Management

• Reliable Scalable Cluster Technology (RSCT) provides the capability for an administrator to monitor system resources, including filesystems, programs, processors, adapters, and kernel information. These resources can be monitored around the clock and automatic responses run if resource values reach certain levels or thresholds.

- Web-based System Manager

  - Presents a significant advance over previous releases by providing a new management console capable of managing multiple hosts

  - Allows applications to be accessed either locally or remotely without a Web browser on AIX 5.1 graphical workstations

  - Adds capability to run a Windows-PC client natively

- A set of Web-based System Manager plug-ins

- Accessibility enhancement to make Web-based System Manager easier to use for all users

- Additional ISO8859-15 locales on the code set so that certain countries that are not part of the European Monetary Union (EMU) can still conduct business with EMU countries

- Hindi character enablement, which permits entering, viewing, and printing

- Additional locales

- Enhancements to the Input Method Editor for the GBK locale

- Korean 103 keyboard support

Graphics Enhancements

OpenGL on POWER GXT4000P and GXT6000P graphics adapters will now support 64-bit direct window access (DWA). This is intended to boost performance for 64-bit OpenGL applications by allowing them to render using the OpenGL protocol directly, rather than going through the Xserver and GLX Extension.

New System Support

- pSeries 620 Model 6F1 Server
- pSeries 660 Model 6H1 Server

AIX 5.1 has been enhanced to provide support for up to 32-way SMP scalability and 256 GB memory.

New I/O Support

- POWER GXT4000P Entry, 3D 64-Bit PCI Graphics Accelerator

- POWER GXT6000P Mid-Range, 3D 64-Bit PCI Graphics Accelerator with onboard geometry engine

- 4.7 GB SCSI-2 DVD-RAM Drive, including mksysb function

Tivoli® -Ready

In support of developing systems management standards, Tivoli Management Agent is installed from the base operating system, making AIX Tivoli-ready.

Euro Currency

This program is EuroReady.

Statement of Direction

AIX 5.1 Support on SP System

AIX 5L Version 5.1 is not supported on the RS/6000 SP System at this time.

IBM intends to support AIX 5L Version 5.1 on the RS/6000 SP in the future with the next revision of its:

- Parallel Systems Support Programs (PSSP)
- General Parallel File System (GPFS)
- High-Availability Cluster Multi-Processing (HACMP)
- High-Availability Geographic Mirror (HAGEO/GeoRM)
- LoadLeveler®
- Engineering Scientific Subroutine Library (ESSL)
- Parallel ESSL
- Parallel Environment (PE) products

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objective only.

Cluster System Management

IBM plans to make available a cluster systems management functional offering during 3Q2001 from the IBM alphaWorks Web site at http://alphaworks.ibm.com as an Initial Technology Release.

The planned offering will introduce a rich set of distributed systems management functionality on AIX that includes the ability to:

- Form a domain of AIX machines into a cluster of "nodes" for management and monitoring. Node groups can be created from sets of machines inside this domain for managing at a more granular level. This domain of AIX machines can be managed from a single point of control (which is any AIX machine designated by the administrator to be the management server).

- Run commands across nodes or node groups in this domain and gather output from these commands.

- Monitor across the nodes in the domain for node status and monitor resources on each node such as programs, CPU, memory, filesystems, processors, and adapters.

  These resources can be monitored around the clock and automatic responses run if the values of resources reach certain levels or thresholds. The automated responses include running any command or script (for example a user-provided pager command or a recovery script), broadcasting a message, sending e-mail, or logging the event to a file. Different responses can be run based on time of day and whether a particular problem occurred or has been resolved.

- Synchronize and replicate files across multiple nodes by editing files in one spot — on the management server.

- For this Technology Release, IBM plans to test the systems management cluster software to scale up to 32 machines. The software is architected to scale well beyond 32 nodes. IBM plans to make this larger scalability available in subsequent releases.

This is a release of IBM software that has been tested but has not yet met IBM product criteria for customer production environments. IBM plans to provide this offering to customers to enable application development

and testing in preproduction environments. IBM does not recommend use of this initial technology in customer production environments. IBM does not plan to provide support for the code and plans to provide it "AS IS," under the terms of the license provided with the code at the alphaWorks site.

These statements represent the current intentions of IBM. IBM development plans are subject to change or withdrawal without further notice. Any reliance on this Statement of General Direction is at the relying party's sole risk and will not create any liability or obligation for IBM.

Reference Information

Refer to Hardware Announcement 101-100, dated April 17, 2001 (IBM @server pSeries 620 Model 6F1 Brings Faster 64-bit Computing to 6-Way Deskside Servers)

Refer to Hardware Announcement 101-101, dated April 17, 2001 (IBM @server pSeries 660 Model 6H1 Brings Enhanced Performance to 64-bit, Mid-Range Rack SMP Servers)

Refer to Hardware Announcement 100-289, dated October 3, 2000 (IBM RS/6000 POWER GXT6000P and GXT4000P Graphics Accelerators Designed To Deliver Improved Performance)

Refer to Software Announcement 201-093, dated April 17, 2001 (IBM Performance Toolbox V3 — Obtain and Analyze System Data; IBM Fast Connect Version 3.1 —Enhanced Systems Management)

Refer to Software Announcement 201-092, dated April 17, 2001 (IBM AIX 5L for POWER Version 5.1 Expansion Pack and Bonus Pack Provide New Programs)

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